Practical Implementation Strategies

Local Planning & Design for Active Transportation
Outline

- Introduction
- Local Planning
  - Pedestrian Environments
  - Bicycling & Non-Motorized Systems
- “Intermodal” Examples
3 Popular Planning Myths

…and how to dispel them
We don’t have time to do it right.

(But we will have time to do it over.)

Planning Myths
We need to finish this plan once and for all.

Planning Myths
Planning is iterative...

...it is never finished or complete.
Never start planning or design until you know for sure you have the money to build the project.
Money comes to plans...

...much faster than plans come to money.
Terms and Concepts

- Trip purpose
- Travel mode
Typical Urban Trip Purpose Distribution

- **HBW** = Home-Based Work (Commuting)
- **HBO** = Home-Based Other (Shopping, Recreation, “Mommy 500”)
- **NHB** = Mid-Day Trips, Deliveries, Work Trips, Other
Mode Share* – Typical Small City

- Personal Vehicles: 93%
- Transit: 1%
- Pedestrian: 5%
- Bicycle: 1%

* % of trips
Mode Share* – Boulder

- **Personal Vehicles**: 61% of trips
- **Transit**: 6% of trips
- **Pedestrian**: 19% of trips
- **Bicycle**: 14% of trips

* % of trips
# Three Car Family

<table>
<thead>
<tr>
<th></th>
<th>Mom</th>
<th>Dad</th>
<th>Daughter</th>
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<tr>
<td>Sunday</td>
<td>varies</td>
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## Two Car Family

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<td>SOV</td>
<td>Bike</td>
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<td>Transit</td>
<td>SOV</td>
</tr>
<tr>
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<td>SOV</td>
<td>SOV</td>
<td>Bike</td>
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<tr>
<td>Friday</td>
<td>Bike</td>
<td>Transit</td>
<td>SOV</td>
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<tr>
<td>Saturday</td>
<td>--</td>
<td>SOV</td>
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<tr>
<td>Sunday</td>
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Local Planning

- Pedestrian Environments
- Bicycle & Non-Motorized Networks
Pedestrian Environments

- What are pedestrians?
- Types of pedestrians
- Types of pedestrian environments
- Setting clear priorities
- Distinguishing urban from suburban design
- Understanding the crossings challenge
- Safe routes to school
Types of Walking

- Rambling
- Utilitarian Walking
- Strolling, Lingering
- Promenading
- Special Events
The Pedestrian Environment
The Street Room
Elements of the Street

1. Street Wall
2. Pedestrian Realm
3. Overhead Area
4. Vehicle Realm
5. Subsurface Area
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Characteristics of Street Elements

1. Street Wall

Characteristics:
- Height
- Building Articulation
- Entry Frequency
- Urban Scale
- Transparency/Glazing
- Canopies & Arcades
Characteristics of Street Elements

2. Pedestrian Realm

Characteristics:

- Cross Section
- Canopies & Arcades
- Amenities
- Crosswalks
- Street Trees
3. Overhead Area

Characteristics:

- Utilities
- Street Trees
- Lighting
- Canopies & Arcades
Characteristics of Street Elements

4. Vehicle Realm

Characteristics:

- Number of Lanes
- Lane Width
- On-Street Parking
- Traffic Volume
- Traffic Speed
- Traffic Control Systems
Characteristics of Street Elements

5. Subsurface Area

Characteristics:

- Storm Water Drainage
- Utilities
Street System

1. Street Vehicles
2. Bike Lanes
3. Sidewalks
4. Drainage
5. Buses
6. Utilities
7. Signals
8. Safety
9. Parkways
10. Landscaped Medians

Street System Components:
- Electric Driveaway
- Gas
- Phone
- Storm Sewer
- Water
- 2 Bike Lanes
- Cable
- 4D Rainage
- 1 Street Vehicles
- 8 Safety
- 9 Parkways
- 5 Buses
- 3 Sidewalks

Additional Features:
- Irrigation
- Cable
- Electric Ducts
- Bus System
- Storm Sewer
- Water
Urban Scale

Urban Design Concepts
Height to Width Ratio

X:Y

Height

Width
Urban Scale

Sun Angle = 66°

3:2 Height to Width Ratio
Urban Scale

Sun Angle = 45°

1:1 Height to Width Ratio
Urban Scale

Sun Angle = 33°

1:2 Height to Width Ratio
Urban Scale

Sun Angle = 22°

1:4 Height to Width Ratio
Urban Scale

Sun Angle = xx°

1:5 Height to Width Ratio
Pedestrian Environments

“Pedestrian Friendly”
Pedestrian Environment Continuum

- Pedestrian Place/District
- Pedestrian Supportive Environment
- Pedestrian Tolerant Environment
- Pedestrian Intolerant Environment
Pedestrian Place/District

- Mixed use with retail
- Gathering place – identifiable as a PLACE
- Significant pedestrian presence
- Motor vehicles present, do not dominate
- Supportive transportation required (parking, transit, bike)
Pedestrian Supportive

- Mixed use including residential
- May include gathering PLACES
- Pedestrians present at busy times
- Motor vehicles present, do not dominate
Pedestrian Tolerant

- All land uses except freeway & certain special uses (airport runway, garbage dump, etc.)
- Utilitarian walking & rambling only
- Motor vehicles present, may tend to dominate
Pedestrian Intolerant

- Any land use
- Little or no walking
- Motor vehicles dominate
- Unsafe, unpleasant
Walk Environments and Types of Walking

- **Pedestrian Place**
- **Pedestrian Supportive**
- **Pedestrian Tolerant**
- **Pedestrian Intolerant**

Types of Walking:
- **Utilitarian Walking**
- **Rambling**
- **Strolling, Lingering, Promenade, Special Events**
Practical Pedestrian Strategies

- Adopt “complete streets” design standards
  - Private development
  - Public works projects (context sensitive)
- Apply concurrency/adequate public facility requirements to development projects
- Designate “safe routes to school”
- Focus public investment in high priority pedestrian districts and school routes
- Get serious about maintenance
Setting Priorities

Practical Implementation Strategies
Real-World Pedestrian Structure
(Nodes and Corridors)
Complete Streets – Design Standards

Practical Implementation Strategies
A ITE Proposed Recommended Practice

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities

Institute of Transportation Engineers
Design Reflecting Context
Pedestrian & Streetscape Guide

Sponsored by the Georgia Department of Transportation

September 2003
Prepared by: Otak, Inc.
Top 3 Pedestrian Design Issues

1. Continuous sidewalks – both sides of street
2. Street crossings
   - Shorten crossings
   - Slow traffic
3. Modern curb ramps
1. Continuous Sidewalks
Sidewalks should be on both sides of the street and continuous
2. Street Crossings
Pedestrian Survival Rates – Vehicle Speeds

% survive

<table>
<thead>
<tr>
<th>Speed</th>
<th>20mph</th>
<th>30mph</th>
<th>40mph</th>
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<tr>
<td>100%</td>
<td>95%</td>
<td>55%</td>
<td>15%</td>
</tr>
<tr>
<td>50%</td>
<td>5%</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>0%</td>
<td></td>
<td></td>
<td>85%</td>
</tr>
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</table>

% die

Charlier Associates, Inc.
Keep Turning Radii Tight
Crosswalks are pushed back
Effect of large radius on crosswalk:

- Additional area to cross
- Higher speed turns

Additional area to cross
+ Higher speed turns

Bend OR
3. Modern Curb Ramps
Pair of perpendicular curb ramps with curb extensions and on-street parking

Pair of perpendicular curb ramps aligning with crosswalks
Bicycle & Non-Motorized Systems

Practical Implementation Strategies
Practical Non-Motorized Strategies

- Build a spine route – an iconic corridor
- Formally approve parallel redundancy
- Designate primary & secondary bike corridors and prioritize public spending
- Map missing links
- Create route IDs for primary corridors
- Take advantage of modern design
- Consider road diets
- Get serious about maintenance
- Use the Web to map/promote bicycling
Build a Spine Route
(Iconic Corridor)

Practical Implementation Strategies
Formally Approve Parallel Redundancy

Practical Implementation Strategies
“Type A” Cyclist:
• comfortable in traffic
• prefers direct but safe routes
• rides with or without bicycle facilities present

“Type B/C” Cyclist:
• less skilled adults and children
• intimidated by traffic
• prefer designated facilities (bike lanes and multi-use paths)
Designate Primary & Secondary Corridors & Prioritize Funding

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Boulder Transportation Master Plan
Previously Proposed Facilities

- 421 miles off-road paths
- 0 miles on-street bicycle lanes
- 0 miles paved shoulders
Importance of Network Connectivity:

• distance and safety impediments are the major obstacles to overcome

• facility type may change based upon context

• transitions need to be seamless
Primary Corridor System

- 164 miles off-road paths
- 67 miles on-street bicycle lanes
- 18 miles paved shoulders
Map Missing Links

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pathway users focus group
Create IDs for Primary Corridors

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Apply Modern Design

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Paved Shoulders, Pathways or Bike Lanes?

- AASHTO & MUTCD guidelines
- Drop or dash bike lane striping in advance of intersections
- Position bike lanes to left of right-turning vehicular lanes
Consider Road Diets

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“Road Diet”

Crash Studies: Vehicle-Vehicle
Crash frequency: Road diets: 6% lower

Crash severity: No difference

Crash type:
- Road diets had a higher percentage of angle crashes
- Road diets had a lower percentage of rear-end crashes

Source: HSIS, FHWA
University Place, WA
Bridgeport Way: 5-lane to 4-lane

Results
The City has analyzed speed, accident, and economic development data collected before and after the construction of the Bridgeport Way improvements between 35th and 40th Streets. The project’s traffic calming features reduced speeds and crashes while increasing business activity. Average speed decreased by 13 percent and traffic accidents were reduced by 60 percent (see table below).

<table>
<thead>
<tr>
<th>Safety Measures</th>
<th>Before</th>
<th>After</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posted Speed Limit</td>
<td>6 km/h (35 mi/h)</td>
<td>56 km/h (35 mi/h)</td>
<td>Same</td>
</tr>
<tr>
<td>Average Actual Speed</td>
<td>1 km/h (37.6 mi/h)</td>
<td>52 km/h (32.6 mi/h)</td>
<td>-13 %</td>
</tr>
<tr>
<td>Average Annual Crashes</td>
<td>19</td>
<td>8 (first year)</td>
<td>-60 %</td>
</tr>
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Table 1. Data from before and after the Bridgeport Way redesign.

Source: PEDSAFE
## "Road Diets" Capacity Comparisons

### Lane Reductions of Select Street Conversions -- Volume Changes

<table>
<thead>
<tr>
<th>Roadway Section</th>
<th>Change</th>
<th>ADT (Before)</th>
<th>ADT (After)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lake Washington Blvd., Kirkland, Washington South of 83</td>
<td>4 lanes to 2 + TWLTL + bike lanes</td>
<td>23,000</td>
<td>25,913</td>
<td></td>
</tr>
<tr>
<td>2. Lake Washington Blvd, Kirkland, Washington Near downtown</td>
<td>4 lanes to 2 + TWLTL + bike lanes</td>
<td>11,000</td>
<td>12,610</td>
<td></td>
</tr>
<tr>
<td>3. Electric Avenue, Lewistown, Pennsylvania</td>
<td>4 lanes to 2 + TWLTL + bike lanes</td>
<td>13,000</td>
<td>14,500</td>
<td></td>
</tr>
<tr>
<td>4. Burcham Road, East Lansing, Michigan</td>
<td>4 lanes to 2 + TWLTL + bike lanes</td>
<td>11-14,000</td>
<td>11-14,000</td>
<td></td>
</tr>
<tr>
<td>5. Grand River Boulevard, East Lansing, Michigan</td>
<td>4 lanes to 2 + TWLTL + bike lanes</td>
<td>23,000</td>
<td>23,000</td>
<td></td>
</tr>
<tr>
<td>6. St. George Street, Toronto, Ontario, Canada</td>
<td>4 lanes to 2 + bike lanes + wide sidewalks</td>
<td>15,000</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td>7. 120th Avenue, NE Bellevue, Washington</td>
<td>4 lanes to 2 + TWLTL</td>
<td>16,900</td>
<td>16,900</td>
<td></td>
</tr>
<tr>
<td>8. Montana (commercial street) Bellevue, Washington</td>
<td>4 lanes to 2 lanes + TWLTL</td>
<td>18,500</td>
<td>18,500</td>
<td></td>
</tr>
<tr>
<td>9. Main Street Santa Monica, California</td>
<td>4 lanes to 2 lanes + TWLTL</td>
<td>20,000</td>
<td>18,000</td>
<td></td>
</tr>
</tbody>
</table>

Source: Walkable Communities Inc.
Iowa DOT

4-lane to 3-lane Conversions

Roads with less than 20,000 vehicles per day:

- 20%-30% reduction in crashes (due to reduced conflict points and improved sight distance)
- More user friendly to elderly drivers
- LOS remained the same (intersection delay increased from 6.2 sec/veh to 6.7 sec/veh)
- Improved emergency response time
- Improved pedestrian safety

Source: Transportation Research Board
Get Serious About Maintenance

Practical Implementation Strategies
Maintenance

- Spot improvement program
  - Standard reporting and responsibility assignment

- On-street facility maintenance
  - Sweep right hand edges
  - Maintain drainage grates

- Off-street facility maintenance
  - Remove loose material from pathway surface
  - Fix rough surfaces and post warning signs

- Prioritize snow removal
An “Intermodal” Example

Practical Implementation Strategies
Pearl Street “Pedestrian Mall”

- 8th
- 9th
- 10th
- 11th
- Broadway
- 13th
- 14th
- 15th
- 16th
- 17th
- 18th
- 19th

- Pine
- Spruce
- Pearl
- Walnut
- Canyon

Pedestrian Mall
- Parking Structures
- Parking Structure with Transit

Downtown Loop
- Transit Routes
- Bike Facilities
Boulder’s “pedestrian mall” works because …
... it is an integral part of an intermodal system