DANGER AHEAD
FASTEN SAFETY BELTS
AND REMOVE DENTURES

GEVAAR VOOR
MAAK GORDELS VAST
EN VERWYDER KUNSTANDE
roadside trees = bad trees?
Presentation Outline

- City Trees & DOTs – traditions/standards
- Parking
- City Trees and Safety
- Design Opportunities
Clear Zone (U.S. policy): Class 1- Least Risk

Solution to run-off-the-road crashes, auto damage & driver injury

forgiving roadside
Class 7: Highest Risk
Big Road

Drive Fast
Streets Focused on Vehicles

need people space, and multi-modal mobility
Walkable Communities & Health
Walkable Neighborhoods
Presentation Outline

- City Trees & DOTs – traditions/standards
- Parking
- City Trees and Safety
- Design Solutions
trees make cities pretty . . . .

More than beauty . . .

environment, economics, social benefits
Tree Values & Benefits

- Ecosystem / Environmental Services
- Community Economic Development
- Human Health & Social Benefits

so much more than aesthetics!
TN urban land cover :: residential 24% :: transportation 25%
Hilton Head, South Carolina
Parking Demand Ratios

- used to size parking lots
- specify # of parking spaces per building floor area
- varies by land use
- often designed to meet peak demand
- high vacancy rates (36% in Sacramento study)
Safe Urban Form

Revisiting the Relationship Between Community Design and Traffic Safety

Eric Dumbaugh, Ph.D.
Assistant Professor
Program Coordinator, Graduate Certificate in Transportation Planning
Texas A&M University
Focused Parking Requirements

• What are the effects on site development?

<table>
<thead>
<tr>
<th>Use</th>
<th>Floor Area</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Building</td>
<td>250 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Personal Service Shop</td>
<td>250 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Priv. School or Comm. Studio</td>
<td>100 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Retail Sales &amp; Service: C-1</td>
<td>250 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>350 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>250 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Restaurant (w/o drive-through)</td>
<td>65 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Restaurant (w/ drive-through)</td>
<td>100 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Rooming/Boarding House</td>
<td>Person</td>
<td>1.0</td>
</tr>
<tr>
<td>Sales Display</td>
<td>250 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Single-family Dwelling</td>
<td>DU</td>
<td>2.0</td>
</tr>
<tr>
<td>Shopping Center** C-1</td>
<td>250 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Shopping Center** C-2</td>
<td>350 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Shopping Center** C-3</td>
<td>250 s.f.</td>
<td>1.0</td>
</tr>
<tr>
<td>Townhouse</td>
<td>DU</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Example 1: Urban Building/Compact Units

- 50 sf x 100 sf = 5000 sf footprint
- 5 stories = 25,000 sf
- 1 space per 250 sf = 100 parking spaces
- Stall = 9x20 = 180 sf
- Min area = 18,000 sf
- Aisles and stall reqmt’s – typically require same area as parking
- Parking area = 36,000 sf
- Area = 0.83 acres.
- Equivalency is the area of 8 of the shown buildings
Example 2: What about the Louvre?

- 3 million sf
- 12,000 parking spaces
- 4.3 million sf parking + aisles
- 100 acres of parking
What if the Louvre met conventional parking standards in the US?
Presentation Outline

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Trees and Transportation

Transportation systems have traditionally been designed for traffic mobility and driver safety. Road systems and roadsides are now being designed to address a variety of other functions, including aesthetic, environmental, and community interests.

Context Sensitive Design is a new approach in transportation planning that recognizes community values. Road vegetation and green spaces are often valued for transportation corridors. The studies below are informed by public values regarding trees and vegetation in vehicular use areas.

Studies

Urban Trees and Traffic Safety

Across our nation, transportation policy and practices regarding urban livability of cities and towns. Professed reasons of driver safety and being removed or precluded in commercial streetscapes and along investigating the scientific basis of no-tree transportation policy. Analyzing the circumstances and attributes of tree collisions in urban trees can be designed into streetscapes more safely. (See bottom of page.)

www.naturewithin.info
Problem!

Drivers run off the road and crash into trees

national crash data analysis for 2002

research funding: USDA Forest Service; NUCFAC
Distribution of Crashes

Total 2002 motor vehicle crashes: 6,316,000
Collisions with trees - 1.9% (120,000 per year)
Injury Comparison

All accidents

- No injury: 61%
- Possible injury: 14%
- Non-incapacitating injury: 12%
- Incapacitating injury: 12%
- Fatality: 1%

Trees only

- No injury: 29%
- Possible injury: 10%
- Non-incapacitating injury: 15%
- Incapacitating injury: 40%
- Fatality: 6%
Speed Comparison

- All crashes
- Trees only
Urban/Rural Crash Rates

![Graph showing urban and rural crash rates in 2001 traffic data. The graph plots location (rural vs. urban) on the x-axis and percent on the y-axis. Two lines are shown: one for miles traveled and one for crashes. The miles traveled line is green and decreasing from rural to urban, while the crashes line is red and increasing from rural to urban.]
## U.S. traffic accident rates in 2002

<table>
<thead>
<tr>
<th></th>
<th>U.S. Total</th>
<th>Tree Accidents</th>
<th>Urban Accidents</th>
<th>Urban Tree Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Accidents</td>
<td>*6,316,000</td>
<td>1.9%</td>
<td>37%</td>
<td>0.7%</td>
</tr>
<tr>
<td></td>
<td>(100%)</td>
<td>*141,000 (2.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incapacitating</td>
<td></td>
<td>0.9%</td>
<td>4.1%</td>
<td>0.04%</td>
</tr>
<tr>
<td>Injury and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatality</td>
<td>1.2%</td>
<td>0.1%</td>
<td>0.4%</td>
<td>&lt; 0.001%</td>
</tr>
<tr>
<td></td>
<td>*43,005 (0.6%)</td>
<td>*3,258 (&lt; 0.001%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* NHTSA (2004) - %s may differ due to sampling and analysis procedures

Bratton and Wolf, Trans Research Board, 2005
### Annual Fatality Risks:

M. Norris, Australia ISA, 2005

<table>
<thead>
<tr>
<th>Risk</th>
<th>Individual risk per person per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking (20 cigarettes a day)</td>
<td>1:200</td>
</tr>
<tr>
<td>Cancers from all causes</td>
<td>1:500</td>
</tr>
<tr>
<td>Drinking alcohol</td>
<td>1:2,500</td>
</tr>
<tr>
<td>Travelling by Motor vehicle</td>
<td>1:7,000</td>
</tr>
<tr>
<td>Travelling by Train</td>
<td>1:33,000</td>
</tr>
<tr>
<td>Travelling by Aeroplane</td>
<td>1:100,000</td>
</tr>
<tr>
<td>Fires and accidental burns</td>
<td>1:100,000</td>
</tr>
<tr>
<td>Cataclysmic storms and storm flood</td>
<td>1:5,000,000</td>
</tr>
<tr>
<td>Lightning strike</td>
<td>1:10,000,000</td>
</tr>
<tr>
<td>Meteorite</td>
<td>1:1,000,000,000</td>
</tr>
</tbody>
</table>

*Table 2 Every Day Risks
Source ANSTO (Higson 1989)*
research on risk management
perceived versus actual risk
No sir, I was *not* talking on my cell phone.... I was watching a T.V. show on my iPod....
Behavior & Safe Driving!

• Crashes occur on weekends, late evening hours
• Winding rural roads, vehicle leaves road on outside of curves
• Male traffic fatalities outnumber female 2 to 1
• Drunk driving - about 50% of all traffic fatalities
• Seat belt use reduces risk of death by 42%
• Travel speed exceeds posted speed - about 30% of fatalities

Psychology division in transportation agencies?
Presentation Outline

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- Parking
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- Design Opportunities
the "green book"

AASHTO: policy vs standards

professional interpretation
Streets Focus on High-Speed

poor livability
Why Urban Street Trees Aren’t the Hazard the Traffic Engineer Thinks They Are.

Eric Dumbaugh, Ph.D.
Assistant Professor
Program Coordinator, Graduate Certificate in Transportation Planning
Texas A&M University
Safe Streets

- “traffic calming”
- driving behavior at too high speed

Eric Dumbaugh
Transportation Planning
Texas A&M
Traffic Calming?

- pilot study . . . .
- increased safety perception: urban and suburban
- slower travel speed: suburban

Naderi, Kweon, Maghelal, ITE 2008
Alternative!

Psychological Traffic Calming

“body language of the street”
“mental speedbumps” D. Engwicht

- complete streets
- home zones
Home Zones (Dutch “woonerf”) Integrating the Street into Everyday Life
Home Zones
Traffic Calming
Green Streets
Festival Planning
Play Spaces
Multi-modal Transport
Let’s Complete America’s Streets!

The streets of our cities and towns ought to be for everyone, whether young or old, motorist or bicyclist, walker or wheelchair user, bus rider or shopkeeper. But too many of our streets are designed only for speeding cars, or worse, creeping traffic jams. They’re unsafe for people on foot or bike — and unpleasant for everybody.

Now, in communities across the country, a movement is growing to complete the streets. States, cities and towns are asking their planners, engineers and designers to build road networks that welcome all citizens.

Complete Streets Bill passed in Illinois!
The Complete Streets law requires that bicycle and pedestrian ways be established in the planning and construction of all state transportation projects.

Get the latest Complete Streets News!
Overview article from On Common Ground Magazine
Elements of Complete Streets Policies
Frequently Asked Questions
Thunderhead Alliance’s Complete Streets Page
Groups Working for Complete Streets
Complete Streets brochure pdf or html
Join the Coalition!
Donate!

Click here to view a short slide show on why we need complete streets.
Complete the Streets!
cars/pedestrians/bikes

multi-modal systems
Context Sensitive Solutions
national & state policy – U.S.

Barracks Row

8th Street Barracks Row, a 3/4 mile, 6 block stretch between Pennsylvania Avenue and M Street SE, is one of the District’s oldest commercial corridors. 8th Street’s turn of the century buildings give the street charm and character, but over the years the commercial strip had experienced economic decline. Vacant storefronts and loitering added to the perception that 8th Street was an unsafe place to be and shop after dark. Merchants complained that there was inadequate public parking. And time...
Context Sensitive Solutions

case study: Barracks Row, WA DC
Context Sensitive Solutions

case study: Barracks Row, WA DC
Goals for Roadside Trees?

- Common Transportation Perception: trees & landscape enhance beauty
- Evolving Understanding: green streets offer environmental, economic, and social benefits
- Do not compromise Safety! Reasonable Risk?
- Engineering, landscape, and tree professionals working together
Urban Streets Guidelines - 2008 –

crash stats
best practices
(what is, not what could be)

still has a “clear zone” bias
Context Sensitive Solutions

U.S. national & state policy
e.g. 2006, Institute of Transportation Engineers

- Acknowledge & integrate community values
- Documentation of public process limits liability
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