Smart Transportation

*It’s All About Building the Communities We Desire*

Norman W. Garrick
University of Connecticut
Cities afraid of death by congestion

Extra-wide freeways are among ideas to keep traffic and local economies moving smoothly in future

By Larry Copeland
USA TODAY

A plan to widen part of Interstate 10 in Houston and Phoenix from 14 lanes to 24 is the USA's latest giant superhighway proposal designed to ease the kind of gridlock that some planners say could stunt economic growth.

For a 2-mile stretch between U.S. 60 in Tempe and State Route 143, the interstate would have six general-purpose lanes, two carpool lanes and four lanes for local traffic in each direction. Work on the first phase, which planners expect to cost about $350 million, could begin by 2011.

Political and business leaders in metro areas increasingly view traffic congestion as hurting their ability to compete with other regions for new businesses and young professionals.
A proposed expansion of a stretch of traffic-clogged Interstate 10 in the Phoenix area would widen the highway’s right of way to about 400 feet, according to federal highway guidelines.

Two Boeing 747-400s side by side
422 feet, 10 inches wide

12 lanes

12 lanes

400 feet

Football field (including end zones)
360 feet long

Sources: Arizona Department of Transportation, U.S. Department of Transportation and Boeing

By Karl Geles, USA TODAY
What do we know about Phoenix and Atlanta?
Let's see...
Urban Density, 1995 (Persons/Ha)

Source: Institute for Sustainability and Technology Policy, Murdoch University
Public Transport Boardings per Person, 1995

Source: Institute for Sustainability and Technology Policy, Murdoch University
Length of Freeway per Capita, 1995 (metres)

Source: Institute for Sustainability and Technology Policy, Murdoch University
We're #1
Private Passenger Transport Energy Use per Person, 1995

Source: Institute for Sustainability and Technology Policy, Murdoch University
Indianapolis
How Indianapolis Commutes?

Car: 91%
Public Transit: 3%
Walk: 2%
Bike: 0.3%
Length of Freeway per Capita, 1995 (metres)

Source: Institute for Sustainability and Technology Policy, Murdoch University
Private Passenger Transport Energy Use per Person, 1995

Source: Institute for Sustainability and Technology Policy, Murdoch University
Bloomington
How Bloomington Commutes?

<table>
<thead>
<tr>
<th>Mode</th>
<th>1990</th>
<th>2000</th>
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<tbody>
<tr>
<td>Car</td>
<td>74 %</td>
<td>76 %</td>
</tr>
<tr>
<td>Public Transit</td>
<td>4 %</td>
<td>3 %</td>
</tr>
<tr>
<td>Walk</td>
<td>17 %</td>
<td>15 %</td>
</tr>
<tr>
<td>Bike</td>
<td>2 %</td>
<td>3 %</td>
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Bloomington Commuting Time

Commuting Time 1990 and 2000

- 9 to 14
- 15 to 25
- 25 to 45
- > 45

Bloomington 1990
Bloomington 2000
Congestion is important to address but...

1. We can’t continue to go on as if congestion is all that matters to our towns and cities

2. In addressing congestion we can’t keep doing the same old things and then turn around and expect a different result
We have tried this experiment for the last 60 years... time to move on

Too much space
Not enough capacity
Too much noise
Too much dirt
Too ugly
Cause climate change
Deplete resources
Moving On
We need to get out of This Cycle of Waste...

Auto dependency makes sprawl possible
Auto dependency saps the life from cities

Sprawl makes auto necessary
Transit non-competitive
Walking and biking impractical

Auto - dependency

Sprawl Urban Decay
And replace it by a Smart Transportation Cycle

Transit is form giver and rejuvenator
Walking and Biking add life and energy

Strong, Vibrant Communities

Smart Transportation

Concentrated land use and attractive places: more access, more choices, more competitive transit, more people choose to walk and bike
Let's Get Smart
Lewis Mumford

Transportation Private Eye
What is transportation for?

Lewis Mumford, *The Highway and the City*
A good transportation system minimizes unnecessary transportation

Lewis Mumford, The Highway and the City
In other words ...

A good transportation system provides **more access with less mobility**
Smart Transportation supports Strong, Vibrant, Healthy Communities by Focusing on Access not Mobility
The Elements of 

**Smart Transportation Planning**

1. Use **broadly defined goals** embracing economic, social and environmental outcomes
2. Plan for **desired outcomes**, not continuation of past trends
3. Develop solutions **maximizing access**, not mobility
4. Give **priority treatment** to the cheaper, cleaner, more **efficient mode** of travel
5. Provide a **diversity of modes** so as to meet different needs and context
Getting Smart Transportation

Some American Experiences

1. Portland, OR
2. Arlington, VA
3. Cambridge, MA
4. Davis, CA
Portland, OR
Transportation for Placemaking
The Willamette Valley Choices for the Future - 1972 -
Scenario Planning for Portland

Planning based on considering the impacts of different land use and transportation choices and working to achieve the desired outcome

Taking control - not being controlled by ‘fear of death by congestion’
The Two Scenarios

Scenario I
Continue Current Trends

Scenario II
Higher density urban development
Development decisions that emphasize environmental concerns
Scenario I
Prediction for The Willamette Valley in 2002

Continue current trends

✓ increased suburban sprawl
✓ reductions in farmland
✓ greater dependence on automobiles
✓ reduced access to parks and open space
✓ increased air, water, and noise pollution
✓ less diverse economy (including declines in rural and forest economies)
Scenario II
Prediction for The Willamette Valley in 2002

Higher density guided by environmental concerns

✓ comprehensively planned growth
✓ rejuvenation of inner cities
✓ preservation of farmlands
✓ increased use of mass transit
✓ increased access to parks and open space
✓ decreases in air, water, and noise pollution
✓ a vital and diverse economy
Portland’s experience with smart transportation planning has been an unqualified success.
Portland is one of only two large cities (the other is Seattle) that has become substantially less auto-dependent since 1990.
Population and Vehicle Traffic Growth
USA

- VMT
- Population


Percentage: 0%, 20%, 40%
Population and Vehicle Traffic Growth

Portland Metro

- Population
- VMT

Graph showing population and vehicle miles traveled (VMT) growth from 1990 to 2005.
The Max
Transit and Vehicle Traffic Growth
Portland Metro

Transit trips
VMT
Travel by Bicycle
Portland

Bicycle trips to Downtown

Transit trips

VMT

Arlington, VA

From Decaying Suburb to Lively City
In the 1970s, Arlington’s Wilson Blvd. was a decaying, auto-oriented commercial strip when the county was presented with the opportunity of a line with five stops on the new Washington Metro.
The choice offered Arlington was an **above ground** line.

Arlington rejected this choice and elected to use local monies to upgrade to an **underground** line.
From a place making viewpoint the difference is not trivial.

Above ground station in Alexandria.
Intense development around station entrance

Court House Station, Arlington
In choosing this option Arlington showed that it asked the key question...

What is transportation for?
The clear answer

In Arlington

Transportation is for economic development, urban revitalization and sprawl mitigation
But Mumford also said that transportation should

... concentrate the greatest variety of goods and people within a limited area, in order to widen the possibility of choice without making it necessary to travel

Lewis Mumford, The Highway and the City
Clearly Mumsford’s point was well understood as part of smart transportation planning in Arlington.

To facilitate the concentration of goods and people, Arlington implemented an innovative concept called Bullseye Zoning.
The R-B Corridor
The R-B Corridor 1980
Traveling in Arlington

- Transit: 38%
- Walk: 8%
- Drive Alone: 42%

73% of transit users WALK to the station
33% of county’s real estate tax revenue from 8% of land
The numbers demonstrate the extent to which Arlington has grown, but what really sets Arlington apart is not growth but the type of growth.
Compared to any number of high-rise clusters in the surrounding Metro Washington area, Arlington’s Rosslyn-Ballston (R-B) Corridor has energy, life, sense of place, pride of place that is hard to beat.
Cambridge, MA
Making a strong community better
Over the last 10 years or so Cambridge has undertaken an aggressive remake of its transportation system.

To the casual observer, this is most obvious in the form of bicycle lanes, traffic calming and streetscape improvements.
Behind the scenes the changes are even more dramatic (and perhaps more impressive) and represent a whole new way of thinking about transportation.
The impact of these changes on access and travel have been quite dramatic over such a short time period.

The framework for transportation planning in Cambridge is a model that is worth studying.
Transportation Planning in Cambridge is carried out by the

Division of
Environmental and Transportation Planning
Environmental and Transportation Planning is housed within the

Department of Cambridge Community Development

the divisions include

Community Planning
Economic Development
Environmental and Transportation Planning
Housing
Lead-Safe Cambridge
The goal of the Division of Environmental and Transportation Planning

improving the city's quality of life, by protecting the environment and natural resources and by improving the transportation system.
The programs of this office also tell an important story

The programs are

Environmental Planning, including Climate Protection
Roadway, Sidewalk and Path Projects
Traffic Calming
Pedestrian Programs
Bicycle Programs
Parking and Transportation Demand Management
Lead-Safe Cambridge
Regional Planning
This structure is indicative of a holistic approach to transportation planning as an integral component of community.

The changes in travel patterns that have occurred in Cambridge over the last decade demonstrate the success of this approach.
The Changing Cambridge

1990 to 2000

Vehicle Traffic into Cambridge has decreased

Walking, Biking, Transit
51% → 55%

Cars
45% → 40%
Davis, CA

It is not just about bikeways
It is always interesting meeting former Davis residents round the country. You mention that you lived in Davis also and immediately their eyes light up and they wistfully tell you how they miss being able to bike everywhere for their everyday needs.

Davis epitomizes small town America, and a big part of this charm is the bicycles.
Davis is known for bicycles, with good reason. Many people focus on the bicycle lanes and bicycle paths. But part of the story that many are less familiar with is the transportation and land use planning that make biking such a viable option in Davis.
Davis is 10 square miles of urbanity surrounded by farmlands.

There is very little sprawl outside the city limits.

In this way the city is more like a Swiss city rather than an American one.
Davis is a rapidly growing city that has done most of its growing up over the last 40 years. By rights, it should have the sprawling, strip mall pattern typical of this era of city building. It is the city’s planning that prevents this by ensuring that new developments are expansions that are truly integrated into the fabric of the city.
Davis also has a financial agreement with the county that prevents development in the unincorporated land surrounding the city.
It is hard to have high bicycle use without getting the streets right - creating a comfortable and safe street environment for bicyclists. Davis seems to excel on this point.
Three Rules for Streets that Support Livability

1. Good streets function as part of a **complete network** with different types of streets serving different functions.
2. Good streets are **safe and comfortable for all users**.
3. Good streets are **places** **never** just conduits for travel.
1. The Network
James Oglethorpe’s Savannah, GA
The street network serves as the **bones** of the city

The **framework** on which everything else depends
Who is in charge of creating the street network for today’s cities?

Today there is nobody professionally charged with determining what the street network should look like.

We have abandoned this important task to the happenstance of where the highways are routed and the whim of individual developers.
The Evolving Street Network

Adapted from Stephen Marshall, Street Patterns
Dead-worm Subdivision

Long, winding roads that go nowhere.

Delores Hayden, *Field Guide to Sprawl*
Zoomburg

A place growing even faster than a boomburg.

Delores Hayden, Field Guide to Sprawl
(jim Wark, Ariel Photos)
One advantage to this type of street layout is that there is negligible traffic on local streets.

But this benefit comes at a huge cost to the community as a whole.

The same effect can be achieved from a properly designed street network.
Paying the Piper

Inefficient traffic flow

Fractured, formless urban fabric

Monochromatic places and economic arrangements

Walking, biking, transit rendered ineffectual as transportation
Evolving Street Network

Urban Network

Pre-1950’s

Severe Congestion

Post-1950’s

Adapted from Stephen Marshall
The old style street networks worked well because each street was carefully designed for its specific mix of functions.

Primarily residential streets were designed so that they would get relatively little traffic.

Streets differed not only in terms of their cross-section, but also by their location in the network and their continuity.
The Streets of Prenzlauer Berg

Schoenhauser Allee
The main street

Prenzlauer Allee
The second main street

Pappelallee
A neighborhood shopping street

Raumerstrasse
A neighborhood “living room” street

Goehrener Strasse
A residential street
Schoenhauser Allee
The main street
Schoenhauser Allee
The main street
Schoenhauser Allee
The main street
Raumerstrasse
A neighborhood ‘living room’ street
Greigenhagener Strasse
A residential street
2. Street Must Serve all Types of Users
Streets as Integrators

Streets bring together people, places and things

They work best when they integrate rather than segregate different modes of travel

They must tie the city together: they must never be separators
Not all road users are created equal

there is a strong argument for giving priority to non-motorized travelers

Why?
1. They are cheaper to serve
2. They much more efficient
3. They don’t pollute
4. They don’t deplete resources
5. They don’t take up so much space
6. They are not armored
7. They tire more easily
8. They bring life, energy and vitality to cities
Speed is Critical

Impact Speed (mph) vs. % Fatalities

Source: Ashton & Mackay (1979)
Route 195
near Hanks Hill and Flaherty Road

High Speed: 54 mph
Average Speed: 44 mph
Low Speed: 38 mph
South Eagleville Road
near Mansfield Community Center

High Speed: 52 mph
Average Speed: 39 mph
Low Speed: 28 mph
Storrs Road
near Mansfield Town Hall

High Speed: 42 mph
Average Speed: 33 mph
Low Speed: 29 mph
Why the Difference in Speed?

Our study shows that the design of the street and the surroundings have a huge impact on speed.
Contributing Factors

High Speeds

shoulders
no curb
no sidewalks
no trees
large building setback
guide rails

Facility has the features of a ‘road’ or ‘highway’
Contributing Factors

Low Speeds

small setbacks
raised curbs
no shoulders
parking
Small curb radii
Street trees
Median
Urban type fixtures

Facility has the features of a ‘street’ or ‘avenue’ or ‘boulevard’
3. Streets are Places
Streets are Places

Streets are perhaps the most influential civic spaces we have. They are paramount in shaping our sense of place and civic pride. Street design must reflect this reality and create streets that support the needs of a city. The street should serve the city, not the other way around.
Can a street be too Big?
Poundbury
An old - new way of design
Portland, Arlington, Cambridge and Davis are important not for what they are but for what they have accomplished.
The basic principles of smart transportation planning are universal.
The starting place for smart transportation planning is always the same

Understanding the implication of the question...

What is transportation for?