



TAPPAN ZEE BRIDGE/I-287  
ENVIRONMENTAL REVIEW

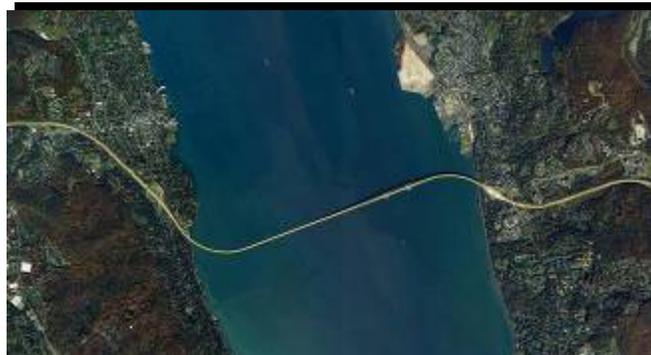
**New York State Department of Transportation  
Metropolitan Transportation Authority Metro-North Railroad  
New York State Thruway Authority**

**Presentation**

***Stakeholders' Advisory Working Groups (SAWGs)  
Land Use SAWG Meeting #3***

***Tappan Zee Bridge/I-287 Corridor  
Environmental Review***

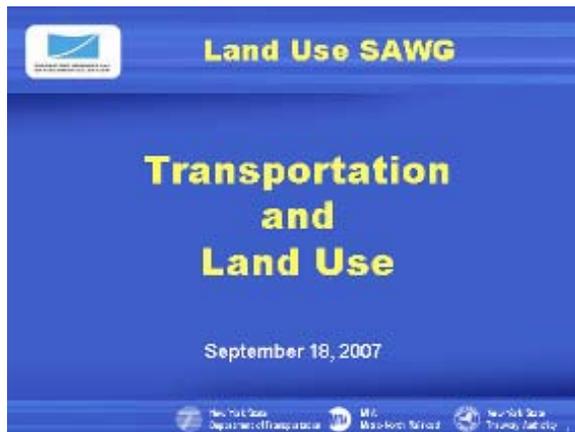
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September 18, 2007

Item 1: Andrew Parker - Land Use and Transportation Planning Concepts Presentation

This presentation presented various economic concepts for managing land development that may be induced by or otherwise occur as a result of new transportation developments (see Slides and Annotations).



**Slide 1**

This presentation provides an overview of the relationship between transportation and land use with regards to the Tappan Zee Bridge/I-287 Environmental Review.



**Slide 2**

This introductory presentation, divided into three parts, begins with a review of current theory on the land use – transportation connection. The presentation will be followed by presentations by two guest speakers: SAWG member Jeff Zupan, of the Regional Plan Association (RPA), who will provide a synopsis of the recent charrette on Transit Oriented Development opportunities sponsored by Rockland Economic Development Corporation (REDC) and the RPA; and Ed Buroughs, Deputy Commissioner of Westchester County Department of Planning, providing a preview of how the county is updating its vision plan, *Patterns*, with a particular focus on TOD opportunities at centers on the county’s rail corridors.



**Slide 3**

The introductory presentation will focus on three topics:

- 1) market forces and urban development patterns;
- 2) growth and congestion and economic policy options, focusing on efficient pricing of highways and land development; and
- 3) a balanced transportation-land use policy emphasizing demand management, higher densities and mixed use development, and the need to limit urban sprawl.



**Slide 4**

The first part of the presentation is Market Forces and Models of Urban Development.



**Slide 5**

The US has seen huge changes in the scale and pattern of urban development. In 1810 only 10% of the US population lived in towns and cities. The US now has 55 times the population, and 80% lives in towns and cities. This shift largely has been made possible because of the advances in technology. We face the prospect of continuing change, innovation, and demographic shifts. In our region, we can see particular changes in the patterns of immigration, the aging population, and rapidly growing areas like Orange County.



## Models of Urban Development

**Primary forces driving urbanization:**

- Key rationale of cities is to economize on transportation costs:
  - Economizing on transportation costs also distributes urban areas around a region
  - Land is so expensive in cities because transportation savings are so valuable
  - Internal economies of scale
- Economic advantages of clustering
  - External economies of scale





### Slide 6

From an economic perspective, there is a generalized “sorting-out” process that determines the location of land uses by their willingness to pay for highly accessible locations. Land in central cities tend to be more expensive because the transportation cost savings have significant value. Another economic efficiency is associated with the advantages of specialized clusters of activity, trade, or industry.



## Models of Urban Development (Cont.)

**Size and regional distribution of cities:**

1. *Central Place Theory* – market-driven hierarchy of cities/towns in a region
2. *Monocentric urban development* – central import/export node, near ports/railroad stations:
  - Land uses tend to be segregated
  - Land values and intensity of development fall with distance from center
  - Most travel is radial
  - Land uses distribute in concentric rings based on transportation costs



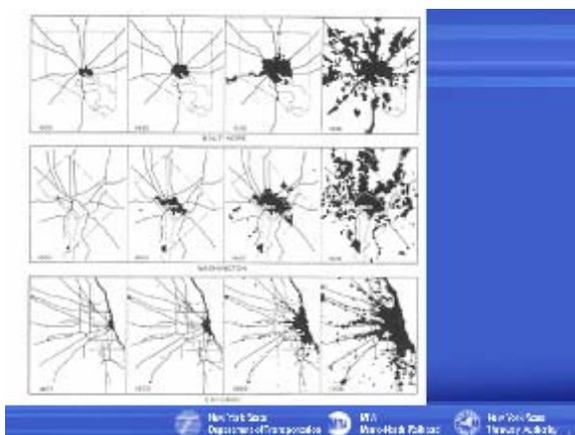


### Slide 7

Three models of urban development are notable for our review:

1. The first model is Walter Christaller’s Central Place Theory of the 1920’s and 1930’s, which provides a very useful abstract of how activities confirm to a hierarchy of places and centers in a region. It is still very relevant in market studies today.

2. The second is the monocentric urban development model, which dominated the 19<sup>th</sup> century and early 20<sup>th</sup> century. During this period cities developed around a central transportation node. Land uses tended to be segregated with land values and development intensities declining as distance from the center increased. As a result land uses were distributed in concentric rings based on transportation costs, with most travel taking place along radial axes.



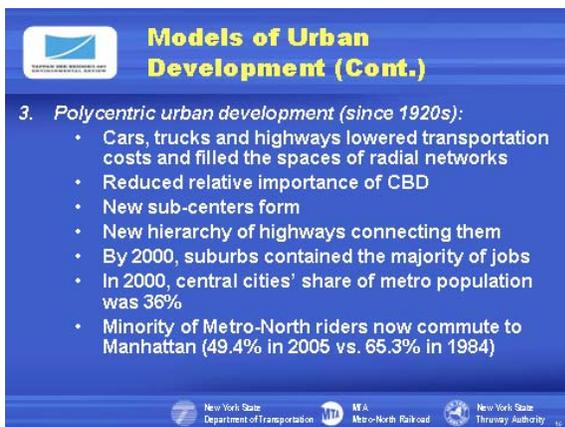
### Slide 8

This slide shows an example of monocentric development patterns in three U.S. cities: Baltimore, Washington, and Chicago. As is shown, the greatest densities were concentrated in the center with additional development occurring along the radial railways that provided access to the center.



**Slide 9**

The radial pattern was used as a planning tool to try to preserve the open spaces between the “fingers” in this famous 1947 plan of Copenhagen, Denmark by Rasmussen.



**Slide 10**

•As the automobile and trucks and the highways that followed came to dominate transportation, transportation costs dropped and the spaces between the radials were filled. This change resulted in polycentric development patterns that have dominated since the 1920s.

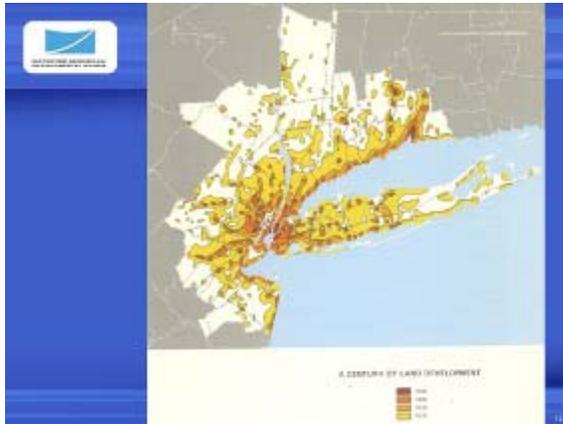
•With this flexibility, new subcenters formed, reducing the relative importance of central cities, and a new hierarchy of highways connected the subcenters.

In the New York City region, by 2000, suburbs contained the majority of jobs and nearly two-thirds of the region’s population. Evidence of this shift can be seen in the travel patterns of Metro-North ridership, where only 49 percent of the trips were commuters to Manhattan in 2005, compared to 65 percent in 1984



**Slide 11**

• This slide shows how Washington DC’s monocentric pattern morphed into a polycentric one by the mid-20<sup>th</sup> century.



**Slide 12**

- A similar pattern has evolved in the New York region, as shown by this slide, which depicts a century of urban development. We should note that another 35 years of development have further absorbed the white spaces on the slide; if we anticipate 35 years into the future, current patterns will likely absorb everything else that is not dedicated parkland.

**Transportation in a Polycentric City**

1. Subcenters grow until growth-induced costs overwhelm the savings from clustering
2. Complex trade-offs make for difficult transportation planning
3. An efficient transportation system experiences congestion
4. No planning model can define optimal size/configuration of land use/transportation in a real urban area

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**Slide 13**

- Four important dynamics of transportation in a polycentric urban region are:
  1. The cycles of development, stasis, and possibly decline, as the costs overwhelm the savings of clustering;
  2. The complex trade-offs in the “sorting-out process” make for a very difficult transportation planning function;
  3. Congestion is a normal feature of an efficient transportation system; and
  4. There exists no fully functioning land use – transportation model capable of defining or predicting optimal patterns of development and transportation.

**Land Use SAWG**

**2. Growth and Congestion: Policy Options**

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**Slide 14**

This section discusses some of the policy tools used to address and manage growth and congestion.



**Transportation and Land Use Policy Options**

1. Efficient pricing of highway transportation
2. Efficient pricing of land development

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**Slide 15**

Growth and congestion are central to our studies. To address them, economists focus especially on two policy options: more efficient pricing of highways and more efficient pricing of land development.



**Pricing of Highways**

- Simple concept – charge tolls that vary by time of day/demand: area cordons or lane tolls
- Additional HOT Lanes proposed for Rockland
- Pricing has more political than technical obstacles

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**Slide 16**

Variable pricing policies are nothing new. We are all familiar with how restaurants have a different price structure for lunch, when demand may be less, than for dinner. By encouraging consumers at lunch they are able to spread their fixed overhead costs over a larger demand pool.

With highways, we want to discourage riders in the peak hours from making unnecessary and discretionary trips, as well as vehicles carrying only single riders. Charging a toll during peak periods can be used to provide more reliable service for essential trips. Pricing can be done as a cordon, which draws an imaginary line around a congested area and charges vehicles for entering that area. This is the approach used in London and now proposed for NYC. Another approach charges to use a specific lane, as in the case of high occupancy toll (HOT) lanes, which charge single-occupant vehicles a fee to use a lane otherwise reserved for high-occupancy vehicles. Such lanes are under consideration in Rockland County as part of this project. Technology exists to allow efficient implementation of these strategies; however, political obstacles have slowed their realization.



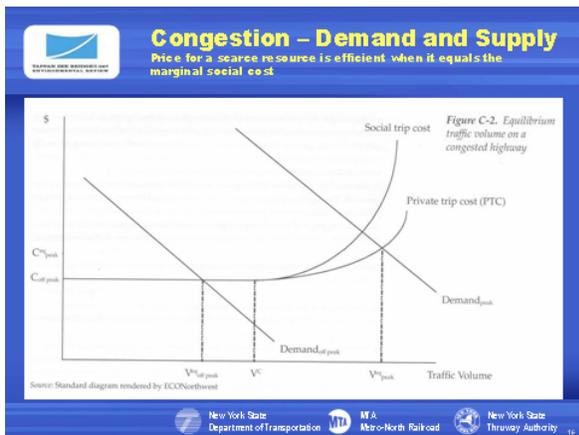
**Slide 17**

In the US there has been an annual 4% growth of vehicle miles traveled (VMT).



**Slide 18**

This growth pattern is similar to that experienced on the Tappan Zee Bridge, where a 4.7 percent annual growth rate occurred 1956-2000.



**Slide 19**

- In this demand and supply curve, costs are shown on the vertical axis and volumes on the horizontal. The demand curves slope downward in the usual way, i.e., the higher the cost, the less demand. We begin with a driver moving along in non-peak traffic but once we reach the more congested peak period, costs to that driver increase and move further up the second demand curve. But that is only part of the story. The real marginal cost from that driver impacts all other drivers by slowing them down too. Thus, the real cost is a social cost, which is much higher. One way to decrease the social cost is by introducing pricing that discourages peak hour trips.



**Slide 20**

This section of the presentation focuses on land development policy



**Slide 21**

We will now look at land development policy. The first session of the Land Use SAWG reviewed the planning systems and toolbox in the US. One distinct feature in the US is how most land development regulation is lodged with local government, of which there are 87,000 units with tax powers.



**Slide 22**

Zoning, the most typical land development regulatory tool, has been around at least since NYC's zoning resolution of 1916. Zoning policies were widely adopted with the evolution of trucks and autos and the creation of new urban patterns. Zoning's historic source was nuisance law, and it has been used to limit the negative spillovers (or externalities) from one land use on others, typically creating single-use districts and exclusionary patterns of development.



## Disadvantages of Zoning

- Disadvantages:
  - income segregation
  - fragmented decision-making
  - increasing commuter distances/sprawl/ congestion
- Separating uses & limiting densities = more congestion & sprawl





### Slide 23

As a land development tool, zoning has numerous disadvantages, including income segregation, the fragmentation of decision-making, and increasing commuting distances, sprawl, and congestion.



## Efficient Pricing of Land Development: Price Land Development at Marginal Cost

Zoning to price spillovers (externalities):

- Industrial performance zoning or emissions trading
- Retail parking taxes or standards based on traffic impacts
- Inclusionary zoning rather than exclusionary zoning





### Slide 24

The efficient pricing of land development would focus on pricing negative spillover effects:

- performance zoning, e.g., where an industry's emissions are regulated to the degree it is compatible with nearby residential uses;
- impact fees and taxes that reflect the costs to others, e.g., retail clusters and associated parking can have major congestion impacts on local highways, so these retail uses should contribute to these costs, perhaps by a tax on parking; and
- inclusionary, rather than exclusionary, zoning would allow for a mix of uses and housing types, e.g., assuring the availability of affordable housing rather than excluding it.



## Efficient Pricing of Land Development : Urban Services

- Pricing extensions of urban services:
  - Until 1970s funded by average cost prices but costs vary
  - Better located, higher density development subsidizes higher cost development
  - Lower density also feeding back with more and longer auto trips
  - ¼ of localities now use development impact fees





### Slide 25

The municipal provision of new urban services is another typical feature of inefficient land development. Frequently the real costs of development are not borne by developers but are passed along to the larger community or more efficient developments. Only one quarter of localities use impact fees to charge developers for the true costs of extending services. The consequences are typically more sprawl and more/longer auto trips.



### Efficient Pricing of Land Development: Property Tax

- Same tax rate on values of both land and improvements
- Tends to discourage improvements with no effect on land consumption
- Reducing tax rate on structures while increasing the rate on land, encourages more intensive use of land

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**Slide 26**

Property taxes are another vector of distortion and inefficiency in land development. The same tax rate is applied to both land and improvements, with the consequence of discouraging improvements with no effect on land consumption. And yet there is widely accepted use of tax abatements on property improvements for economic development purposes, acknowledging the validity of differential tax rates.



### 3. A Balanced Transportation/ Land Use Policy

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**Slide 27**

- The third part of the presentation looks at the need for a balanced transportation–land use policy.



### Achieving a Balanced Transportation/Land Use Connection

- Most transportation planning at large geographic scale (fed/state/metro) with large revenue sources
- Most land development policy is local (fragmented and under-funded)

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**Slide 28**

- Moving towards a more balanced transportation–land use policy.
- Historically transportation planning has led because of its geographic scope and scale (federal, state and metro levels) and their greater revenue sources, whereas land development planning is local, fragmented and under-funded.



## Adjusting the Balance of Land Use and Transportation Policy

Major Debates:

- Should transportation's leadership role continue?
- Pricing could be a powerful tool but often lacks political support
- Land use and urban design are central to growing focus on quality of life
- Effective land use policy requires a regional perspective





### Slide 29

Major debates continue around the following issues:

1. should transportation's leadership role continue?
2. the political controversies surrounding pricing policies, including equity issues and impacts on lower-income households
3. growing focus on land use and urban design as central to quality of life concerns
4. effective urban land use policy requires a regional perspective, overcoming fragmented local decision-making.

There are no simple resolutions of these debates.



## Classification of Land Use Policies Affecting Transportation

**TABLE 5-1. ANOTHER CLASSIFICATION OF LAND-USE POLICIES LIKELY TO AFFECT TRANSPORTATION**

<b>DEFINING A REGIONAL DEVELOPMENT PATTERN</b>	<b>CREATING LIVABLE PLACES</b>
Regional planning	Zoning: mix of use
Transit-oriented development	Zoning: density
Corridor planning	Performance zoning
Jobs-housing balance	Designing for density / amenity
Urban growth boundaries	Street connectivity
	Streetscape
<b>PROVIDING PUBLIC INFRASTRUCTURE AND SERVICES</b>	<b>MISCELLANEOUS POLICIES</b>
Provision: where and how	Pricing externalities
Pricing	Changes in property taxation
Concurrency / impact fees	Purchase or transfer of development rights
	Location-efficient mortgages

Source: ECOnorthwest





### Slide 30

This table from the new American Planning Association's (APA) book *The Transportation/Land Use Connection* (2007) shows the classification of land use policies that affect transportation on different dimensions or levels:

- at the regional scale, land use tools such as transit-oriented development or growth boundaries are very relevant to shape more efficient regions and transportation systems;
- the provision of infrastructure/services is more intermediate and relies on tools such as impact fees;
- at the level of creating livable places, tools such as zoning controls of density, the mix of uses, and performance standards have been widely used;
- other miscellaneous policies include changes to property taxes and the transfer of development rights.

**Built Environment's Influence on Travel Behavior**

Five Dimensions or "Ds":

*Regional Scale*

1. Destinations (balance of jobs & housing)

*Neighborhood Scale*

1. Density (correlates to auto use)
2. Diversity (mixed use)
3. Distance (proximity to transit)
4. Design (balance of form & function)

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**Slide 31**

To summarize the built environment's effects on transportation, we can emphasize the five "Ds," or dimensions: destinations, density, diversity, distance, and design.

**Density and Auto Ownership**

Source: Adapted from Holtclaw et al. 2002

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**Slide 32**

The graph shows a decline in auto ownership with higher residential densities

**Land Use Policies Affecting Transportation**

**Regional form:**

- Creating boundaries: zoning and urban growth containment
- Creating centers and corridors: TOD & retrofitting corridors
- Pricing public infrastructure & services: impact fees
- Incentives and public investment: expediting, supportive zoning, land assembly, TDR

**Neighborhood form:**

- Urban design

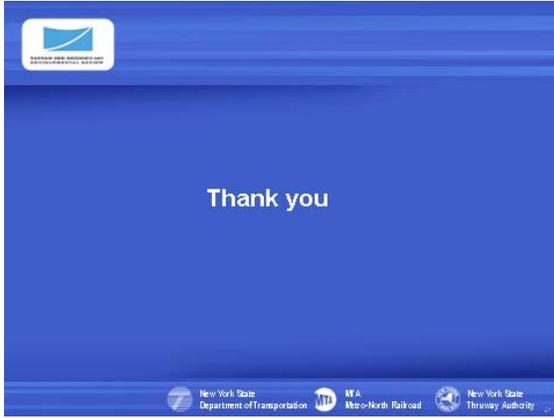
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**Slide 33**

To conclude, at the regional level we see the relevance of:

- creating growth boundaries to contain development;
- creating centers and corridors by the use of TOD and the retrofitting of corridors;
- the appropriate pricing of public infrastructure and services using impact fees to charge developers the true marginal social costs of their developments;
- adopting public incentives, including expediting appropriate development approvals, land assemblage, transfer of development rights, and supportive zoning.

At the neighborhood level, the relevant tools focus on livable places using urban design, connectivity, and streetscapes.



**Slide 34**

- Thank you