Transit Oriented Development
Right Sizing
TODs & Travel

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TCRP Report 128
Effects of TOD on Housing, Parking, & Travel

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Agenda

- TOD & Travel
- Parking Puzzle
- Latest TOD & Parking Research
- Testing for Urban Form
- Implications
- Dissemination
TODs and travel
TODs create less traffic

• TOD residents are:
  – Twice as likely not to own a car as US Households
  – 5 times more likely to commute by transit than others in region

• Self-selection:
  – Responsible for up to 40% of TOD ridership bonus

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### Portland Travel Behavior

<table>
<thead>
<tr>
<th>Area</th>
<th>Transit Modal Share</th>
<th>Non-auto Modal Share</th>
<th>VMT per Capita</th>
<th>Auto Ownership per Household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Use/Good Transit</td>
<td>11.5 %</td>
<td>41.9 %</td>
<td>9.80</td>
<td>0.93</td>
</tr>
<tr>
<td>Remainder of Region</td>
<td>1.2%</td>
<td>12.7%</td>
<td>21.79</td>
<td>1.93</td>
</tr>
<tr>
<td>Difference</td>
<td>942%</td>
<td>230%</td>
<td>45%</td>
<td>48%</td>
</tr>
</tbody>
</table>

Mixed use + good transit results in much lower automobile use

*Metro 1994 Travel Behavior Study*
Rosslyn Ballston Corridor

- Development since 1980
  - 25m square feet office
  - 14,400 residential units
- Station areas
  - 25% county housing
  - 37% county jobs
- Transit Access
  - Arlington: 73% walk, 13% by car
  - Fairfax: 15% walk, 58% by car

Land use can change transportation behavior
TOD Parking Puzzle
The TOD Parking Puzzle

- TODs behave differently, yet
  - No definitive industry TOD parking ratios exist
  - Lenders tend to require conventional ratios in TODs
  - Developers tend to build TODs w/ conventional ratios

Changing parking key to TOD benefits being fully realized

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$75b opportunity lost?

- Past 11 years $75b in invested in US rail transit
- Market & planning support for TOD
- Many of the hoped for benefits not realized
  - Less time stuck in traffic
  - Lower housing costs
- TODs parked oblivious to transit
  - Most TODs being required to be built & parked like auto-oriented development

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South Waterfront, Portland
Parking a Huge Challenge

- The difference between TOD & TAD
- Often a deal breaker financially
  - Structured space costs 4 to 10 fold more
  - $17,500 per space for simple parking structure
- Parking a barrier to urbanism / walkability
TOD Parking Research
TCRP Report 128

- Detailed look at 17 built TODs
- All multi-family residential
- Four US Metro areas
  - Washington, DC
  - Philadelphia / NJ
  - San Francisco
  - Portland
- Measured actual performance
  - Trips compared to ITE

Disconnect with ITE guidance

- Suburban bias w/ existing parking standards
  - Assumes everyone drives
  - Based on limited observations – from Florida
- Overstates TOD trip generation
  - A result is higher development fees
  - 24 hr based rates 50% high
- Parking likely overstated by same amount
TOD housing generates 50% less traffic than conventional housing

ITE Trip Manual
6.67 trips per unit

Detailed counts
of 17 residential TODs
3.55 trips per unit
## TODs behave Differently

Daily car trips for 50 dwellings

<table>
<thead>
<tr>
<th>Type</th>
<th>Trips</th>
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</thead>
<tbody>
<tr>
<td>SF</td>
<td>500</td>
</tr>
<tr>
<td>MF</td>
<td>333</td>
</tr>
<tr>
<td>TOD MF</td>
<td>177</td>
</tr>
</tbody>
</table>

10 Trips

**6.67 Trips**

**3.55 Trips**
Philadelphia / NJ TOD Case Studies

- Averaged 27% below ITE 24 hr rates
- Lower density projects
- Served by commuter rail
  – limited mid-day & evening service
Washington DC TOD Case Studies

- Avalon @ Grosvenor
- Quincy Plaza
- Lenox Park
- Gallery @ Virginia Square
- Meridian @ Braddock
- Avalon @ Grosvenor
Washington DC TOD Case Studies

- Greatest reduction from ITE 24 hr rates
  - Ranged from 30 to 92% below
  - On average over 60% below
- Meridian @ Braddock Station averaged one vehicle trip for every two units
  - 920 ft from station
Portland TOD Case Studies

- Quatama Crossing
- Collins Circle
- Gresham Central
- Gresham Central
- Quatama Crossing
- Center Commons
- The Merrick

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Portland TOD Case Studies

- Averaged 40% below ITE 24 hr rate
- Collins Circle less than one trip per unit
  - Over 200 units per acre
- Closer to the core better the performance

Actual percent less traffic than ITE 24 hr rate:

- 12%
- 29%
- 70%
- 87%

Portland TODs included TOD research
SF Bay Area TOD Case Studies

- Mission Wells
- Wayside Plaza
- Park Regency
- Verandas
- Montelena Homes

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SF Bay Area TOD Case Studies

- All east bay “suburban” locations on BART
- Averaged 48% below ITE 24 hr average
- Montelena Homes less than 2.5 trips per unit
  - 55% commute by transit
  - 950 ft from S Hayward BART
Testing the implications
Testing the implications

- 8 acre theoretical site
- Four TOD-housing building products
  - Garden Apts
  - “Texas Donut”
  - Townhomes
  - 6-story Mid-rise
- Test two parking ratios
  - 2.2 spaces per unit
  - 1.1 spaces per unit
  - Both transit friendly
TOD Prototypes

Garden Apartment

- Density: 24 to 32 units per acre
- Height 2 to 3 stories
- Surface parking

Gresham Central Apartments, Gresham Oregon
TOD Prototypes

Townhome

- Density: 36 to 48 units per acre
- Height: 2 to 3 stories
- Surface parking
TOD Prototypes
Texas Donut

- Density: 90 to 120 units per acre
- Height: 4 to 5 stories
- Residential wrapped around structured parking

Eastside Transit Village, Plano, Texas
TOD Prototypes
6 Story mid-rise

- Density: 100 to 120 units per acre
- Height: 6 stories
- Freestanding parking structure

Mission Bay, San Francisco, California
### Garden Apts

<table>
<thead>
<tr>
<th>2.2 Spaces per unit</th>
<th>1.1 Spaces per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Lower ratio</strong></td>
<td><strong>Lower ratio</strong></td>
</tr>
<tr>
<td>• + 33% in Density</td>
<td>• + 33% in Density</td>
</tr>
<tr>
<td>• + 60 units</td>
<td>• + 96 units</td>
</tr>
<tr>
<td>• $98,000 parking saving</td>
<td>• $736,000 parking saving</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th></th>
<th>&quot;Texas Donut&quot;</th>
<th></th>
<th>Mid-Rise Apts</th>
<th></th>
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<tbody>
<tr>
<td>2.2 Spaces per unit</td>
<td>![Diagram]</td>
<td>1.1 Spaces per unit</td>
<td>![Diagram]</td>
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<td></td>
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</table>

**Lower ratio**

- + 20% in Density
- + 162 units
- $5.3m parking saving

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**Lower ratio**

- + 20% in Density
- + 225 units
- $12m parking saving
Implications
Case Study Implications

Going from 2.2 to 1.1:

- 20 to 33% higher residential density
- More units + lower parking costs (5 to 36% lower costs)
- Higher transit ridership
- More opportunity
  - Higher developer profits
  - Greater housing affordability
  - More projects financially feasible
Right Sizing TOD Parking

- New standards to reflect TOD should result in:
  - Developers paying lower fees and exactions
  - Diminished need to expand roads
  - Transit agencies realizing increased ridership
  - The public paying less for TOD housing
  - 20 to 33% increase in TOD density