Putting it Together: Bus Rapid Transit-Oriented Development in Chattanooga

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Overview

- Setting
- Research Question
- Literature Review
- Methodology
- Findings
- Policy Conclusions
Chattanooga is:
- A historic transportation center
- A small city with relatively high ridership
- An emerging creative city
- Not dense enough for most rail

Chattanooga plans point to wanting better public transit connections, more compact development, infill (CHCRPA, 2000-2011)
Research Question:

- How can Bus Rapid Transit be implemented in Chattanooga to maximize for land use outcomes?
- Chattanooga could be generalizable to other southern or national midsize cities.
Literature Review

- Bus Rapid Transit
- Transit Oriented Development
- Bus Rapid Transit-Oriented Development
- Transit-Oriented Development Land Use Theories
Bus Rapid Transit

- Like Rail... on a bus!
- Rail-class features differentiate it from normal buses (GAO, 2012)
  - Off-board payment, larger (shinier) vehicle, ITS, own ROW, station amenities, wide stop spacing, etc.
- Cheaper than rail, with potentially equal benefits (GAO, 2012)
Transit-Oriented Development

- Development based around transit service rather than personal car ownership
- Features: more walking (to an extent), better urban design, compact (Cervero, 2004)
- Harder to do in the suburbs--difficult to serve form, habit inertia, neighbor opposition, chicken or egg problem with transit use (Filion and McSpurren, 2011; CTOD, 2010)
It exists! See Seoul, Curitiba, Pittsburgh

Was doubted early—beliefs persist that rail > bus

But, as per Currie 2006, generally, the closer the features come to rail, the fewer the differences in developability.

So, what we already know about land use around stations should be sufficient for BRTOD.
Won’t all look the same— not every stop can be downtown
  - Typologies help a lot (see City of Denver, next slide)

Mixed uses are better than single
  - But actually putting them together is hard, esp. retail. (Filion and McSpurren, 2010)

Denser is held to make it more feasible (Dittmar and Ohland, 2004; Cervero, 2004)

But connectivity and intersection density is more important (Cervero and Ewing, 2010)
<table>
<thead>
<tr>
<th>TOD Typology</th>
<th>Desired Land Use Mix</th>
<th>Desired Housing Types</th>
<th>Commercial/ Employment Types</th>
<th>Proposed Scale</th>
<th>Transit System Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown</td>
<td>Office, residential, retail, entertainment, and civic</td>
<td>Multi-family and loft</td>
<td>Prime office and shopping location</td>
<td>5+ stories</td>
<td>Intermodal Facility/ Transit Hub. Major regional Destination with high quality feeder connections.</td>
</tr>
<tr>
<td>Major Urban Center</td>
<td>Office, residential, retail, and entertainment</td>
<td>Multi-family and townhome</td>
<td>Employment emphasis with more than 250,000 sf office and 50,000 sf retail</td>
<td>5+ stories</td>
<td>Sub-Regional destination. Some Park-n-ride. Linked with district circulator transit and express feeder bus.</td>
</tr>
<tr>
<td>Urban Center</td>
<td>Residential, retail and office</td>
<td>Multi-family and townhome</td>
<td>Limited office. Less than 250,000 sf</td>
<td>3+ stories</td>
<td>Sub-Regional destination. Some Park-n-ride. Linked with district circulator transit and express feeder bus.</td>
</tr>
<tr>
<td>Urban Neighborhood</td>
<td>Residential, neighborhood retail</td>
<td>Multi-family, townhome and small lot single family</td>
<td>Local-serving retail. No more than 50,000 sf</td>
<td>2-7 stories</td>
<td>Neighborhood walk-up station. Very small park-and-ride, if any. Local and express bus connections</td>
</tr>
<tr>
<td>Commuter Town Center</td>
<td>Office, retail, residential</td>
<td>Multi-family, townhome and small lot single family</td>
<td>Local and commuter-serving. No more than 25,000 sf</td>
<td>2-7 stories</td>
<td>Capture station for in-bound commuters. Large park-n-ride</td>
</tr>
<tr>
<td>Main Street</td>
<td>Residential, neighborhood retail</td>
<td>Multi-family</td>
<td>Main street retail infill</td>
<td>2-7 stories</td>
<td>Bus or streetcar corridors. District circulator or feeder transit service. Walk-up stops. No transit parking</td>
</tr>
<tr>
<td>Campus/ Special Events Station</td>
<td>University campus, stadia</td>
<td>Limited multi-family</td>
<td>Limited office/retail</td>
<td>varies</td>
<td>Large Commuter destination. Large park-n-ride</td>
</tr>
</tbody>
</table>
First, Identify feasible alternative routings to existing Route 4 (if any).
Second, space stops at about every half mile.
Third, gather population data
   - Race, gender, and total population from the census via Business Analyst
   - Geocoded employers and Tapestry segments from ESRI
   - Block size, intersection density, car ownership, and transitshed from the Housing and Transportation index
Fourth, make maps of existing land use and zoning with GIS files obtained form CHCRPA
Fifth, take pictures of existing evirons around proposed stops
Sixth, synthesize data into recommendations
Findings

- Routewide
- Area-level
Demographics (Overall)

- More jobs than residents
- 57% White, 35% Black, 7.5% Hispanic
- Fairly young
  - Median age 33.9
- Mixes between older black people and younger everyone else, especially in inner city
- Mostly middle class
  - Exception: older people tend to be poorer
Alignment kept, mostly
- No other place to put the bus.
- Deviations kept, but streamlined
- Extension added from Bonny Oaks to Enterprise South
- Branching in inner city kept for feasibility and title six reasons
More varied in downtown, more single-use the further toward Enterprise South one gets.

Pockets of density exist outside downtown.

Intersection density greatest in inner city, gets less so further out, with few exceptions.

Transit shed greatest around Eastgate, because it’s a transit center for more frequent routes.
Bus Lane exclusivity
- Lots of road types, lots of configurations
- Downtown- take out parking on broad, replace with a bus lane
- Inner city- (peak hour) shoulder bus lane or tow-away lane until Central
- Inner suburbs- (peak hour) shoulder bus lane
- Eastgate to Hamilton Place- (peak hour) shoulder bus lane
- Outer suburbs- (peak hour) shoulder bus lane construction
- Enterprise South- (peak hours) shoulder bus lane designation

Signal Priority throughout route
Chattanooga has a smartcard system

But, very confusingly realized

More refill stations, decouple from bus with offboard payment

Partner with dollar general and CVS for refill program

ITS measures already in place

Buses already equipped with systems that report location
Area-Level Recs

- Downtown
- Inner City
- Inner Suburbs
- Eastgate
- Eastgate to Hamilton Place
- Hamilton Place
- Outer Suburbs
- Enterprise South
Downtown

- Varied land uses
- Zoning mostly Commercial-CBD
- Tourism and Offices have major presence
- Population: older, mostly white (other than near UT-C).
- UT Chattanooga youngest, densest part of city
- Problems
  - Core dead at night
  - Vast amounts parking
  - Vacant space
  - Lack of retail
Some structured parking exists, but should be expanded
- Parking still important for tourism, so not all street lots should be eliminated
- CARTA--flex new parking muscles, influence policy

Infill!
- Retail around aquarium
- Restaurant and entertainment in core
- Residential at 11th and Houston and MLK and Douglas
Inner City

- Single Family homes exist, but until Central, not primary use
- Major medical complex near Parkridge
- High connectivity
- Vacant lots abound, especially near Bailey and Willow
- White/Black mix, turning to majority black past Central

Problems:
- Vacant lots
- Relative lack of non-residential or hospital activity
Inner City Land use

Legend
- BRT Stops
- Density (employees)
- Shopping Goods
- Service
- Restaurant
- Shopping Center Mall
- Stadium
- Entertainment-Auditorium/Theatre
- Office: Executive Medical
- Office Park, Executive Medical
- Trail
- Daycare Preschool
- General Transportation
- Surface Lot
- Private Surface Parking Lot
- Parking Garage
- Utilities
- Government
- College/School
- Religious
- Cultural
- Health Care
- Chemistry
- Emergency Response/Safety
- Public Passive Park
- Public Active Park
- Parks and Recreation
- Preservation/Open Space
- Mixed Use—Commercial/Office
- Residential Mixed Use
- Residential
- Vacant Lot
- Vacant Building
- Residential Non-Structure Lot
- Boarded-up Building
- Single Family
- Duplex
- Multifamily (3-4)
- Group Home/Dorm/Retirement Home
- Attached Townhomes
- Mobile Homes
- Mobile Home Park
- Manufacturing
- Warehouse
- MHI/Warehouse
- Solid Waste Airport
- Commercial—General Shopping
Focus on residential infill
- Small apartments, cluster houses as per 2012 Chattanooga Housing Study by CHCRPA

Some commercial infill along main corridor, mostly concentrated before Central

Sidewalk improvements, especially at Bailey/Chamberlain

Establish inventory/land bank for distressed and vacant properties

Establish/enhance housing rehabilitation programs
  - Low-interest rehabilitation grants/loans
  - First-time homebuyer rehab incentives
Inner Suburbs

- Older, suburban portion– Annexed between ‘50s and ’70s, built earlier.
- Street grid exists (high intersection density, small-ish blocks), except on hills
- Diverse, fairly young.
- Problems:
  - Lacks sidewalks past Germantown
  - Aging commercial stock
Inner Suburbs cont’d

- Sidewalk construction
- Blighted Commercial Inventory
- Zoning code amendments- in favor of mixed use and mother in law apartments
- Cluster Housing and other higher density Infill (where vacant lots present)
- Eventual revamp of corridor into something more pedestrian-friendly (but infrastructure comes first)
Eastgate

Redevelopment Project since mid-1990s.
- Schools, shopping, and government centers
- Transit Center (CARTA and Megabus)

Problems
- Not a lot of clear pedestrian ways
- Not a lot of shade
- Not a lot of definition
Eastgate Land use

Legend
- eighth
- Geocoding Result: Geocoding_Result
- employees
- 100.000000 - 200.000000
- 200.000001 - 500.000000
- 500.000001 - 750.000000
- 750.000001 - 2000.000000
- Parks
- Route4 Rented

Land use categories:
- LU_2012
- Vacant Lot
- Vacant Building
- Residential Non-Structure Lot
- Scrapped Building
- Single Family
- Multi-Family (SF)
- Group Home/ Dorm/ Retirement Home
- Attached Townhomes
- Mobile Homes
- Mobile Home Park
- Manufacturing
- Warehouse
- Mini-warehouse
- Solid Waste Mgmt
- Commercial-General Shoppin

- Shopping- Goods
- Service
- Restaurant
- Shopping Center/Mall
- Stadium
- Entertainment-Nightclub/Theater
- Office- Except Medical
- Office Park- Except Medical
- Hotel
- Daycare/Preschool
- General Transportation
- Surface Lot
- Private Surface Parking Lot
- Parking Garage
- Utilities
- Government
- College School
- Religious
- Cultural
- Health Care
- Cemetery
- Emergency Response/Safety
- Public Passive Park
- Public Active Parks
- Parking Restricted Recreation
- Preservation/Open Space
- Mixed Use- Commercial/Office
- Residential Mixed Use
Eastgate Zoning

Legend:
- BRT stops/downtown

Geocoding Result: Geocoding_Result
- employee
  - 100,000-200,000
  - 200,000-250,000
  - 250,000-300,000
  - 300,000-350,000
  - 400,000-450,000
  - 500,000-550,000
  - 600,000-650,000
  - 700,000-750,000
  - 800,000-850,000

- Roads
- House/standard

Busstop/Zoning
- ZONE
  - Commercial-Convenience
  - Commercial-CBD
  - Commercial-Planned Commerce Center
  - Commercial-Neighborhood
  - Commercial-North Shore Commercial/Mixed Use
  - Manufacturing-Industrial
  - Manufacturing-Wholesale/Light Industrial
  - Manufacturing-Warehouse/Warehouse
  - Mixed Use
  - Office
  - Residential I: Single Family
  - Residential I: Urban
  - Residential I: Apartment/Townhouse
  - Residential I: Moderate Density
  - Residential I: Special Zone
  - Residential I: Townhouse/Zero Lot
  - Residential I: Townhouse
  - Urban General Commercial
Eastgate

- Continue to build up public buildings, like library
- Define walking space better (better-defined crosswalks, sidewalks other than beside mall)
- Start amending zoning code to allow for apartments near Eastgate
Eastgate to Hamilton Place

- Date of building varies
- Some vacant land
- Disconnected uses
- Varied residents, but generally older, whiter, wealthier.
- Mid-late life commercial stock, mostly from 1980s and later

Problems:
- Middle-aged but vacant commercial stock
- No sidewalks
- Spatial distances much further than inner suburbs
Eastgate to Hamilton Place Zoning

Legend
- ◆: BRT stop
- ■: Bus route extended
- △: Geocoding Result: Geocoding_Result: employees
  - ◆: 100.000000 - 200.000000
  - ◆: 200.000001 - 250.000000
  - ◆: 250.000001 - 500.000000
  - ◆: 500.000001 - 750.000000
  - ◆: 750.000001 - 1500.000000
- ---: Roads
- ＃: mixed used

Bus STOP Zoning
- ◆: Commercial - Convenience
- ◆: Commercial - CBD
- ◆: Commercial - Planned Commerce Center
- ◆: Commercial - Neighborhood
- ◆: Commercial - North Shore Commercial/Mixed Use
- ◆: Manufacturing - Industrial
- ◆: Manufacturing - Wholesale/Light Industrial
- ◆: Manufacturing - Warehouse/Wholesale
- ◆: Mixed Use
- ◆: Office
- ◆: Residential - Single Family
- ◆: Residential - Urban
- ◆: Residential - Apartment/Townhouse
- ◆: Residential - Moderate Density
- ◆: Residential - Special Zone
- ◆: Residential - Townhouse/Zero Lot
- ◆: Residential - Townhouse
- ◆: Urban General Commercial
Install sidewalks, with priority within 400 yards of stop on main road
Apply Inner Suburb blighted commercial inventory up to Vance
Cluster housing Infill
Amend zoning code to allow for mother-in-law apartments
Rezone vacant parcels near Vance for potential mid-high density infill rather than commercial
Hamilton Place

- Late 1980s/ Early 1990s Mall
- Mostly commercial uses
- Few sidewalks, but major economic activity
- Problems
  - CARTA not visible
  - Walking can be difficult
Construct a distinct CARTA shelter
   Include countdown/arrival sign, ticket machine, and other information
Enhance parking lot for pedestrians with shade and pathways
Install sidewalks on Hamilton Place Boulevard and Shallowford near stops
Enhance crossing at Shallowford and Hamilton Place Boulevard to make useful for mixed use center
Outer Suburbs

- Low density, except Robin
- Small road (one-way and turn lane)
- Lots of sellable land
- Room to build
- Complete streets priority area

Problems
- Low Density
- Low connectivity
- Road not wide enough for exclusivity
Outer Suburbs

- Add sidewalks, with priority within 400 yards of stop
  - Add greater connections with apartment complexes at Robin
- Concentrate on road upgrades
  - Road widening for bus lane and other complete streets upgrades
- For future, target Robin and Bonny Oaks for further higher density/mixed use development
- Change zoning code to allow for mother-in-law apartments
Enterprise South

- Industrial Park, mostly manufacturing uses
- Landscaped, four-lane road
- Limited Developability
- Problems
  - Currently lacks transit service
Enterprise South

- Equip stops with arrival information boards, comfortable waiting areas, and ticket vending machines
- Provide access to stops from facilities via paths.
Policy Conclusions

- Priority
- Area Foci
- Programs
Focus on area from downtown to Eastgate, in general
- Better intersection density
- More people, generally
- More jobs, including downtown
- Smaller blocks
- Fewer infrastructural needs
- In short, more to work with
- Also, has citizen support

Priority
Area Foci

- Downtown- Mixed use infill, structured parking
- Inner City- Neighborhood infill (mid-level residential and commercial)
- Inner Suburbs- Sidewalk construction, commercial demolition and reconstruction, cluster housing infill
- Eastgate- pedestrian accommodation, plan maintenance, code modification
- Eastgate to Hamilton Place- Sidewalk construction, potential small-scale residential infill, commercial demolition and reconstruction
- Hamilton Place- pedestrian accommodation, CARTA branding
- Outer Suburbs- Sidewalks, roads widening, pedestrian connections with existing density pockets
- Enterprise South- comfortable stop environs
Blighted Commercial Inventory
Incentives for higher density and reuse (make greater for projects with affordable elements)
- Property Tax abatement
- Density bonuses
- Development fee reductions
- Streamlined permitting
Programs, cont’d

- Zoning code amendments
  - Allow for mother-in-law apartments in single-family zones
  - Consider rezoning certain parcels to allow for more residential uses
  - Establish land bank for vacant and distressed parcels in inner city
Questions?