IMPROVING LIVABILITY & TRANSPORTATION THROUGH FORM-BASED CODES

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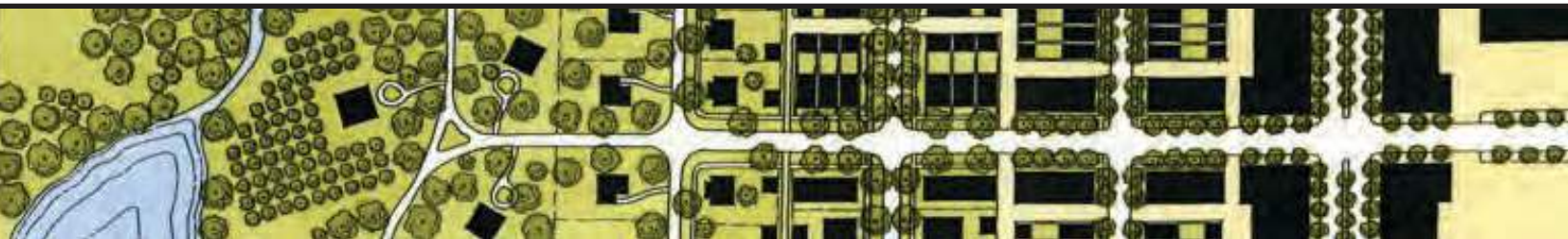
RPCGB
REGIONAL PLANNING COMMISSION OF GREATER BIRMINGHAM



Form-Based Codes

- Origins of Code
- Brief Outline and Applicability
- TODs and TNDs

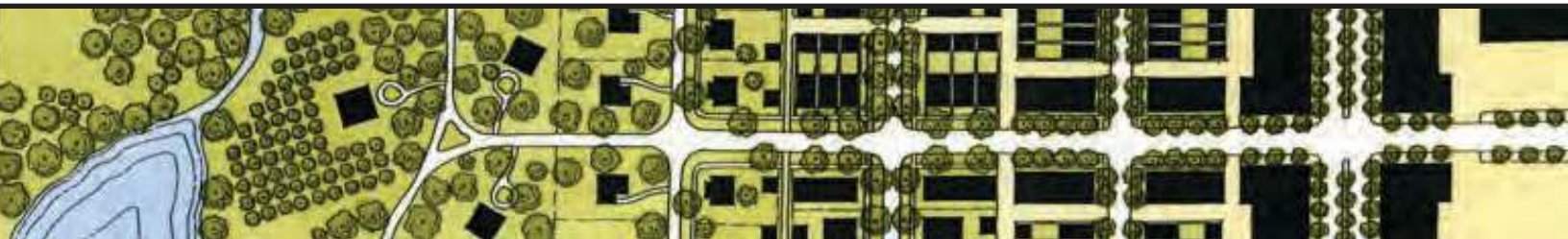
Form-Based Codes & Transportation

- Congestion Management:
  - Grid System vs. Hierarchical/Conventional
  - TOD/TND vs. Conventional
- Cost Reduction

Form-Based Codes & Livability Principles

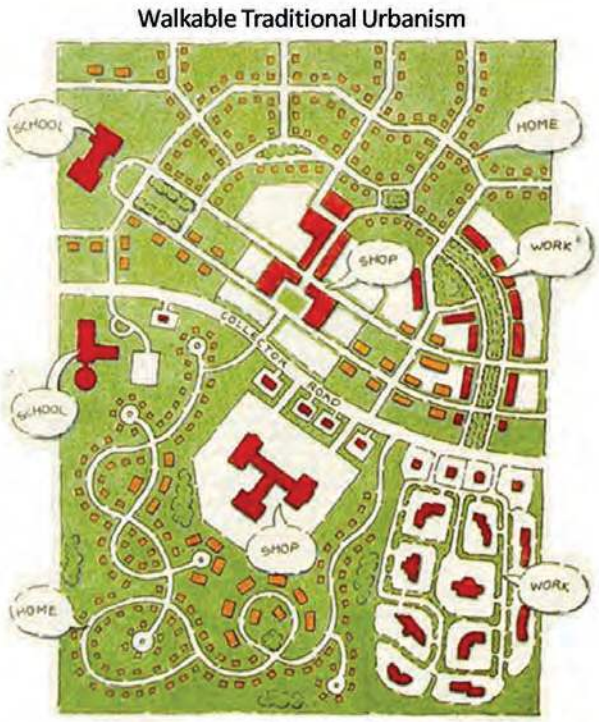
- Principles from the HUD-DOT-EPA Partnership

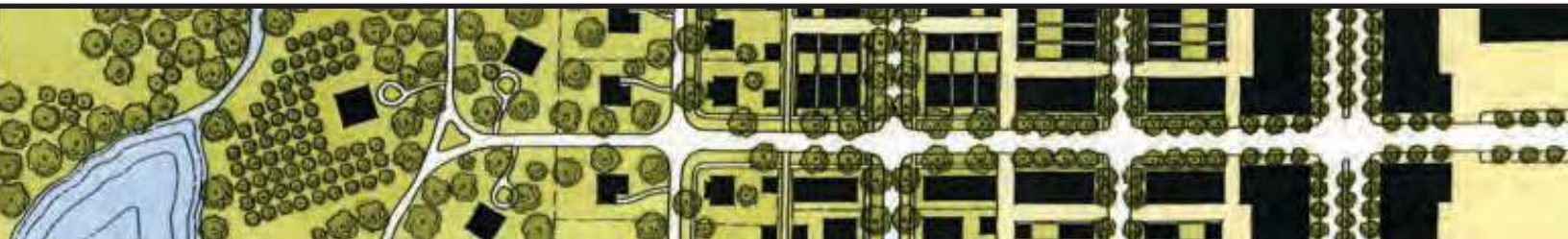
Q & A Session



Introduction to FBC

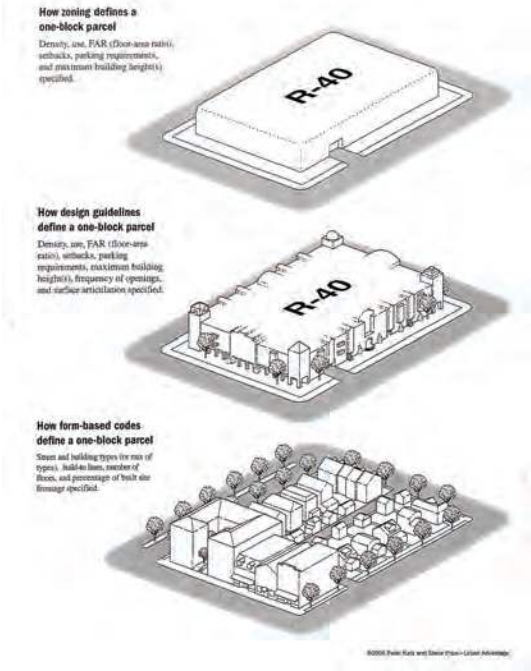
- Response to conventional zoning during the 80s
- Principles of Smart Growth and New Urbanism
  - Mix of land uses
  - Walkable, compact urban form
  - Transportation and housing choices

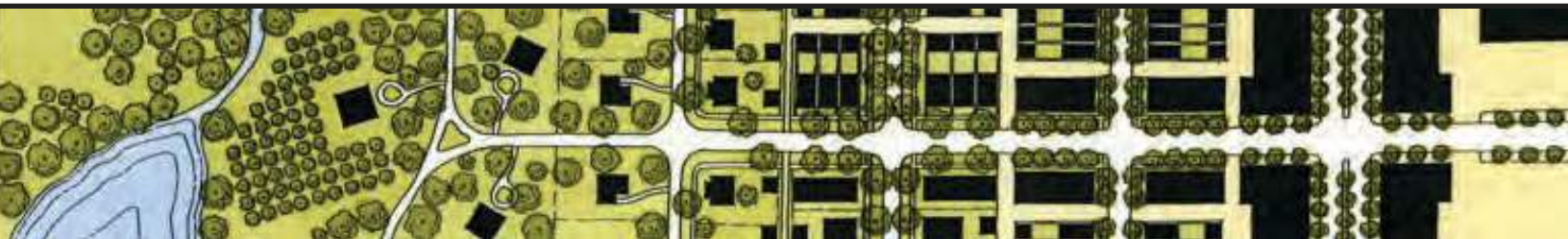




Conventional Zoning

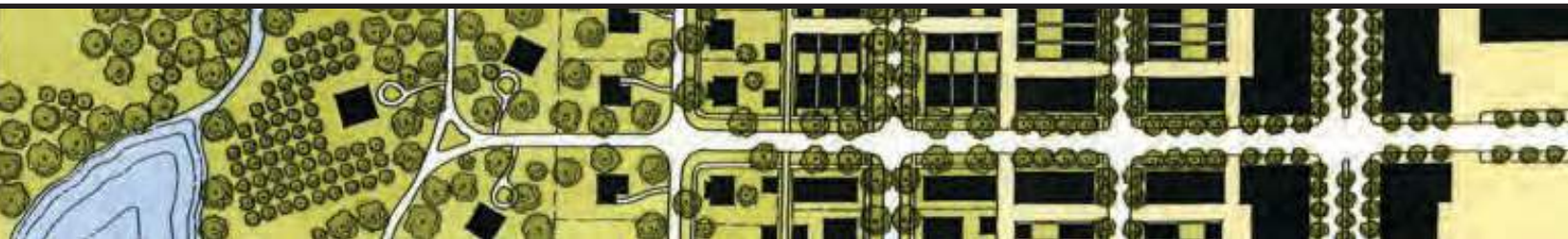
- Auto-oriented
- Proscriptive regulations
- Reactive to individual proposals
- Use is primary
- Regulates to create buildings
- Single-use zone organization





Form-Based Codes

- Mixed-use, walkable, compact
- Prescriptive regulations
- Proactive community visioning
- Physical form & character
- Regulates to create places
- Spatial organization; transect



Introduction to FBC

Old Sevier | Scottish Pike

Reinforcing what is already there

Diagrams

Description

A. Site Configuration
- *Front Setback:* 10'-25'
- *Frontage:* 40% minimum
- *Side Setback:* 5' minimum
- *Lot Size:* 15,000 sq.ft maximum (avg existing)

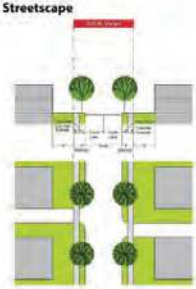
B. Building Configuration
- *Building Width:* 20' minimum
- *Building Height:* 15' and 3 story maximum
- *Entrances:* Individual entrances of housing units must be located on principal frontage road

C. Parking
- *Location:* Garages must be setback from the street 10' further than front building setback. Access is also permitted to garage from rear alley.

D. Notes
1. Balconies and porch projections are encouraged.
2. Buildings destroyed by natural causes or fire may be rebuilt on their existing footprint.
3. Gardens are allowed within property boundaries.

E. Incentives
1. To Be Determined

Streetscape



Character

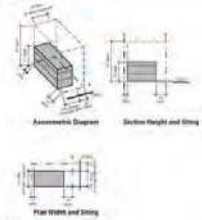
The residential areas of the Old Sevier and Scottish Pike neighborhoods have the "feel of a small town." The residential areas identified in this plan should strive to preserve and reinforce this character where it exists with new development at a complimentary scale. Uses on these parcels should be residential in nature with garages either setback from the street or accessed from the rear by back alleys. Large-scale assemblage of residential properties in these areas is discouraged.

Old Sevier
Scottish Pike

River Road | Goose Creek Place | Island Home Avenue

Still creating a new waterfront experience

Diagrams



Description

A. Site Configuration
- *Front Setback:* 10' maximum
- *Frontage:* 75% minimum
- *Lot Size:* 3 acre maximum

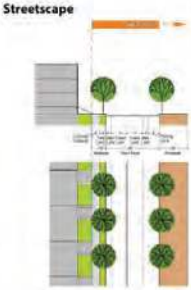
B. Building Configuration
- *Building Width:* 20' - 30' segments
- *Building Height:* 25' and 2 story minimum
  40' and 3 story maximum
- *Entrances:* Individual entrance of ground floor units must be located on principal frontage road.

C. Parking
- *Location:* Garage or surface parking shall be located to the rear of the property. Parking shall be accessed from a rear alley or principle frontage road.

D. Notes
1. Parking is permitted below primary structure in order to raise first floor above flood plain.
2. Balconies, porches, bay windows, or other projections may be incorporated into building setback.
3. Monolithic, unarticulated facades are prohibited.

E. Incentives
1. To Be Determined

Streetscape



Character

Residential development along River Road will create a new identity for the Knoxville South Waterfront. Buildings that front this street must be built to the River Road property line (10' maximum setback) and have primary entrances on River Road with parking to the rear of the site. Views to the river from Phillips Avenue and all north-south streets, shall be preserved and/or enhanced. Public access to the river shall be allowed along the axis created by the north-south streets.

River Road
Goose Creek Place
Island Home Avenue

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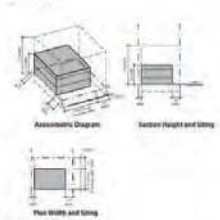
Diagrams



Description

A. Site Configuration
- *Front Setback:* 10' maximum
- *Frontage:* 75% minimum
- *Lot Size:* 3 acre maximum

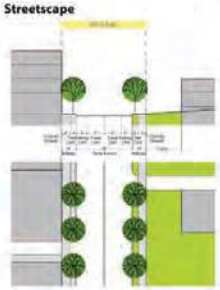
B. Building Configuration
- *Building Height:* 25' and 2 story minimum
  50' and 4 story maximum
- *Entrances:* Shared or individual entrances on Sevier Avenue.

C. Parking
- *Location:* Structured or surface parking in rear.

D. Notes
1. Facades shall be built parallel to principle frontage road.
2. Excessively long facades shall be divided vertically to relate to the proportions of the historic building fabric.
3. On parcels that have a deep lot, additional structures may be located to the rear of the site.
4. Future light rail transit is envisioned for the existing freight rail line.

E. Incentives
1. To Be Determined

Streetscape



Character

Sevier Avenue is the historic commercial heart of the Old Sevier neighborhood. It has the potential to play this role in the future. Historically, buildings with a mix of uses were built up to the street edge. New development in this area shall reinforce the continuity of the street-wall and eliminate the suburbanization of the street with buildings that are currently setback from the street with unsightly surface parking lots. Future parking will be allowed on street or to the rear of the new buildings.

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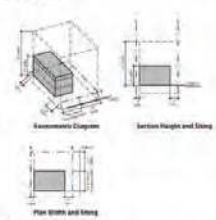
City View | Campus Cove | Quay Village

Encouraging development on the water's edge

Diagrams



Description

A. Site Configuration
- *Front Setback:* 10' maximum
- *Frontage:* 50% minimum
- *Lot Size:* 3 acre maximum

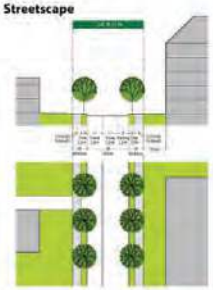
B. Building Configuration
- *Building Height:* 25' and 2 story minimum
  60' and 5 story maximum

C. Parking
- *Location:* Structured or surface parking below building or in rear/side.

D. Notes
1. A long term vision of the masterplan identifies a pedestrian bridge connection from Campus Cove to the University of Tennessee.
2. Structured and surface parking shall be visually screened with landscape elements.
3. Rooftop mechanical units shall be screened from view.

E. Incentives
1. To Be Determined

Streetscape



Character

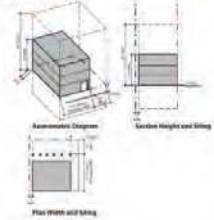
People love to be near the water. These three areas, located between the riverfront and the new River Road and Blount Avenue, respectively, build on the recent residential development along the river's edge. New development in these zones should have a high density with parking incorporated into parking structures or housed beneath the buildings when possible. Large surface parking lots are discouraged. A continuous riverfront promenade with public access under these zones together. A possible pedestrian connection to the University of Tennessee would facilitate redevelopment in the Campus Cove. Buildings facing this linear open space are encouraged to have commercial development on the first floor.

City View
Campus Cove
Quay Village

Bell Tower Walk

Defining a new civic space

Diagrams



Description

A. Site Configuration
- *Front Setback:* 0' (Build to Property Line)
- *Frontage:* 75% minimum on River Road and Sevier Ave.
- *Lot Size:* 3 acre maximum

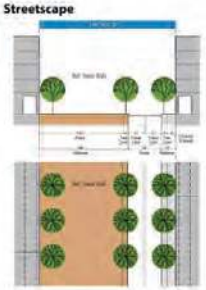
B. Building Configuration
- *Building Height:* 40' and 3 story minimum
  80' and 6 story maximum

C. Parking
- *Location:* Structured or surface parking below building or in rear.

D. Notes
1. Building facades fronting Bell Tower Walk shall have a ground level pedestrian arcade.
2. Structured and surface parking shall be visually screened with landscape elements.
3. Rooftop mechanical units shall be screened from view.

E. Incentives
1. To Be Determined

Streetscape



Character

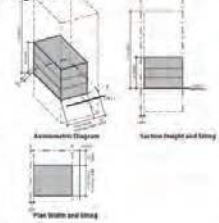
Some of the highest density uses in the Knoxville South Waterfront are located in this area. New development is organized along a civic plaza called Bell Tower Walk. This space capitalizes on one of the most memorable icons in the Old Sevier neighborhood. The plaza creates a "window-to-the-water" from the Baptist Church on Sevier Avenue leading north to the riverfront. This plaza will serve as the vertical celebratory space for the local community and could be used in conjunction with the piers for small scale festivals and urban markets year-round. Buildings facing this linear open space are encouraged to have commercial development on the first floor.

Bell Tower Walk

Henley Gateway

Creating a gateway to downtown

Diagrams



Description

A. Site Configuration
- *Front Setback:* 0' (Build to Property Line)
- *Frontage:* 50% minimum
- *Lot Size:* 3 acre maximum

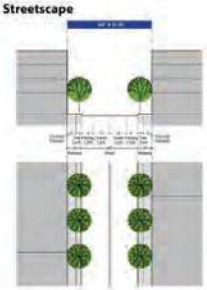
B. Building Configuration
- *Building Height:* 40' and 3 story minimum
  150' and 12 story maximum

C. Parking
- *Location:* Structured or surface parking below building or in rear.

D. Notes
1. A large scale parking structure is envisioned below the Henley Gateway Green (on the existing Baptist Hospital surface parking lot).
2. Future light rail transit is envisioned for the existing freight rail line.
3. Structured and surface parking shall be visually screened with landscape elements.
4. Rooftop mechanical units shall be screened from view.

E. Incentives
1. To Be Determined

Streetscape



Character

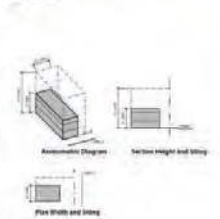
A dominant, figural open space in the shape of a triangular wedge organizes development to the west of the hospital. The Henley Gateway identifies this zone surrounding the Baptist Hospital. The open space gateway provides views to the river and downtown. This zone acts as major new arts zone to downtown Knoxville and a Chapman Highway gateway leading south to the Smoky Mountains. New development is clustered around this open space that contains a parking garage underneath. New development facing the park is envisioned as a complement to the surrounding institutional cast and scale of the Baptist Hospital.

Henley Gateway

Waterfront Marketplace

Establishing a waterfront presence

Diagrams



Description

A. Site Configuration
- *Lot Size:* 1 acre maximum

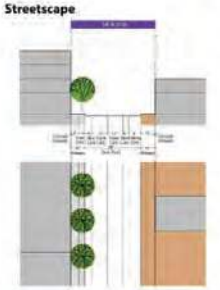
B. Building Configuration
- *Building Height:* 25' and 2 story minimum
  45' and 4 story maximum
- *Building Width:* 20' minimum

C. Parking
- *Location:* Structured or surface parking on side.

D. Notes
1. Structured and surface parking shall be visually screened with landscape elements.
2. Rooftop mechanical units shall be screened from view.

E. Incentives
1. To Be Determined

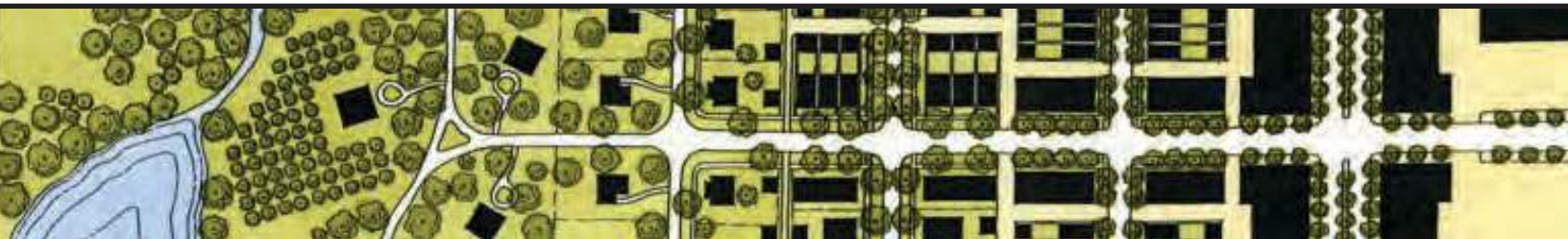
Streetscape



Character

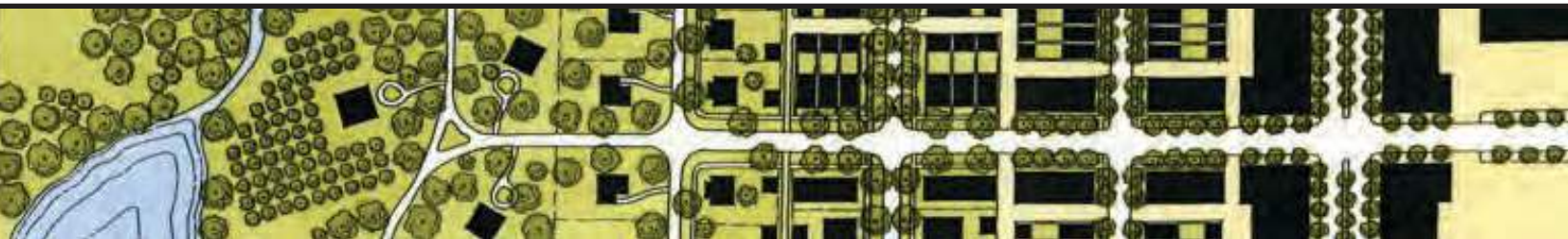
This area is closely connected with the Bell Tower Walk. New development on this site is encouraged to be mixed-use and shall maximize view corridors to the river by orienting buildings perpendicular to the riverfront. Development that creates a continuous visual barrier to the Tennessee River is not permitted. Surface parking on this site shall be kept to a minimum. A new marina at the base of the Gay Street Bridge and boat ramp invite users to spend time on the water.

Waterfront Marketplace



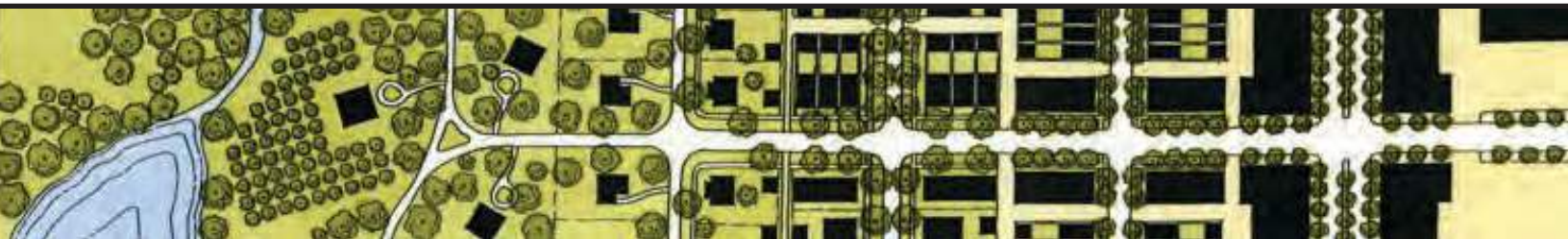
Transit-Oriented Development

- Maximize access to transit
- Range of housing options
- Location efficiency
- Mixed-uses
- Value Capture
- Node & place



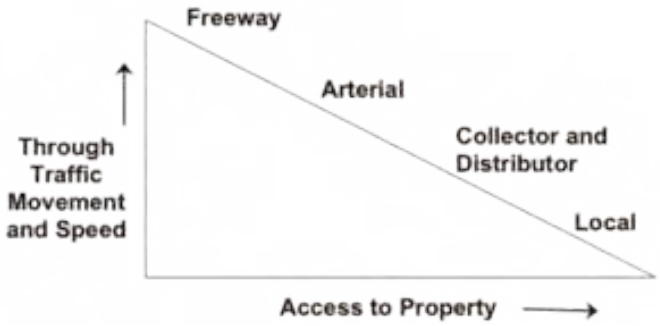
Traditional Neighborhood Development

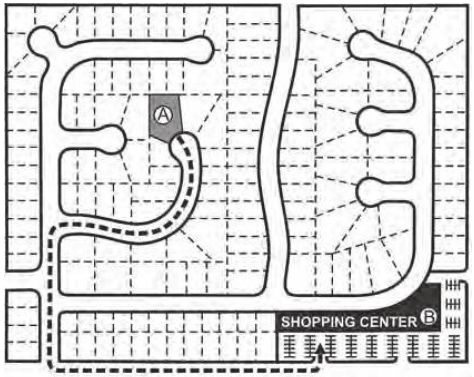
- Complete neighborhood
- Range of land uses
- In walking distance
- Balance of Public & Private
- Community identity
- Greenfield & Infill



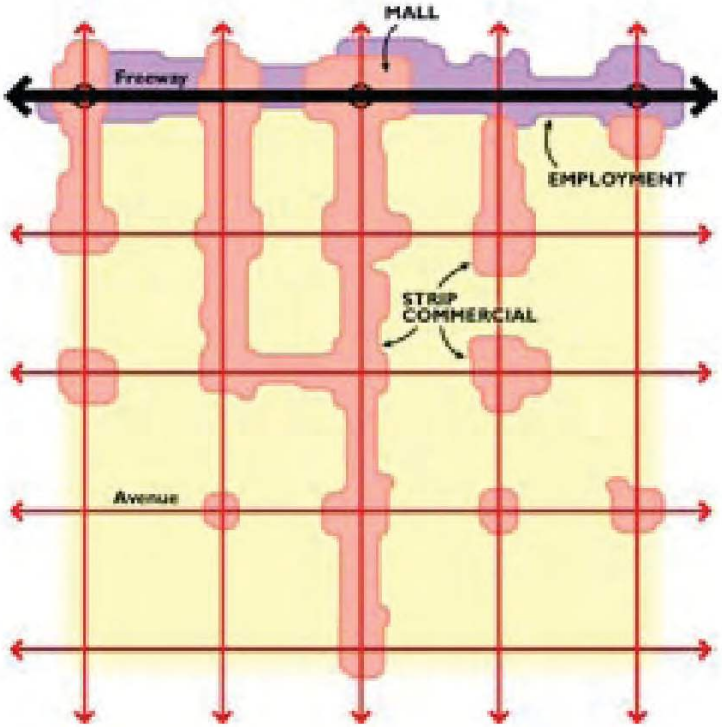
Hierarchical/Conventional Street Network

- Designed for automobile traffic
- Inefficient system for transit
- Functional Classification: Local - Collector - Arterial
- Tendency for congestion to build up on arterials



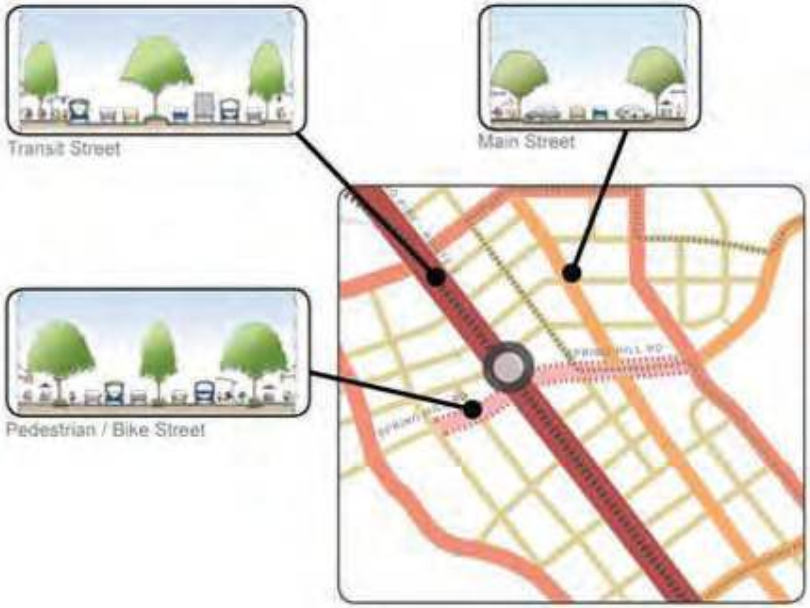


(A) Conventional suburban hierarchical network.



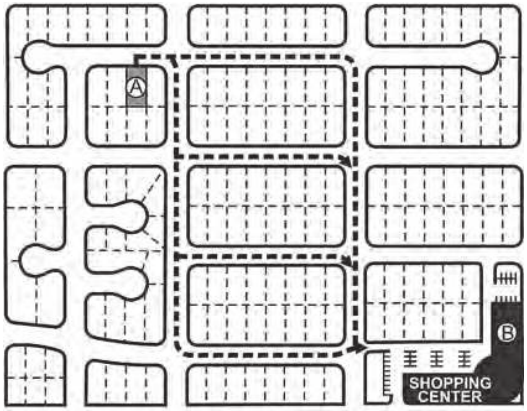
FBC: Grid System/Complete Streets Network

- Form-Based Codes promote Complete Streets
- Thoroughfare assembly through guidelines/prescriptions
  - Regulates design and requirements of Right-of-Way
  - Accommodates various modes of transportation

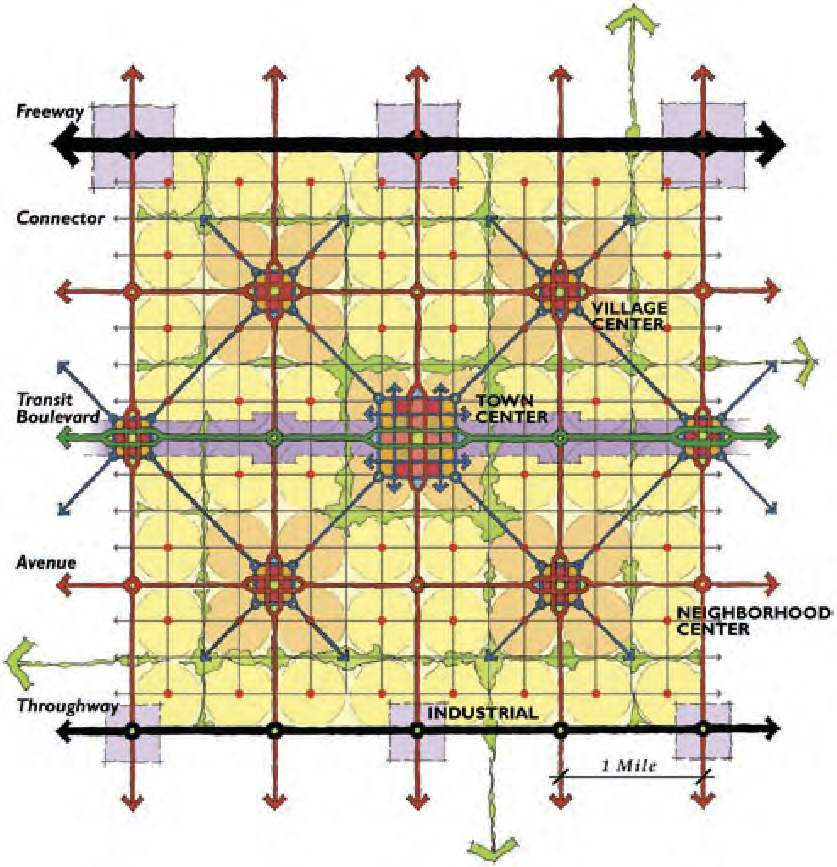


Grid System/Complete Streets Network

- Contextual Network: based on Transect Zones (FBC)
- Multiple connections between origins and destinations
- Access to walking, cycling, and transit



(B) Traditional urban connected network.



Hierarchical/Conventional vs Grid System

	Thoroughfare Types						
Functional Classification	**FREEWAY/ EXPRESS-WAY/PARK-WAY**	**RURAL HIGHWAY**	**BOULEVARD**	**AVENUE**	**STREET**	**RURAL ROAD**	**ALLEY/REAR LANE**
Principal Arterial	■	■	■	■	■		
Minor Arterial		■	■	■	■		
Collector				■	■	■	
Local					■	■	■

Effects of Grid System/Complete Streets Network

- Multiple direct routes & access leads to:
  - ◊ Reduced travel distances
  - ◊ Lower trip generation
  - ◊ Lowers congestion
- Complete Streets:
  - ◊ Provide access to transit
  - ◊ Carry more passengers in less space
  - ◊ Lowers congestion

Studies on Grid System/Complete Streets Network

- Multiple direct routes & access leads to:
  - ◊ Reduced travel distances
  - ◊ Lower trip generation
  - ◊ Lowers congestion
- Complete Streets:
  - ◊ Provide access to transit
  - ◊ Carry more passengers in less space
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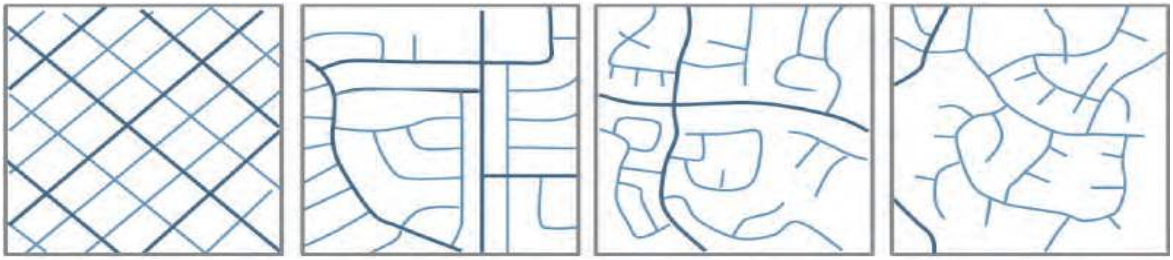


Studies: Hierarchical/Conventional vs Grid System

- ASCE travel demand Conventional vs TND:
  - ◊ -10% volume arterials & collectors TND
  - ◊ +80% travel demand on collector: Conventional
  - ◊ +75% travel demand on arterial: Conventional
  - ◊ Overall TND travel demand 43% lower
  - ◊ Grid reduces travel time and speed
- Growing Cooler by Reid Ewing:
  - ◊ 20-40% higher VMT in sprawl than TND

Taylor, J. (2001). "Transportation and Community Design: the Effects of Land Use and Street Pattern on Travel Behavior." No.11 November 2001
Ewing, Reid. Growing Cooler: The Evidence on Urban Development and Climate Change. Chicago: Urban Land Institute, 2007.

Studies: Hierarchical/Conventional vs Grid System

- SMARTRAQ study
  - -23% weekday travel walkable neighborhood
  - -40% weekend travel walkable neighborhood
- Synergistic effect in lowering VMT:
  - Density, land use, transit, connectivity

SMARTRAQ Final Report. Integrating travel behavior and urban form data to address transportation and air quality problems in Atlanta, by Jim Chapman and Lawrence Frank. Georgia Regional Transportation Authority and Georgia Department of Transportation, April 2004.

TOD vs. Conventional Development

- TOD characteristics vs conventional development:
  - ◊ TOD residents & workers predisposed to transit
  - ◊ Transit and walking more frequent in TOD
  - ◊ TOD households 2x likely to not own a car
  - ◊ TOD increases ridership by 20-40%
  - ◊ TOD transit commute 5-6x more likely

TOD vs. Conventional Development

- TOD Study TCRP Report 128:
  - ◊ 17 cases: DC, San Francisco, Portland, Philly/NJ
  - ◊ Weighted avg weekday: -44% trips than ITE
  - ◊ Variations across urban to suburban TODs
    - Downtown: -70-90% trips than ITE
    - Low-density suburb: -15-25% trips than ITE
    - Grosvenor Station (DC): 54% work/school trips
  - ◊ TOD produced less traffic than conventional

Arrington, G. B., and Robert Cervero. "TCRP Report 128: Effects of TOD on Housing, Parking, and Travel." TRANSIT COOPERATIVE RESEARCH PROGRAM (2008): 124. Print.

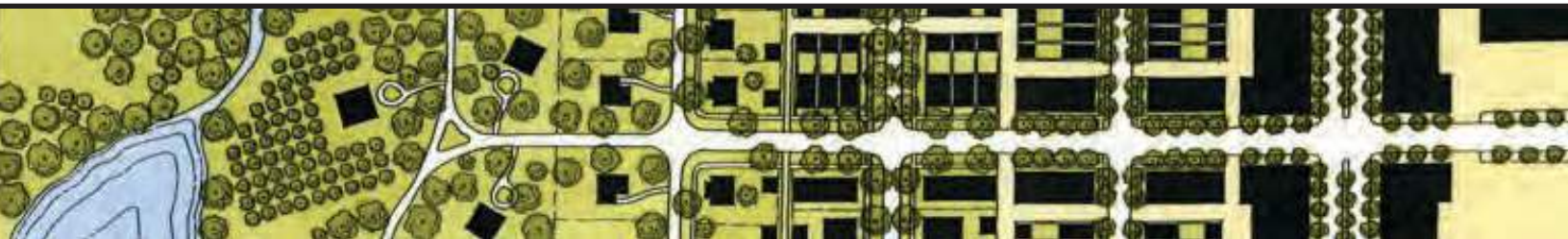
TND vs. Conventional Development

- New Urbanism Best Practices Guide:
  - Density, mix uses, connectivity: -20% driving
  - Chapel Hill: -22% trips TND than conventional
  - Nashville: -25% trips for suburb with better access, connectivity and increase in density
  - Atlantic Station: survey VMT=8; estimate VMT=25.5; region average VMT=34 (per day)

Steuteville, Robert, and Philip Langdon. New Urbanism: Best Practices Guide. Ithaca, NY: New Urban News Publications, 2009. Print.

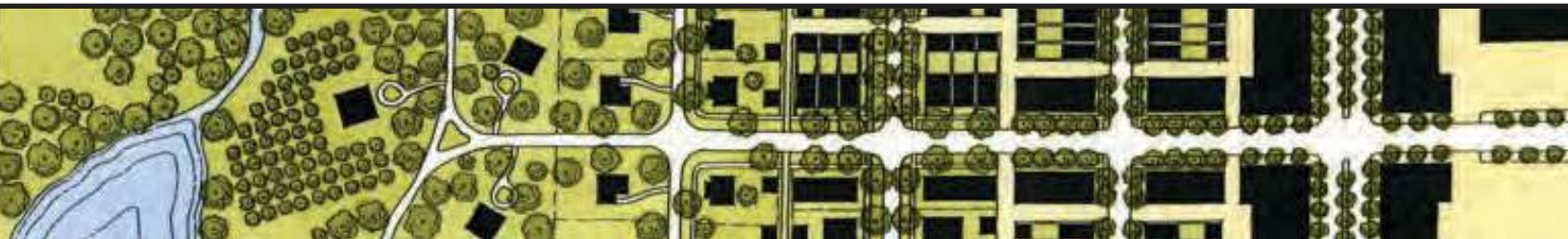
How does FBC Improve Transportation?

- Reduce the transportation capital cost (infrastructure, facilities, bus, train and other public vehicular services).
- Improve Safety



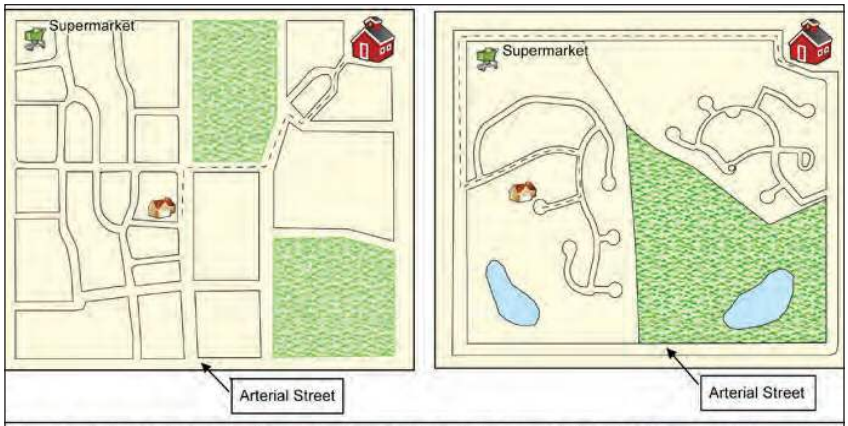
Reducing Transportation Cost

- Reduce "sprawl" and the amount of land required for a development - thus reducing the transportation capital cost required to service that development - by:
  - ◊ Creating compact walkable developments (TODs, TNDs, etc.)

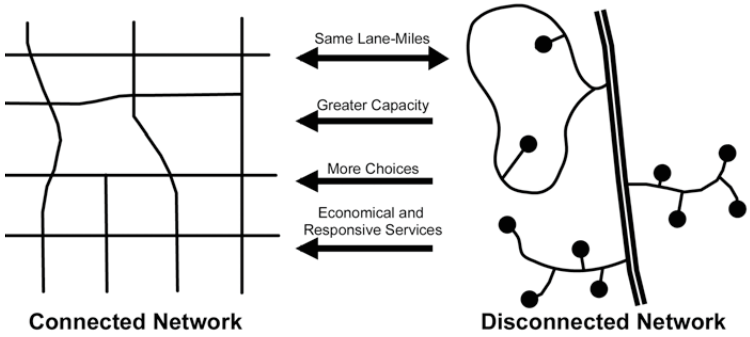


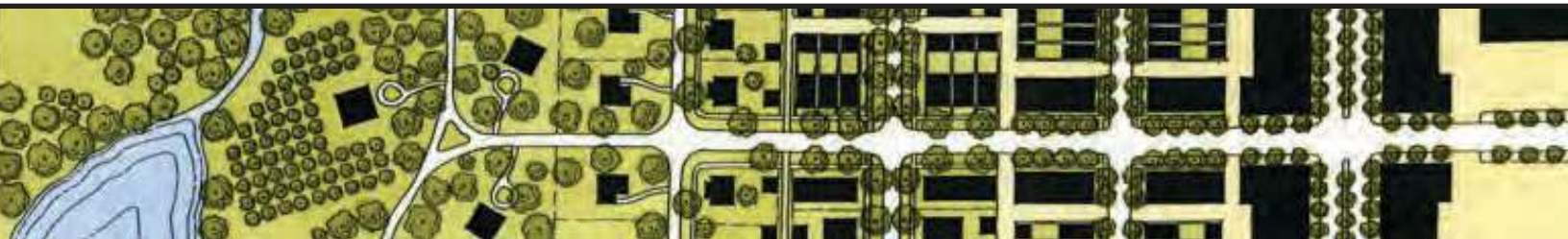
Reducing transportation Cost

- Benefits of compact walkable developments:
  - ◊ Mix of uses rather than separated uses
  - ◊ Greater allowable density
  - ◊ More choices when driving
  - ◊ Lower maintenance cost
  - ◊ Efficient and cost effective delivery of public services



A basic illustration on the benefits of a connected street pattern. In the graphic to the left, a homeowner has a variety of options to travel to school and the grocery store without having to use an arterial street due to the integrated streets of adjacent subdivisions. In the illustration to the right, the homeowner only has the choice of using the arterial street, requiring a more roundabout trip to either destination given that the subdivision is not connected with any other subdivision in the vicinity.

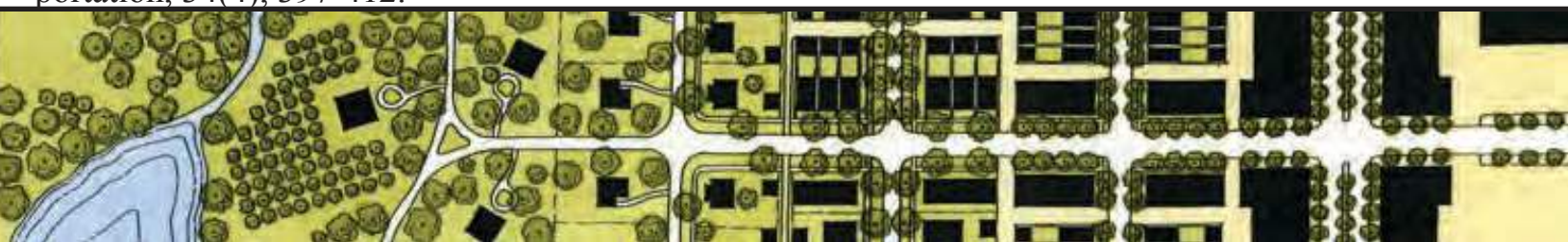




Reducing transportation Cost

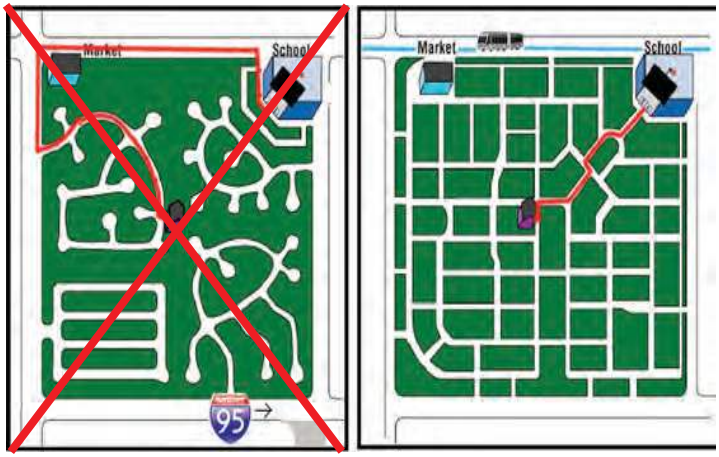
- Examples of how compact developments reduce transportation capital cost:
  - **Sacramento Region Blueprint Transportation-Land Use Study (2004):**
    - Sprawl costs $14.7 billion; compact costs $13 billion
  - **Gainesville, Florida (2000):**
    - Sprawl costs $184 million; compact costs $88 million
  - **Austin (2003):**
    - Sprawl costs $10.6 billion; compact costs $3.04 billion
  - **Salt Lake City (1999):**
    - Sprawl costs $37.6 billion; compact costs $21.9 billion

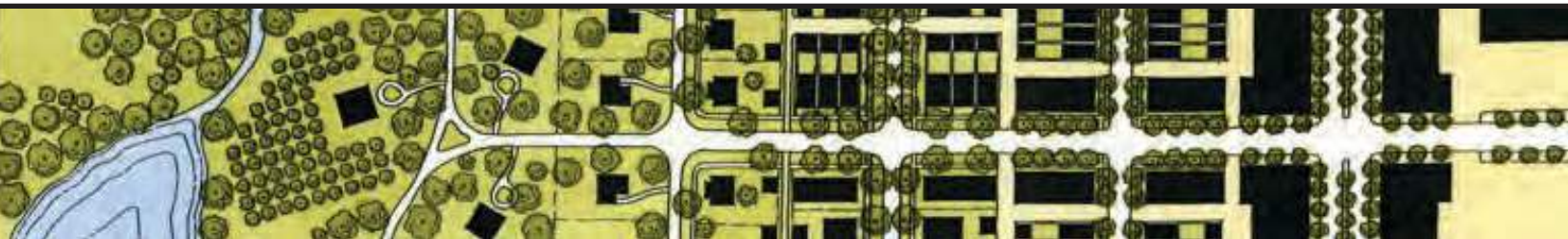
Bartholomew, Keith. (2007). Land Use Transportation Scenario Planning: Promise and reality, Transportation, 34(4), 397-412.



Improving Safety

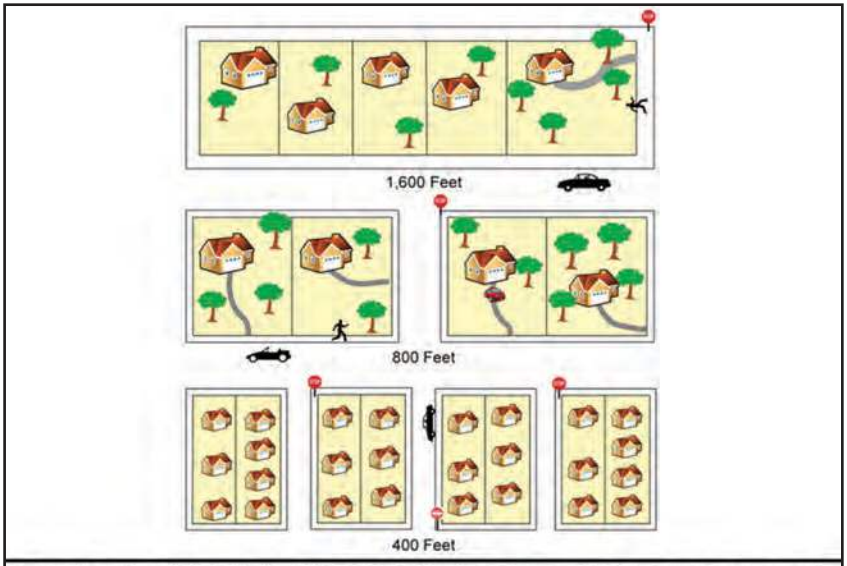
- Improve pedestrian connectivity and reduce the # of disconnected streets:
  - ◊ Reducing block lengths
  - ◊ Creating connected street networks
- Provide streets that accommodate multiple modes of transportation safely:
  - ◊ Providing complete streets





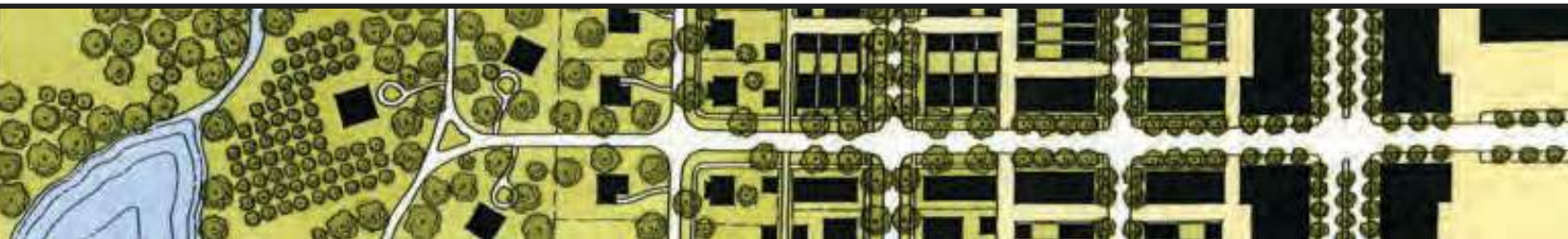
Improving safety

- Benefits of shorter block lenghts and connected street networks:
  - ◊ Safer for pedestrians, motorists and bicyclists
  - ◊ Slower traffic
  - ◊ Lower vehicle miles traveled (VMT)
  - ◊ Fewer fatalities



Lowering the maximum block length will provide for better street and pedestrian connectivity through providing more space for intersections. The appropriate block length for a municipality should be locally determined based on the scale and character that is desired to be achieved. Reducing block length can also help improve traffic safety on local streets. According to a San Antonio, TX study, drivers exceeded the posted speed limits 85% more often on streets exceeding 600-800 feet in unimpeded block length.

1. Jacobsen, P. (2003). "Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Biking." Injury Prevention: 205-209.
2. Lehigh Valley Planning Commission. (2011). Street Connectivity: Improving the Function and Performance of Your Local Streets. http://www.lvpc.org/pdf/streetConnectivity.pdf
3. US Department of Transportation, National Highway Traffic Safety Administration (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. Leaf, W., & Preusser, D.



Improving safety

Form-Based Codes

- Benefits of complete streets:
  - ◊ Shorter crossing time for pedestrians
  - ◊ Improved safety for bicyclist
  - ◊ Lower speeds
  - ◊ Lower fatalities

1. Jacobsen, P. (2003). "Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Biking." Injury Prevention: 205-209.
2. Lehigh Valley Planning Commission. (2011). Street Connectivity: Improving the Function and Performance of Your Local Streets. http://www.lvpc.org/pdf/streetConnectivity.pdf
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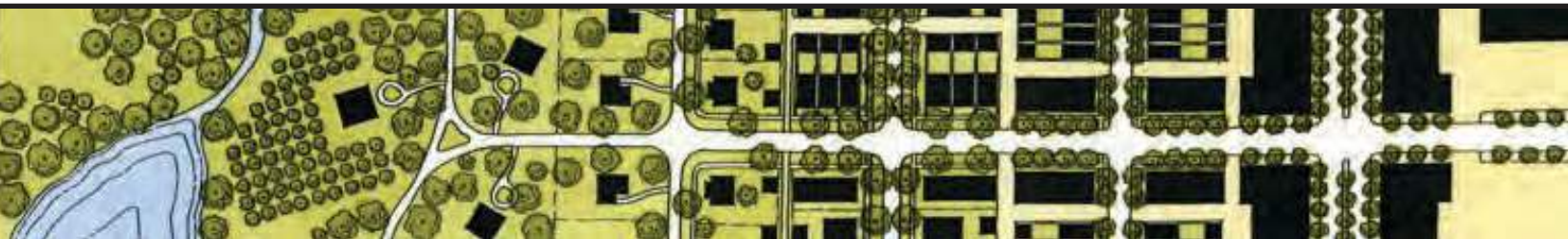
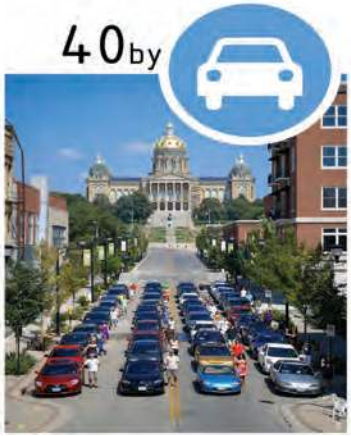
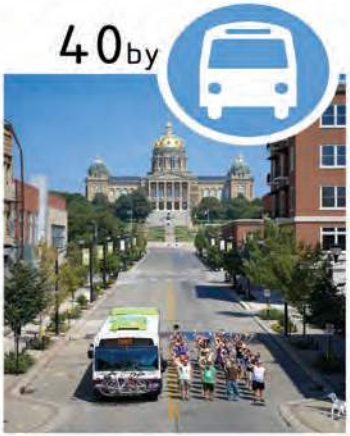
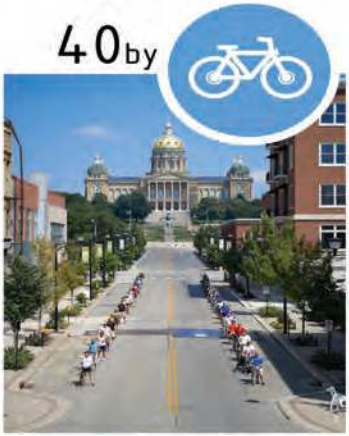


HUD-DOT-EPA Partnership Livability Principles

- Provide more transportation choices
  - ◊ FBC prescriptions for accomodating multiple transportation modes
    - TOD designed with form-based codes
    - Thoroughfare assembly
    - Public space & ROW standards







HUD-DOT-EPA Partnership Livability Principles

- Promote equitable, affordable housing
  - ◊ FBC prescriptions for various lot sizes and building typologies: variety of housing options
    - First Ward Place, Charlotte, NC
    - Glenwood Park, Atlanta, GA
    - New Town, St. Charles, MO
    - Midtown Exchange, Minneapolis, MN
  - ◊ Cities must align land use policies w/ smart growth to ensure affordability is developed and preserved

HUD-DOT-EPA Partnership Livability Principles

- Enhance economic competitiveness
- Support existing communities
- Value communities and neighborhoods
  - ◊ FBC produces economically sustainable places
  - ◊ TODs holds value better than conventional
  - ◊ FBC maintains a community's physical character
  - ◊ FBC improves existing infrastructure, enhancing private sector economic opportunities
  - ◊ TND/TOD attracts retailers & employers through lower transportation costs

HUD-DOT-EPA Partnership Livability Principles

- Coordinate and leverage federal policies and investment
  - ◊ FBC prescriptions on housing ensure proportional funding application to multiple housing types
  - ◊ FBC prescriptions on infill, redevelopment, and preservation guide public/private investment into existing communities

Any Questions?

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