

Transportation Efficient Land Use and Design

A Guide for Local Governments



prepared by:

The Cox Company
Renaissance Planning Group
Rhodeside&Harwell

Transportation Efficient Land Use and Design

A Guide for Local Governments



This Guide was prepared under a contract for the Virginia Department of Transportation and the Office of Intermodal Planning and Investment. The authors are responsible for the facts and the accuracy of the information presented herein. The contents do not necessarily reflect the official views or policies of the Virginia Department of Transportation or the Commonwealth of Virginia Transportation Board. The Guide does not constitute a standard, specification, or regulation.

prepared by the team of :

The Cox Company *Editors: Frank Cox, PE, and Todd Gordon, AICP*
220 East High Street • Charlottesville, Virginia • 22902 • 434.249.2091

Renaissance Planning Group *Principal: Vlad Gavrilovic, AICP*
455 Second Street • Charlottesville, Virginia • 22902 • 434.296.2554

Rhodeside&Harwell *Principal: Deana Rhodeside, Ph.D.*
320 King Street, Suite 202 • Alexandria, Virginia • 22314 • 703.683.7447

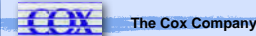


Table of Contents

Preface _____ **1**

I. Introduction _____ **4**

 1. Background _____ 4

 2. Foundational Principles _____ 5

 3. Successful Communities Through Better Plans and Ordinances _____ 6

II. Planning Principles and Design Best Practices _____ **7**

 1. Traditional Neighborhood Development (TND): An Overview _____ 7

 a. Checklist of TND Elements _____ 8

 b. Other Neighborhood Design Considerations _____ 10

 2. Land Use and Urban Design Elements _____ 10

 a. Neighborhoods _____ 10

 b. Mixed Use Areas _____ 12

 c. Non-TND Land Uses in the TND _____ 13

 d. Compatibility: Density and Transitions _____ 15

 3. Design Considerations _____ 15

 a. Building and Lot Types _____ 16

 b. Building Orientation _____ 18

 c. Building Frontages _____ 19

 d. Parking _____ 20

 e. Public Space and Natural Areas _____ 22

 4. Transportation and Circulation Design Elements _____ 24

 a. Network Connectivity _____ 24

 b. Thoroughfare Types _____ 25

 c. Benefits of Alleys _____ 27

 d. Complete Streets _____ 28

 e. Multimodal Transportation Options _____ 29

III. Benefits of Transportation Efficient Planning _____ **30**

 1. Transportation Benefits _____ 31

 a. Transportation Connectivity _____ 31

 b. Reduced Trips _____ 34

 c. Non-Car Trips _____ 37

 d. Commuter Savings _____ 37

 e. Transit Compatibility _____ 39

 f. Safety _____ 40

 2. Land Use and Infrastructure Benefits _____ 40

 a. Streets _____ 41

 b. Parking _____ 43

 c. Infrastructure and Utility Efficiency _____ 43

 3. Fiscal Benefits for Localities _____ 45

 4. Housing Market Benefits _____ 46

 5. Comparative Transportation Analysis _____ 47

IV. Planning for Growth _____ **51**

 1. Comprehensive Planning in Virginia _____ 51

 2. Transportation Efficiency and the Comprehensive Plan _____ 51

 3. Goals and Objectives for Transportation Efficient Land Use _____ 52

 4. Amending the Comp Plan _____ 53

 5. Planning for Improved Transportation Efficiency _____ 53

 6. Comprehensive Plans and the Transect _____ 54

 7. Small Area (Neighborhood) Plans _____ 56

 8. Projections: Planning for the Future _____ 60

 a. Data Collection and Analysis _____ 60

 b. Projecting Future Housing Demands _____ 62

 c. Determining Land Needed for Residential Growth _____ 64

 d. Projecting Future Employment Demands _____ 65

 e. Determining Land Needed for Employment Growth _____ 67

 9. Net and Gross Density _____ 68

 10. The Future Land Use Map _____ 69

V. Engaging the Public _____ **71**

1. Public Engagement Principles	71
a. Engage Stakeholders at All Critical Levels	71
b. Define the Goals for Engagement Early	72
c. Begin the Engagement Process Early	72
d. Include Venues that will Encourage Thoughtful Ideas	72
2. Tools for Public Engagement	73
a. The Public Engagement Tool Kit	73
3. The Importance of Education	74
a. Educate Stakeholders	74
b. Educate and Learn From the Real Estate Community	75
c. Engage and Educate Elected and Appointed Officials	76
4. Planning in an Anti-Planning Climate	76
a. Typical Issues and Answers	76
b. Strategies for Addressing Issues	78

VI. Implementing Transportation Efficient Land Use _____ **80**

1. Regulatory Impediments to Transportation Efficient Land Use	80
2. The Zoning and Subdivision Amendment Process	80
3. Options for Implementation	82
a. By-Right TND	83
b. Targeted TND Zoning	84
c. TND District (Private Sector Initiated)	84
d. Adaptation of Existing Zoning	85
e. Form-based TND District	86
4. Designing TND Implementation Measures: Self Evaluation	87
5. Subdivision Ordinance Provisions	88
a. Connectivity	88
b. Road Design	89
c. Flexibility Provisions	90
6. TND Traffic Impact Studies	90
7. Environmental Regulations	91
a. Stormwater Management and BMPs	92

VII. Supplemental Planning Tools _____ **93**

1. The Official Map	93
2. Proffers and Conditions	97
3. Transferrable Development Rights	98
4. Fiscal Policy	98
5. Phasing and Adequate Public Facilities	99

Appendices (contained in a separate volume)

A. Development Area Planning Examples	
• Residential Infill Development Guidelines - The Town of Blacksburg	
• Bealeton Area Plan - Fauquier County	
• Demographic Analysis and Land Area Demand Projections - The Town of Orange	
• Development Area Build-Out Analysis - Isle of Wight County	
B. Transportation Benefits Studies	
• TND Transportation Benefits - Fluvanna County	
• Transportation Benefits - Albemarle County	
C. TND Implementation Ordinances	
• TND Ordinance - Montgomery County	
• TND Zoning District - The City of Martinsville	
• TND/PUD Zoning District - Fluvanna County	
D. Miscellaneous	
• Community Opinion Survey - The City of Martinsville	
• TND Prototype Residential Lot Types	
• TND Prototype Street Types	
• TND Projects in Virginia	

Preface

The current economic reality in Virginia (and the nation as a whole) calls for more prudent and cost effective approaches in many areas, not least of which is in how we design, build, and pay for our roads and transportation systems. A wasteful pattern of spreading land development and public road infrastructure in an overly dispersed pattern has led to increasing burdens on the public coffers and taxpayer pockets to construct and maintain such a scattered system of roads and communities.

The purpose of this guidebook is to suggest more efficient ways that planners, architects, engineers, and local government officials can plan for growth and change – from both a land use and transportation perspective. This guidebook’s focus is not intended to replace the “toolkit” that planners and public officials now use, but, rather, to better enhance the toolkit by adding tested, successful strategies that better integrate land use and transportation in more cost effective ways. This frame of reference – transportation efficient land use planning and design – aims to add much needed enhancements to the local planning paradigm that are more functionally efficient, economically productive, marketplace aware, and fiscally beneficial.



Compact and traditionally designed communities can deliver significant benefits over typical suburban development.

“What does the Guidebook provide?”

Transportation efficient land use planning and design is an important set of community planning principles that can translate into benefits to Virginia localities. These benefits can affect planners and local officials, as well as taxpayers, prop-

erty owners, residents and businesses. This guidebook defines the benefits of this method of community planning and offers guidance to communities who want to access these benefits by improving transportation efficiency.

“Who will benefit from the Guidebook?”

Local Government Officials, Infrastructure Agencies, Virginia Department of Transportation (VDOT) Engineers, Developers, Homebuilders, Public and Private Planners, Engineers, Architects and Landscape Architects who seek a greater understanding of the links between transportation and land use, and the benefits of transportation efficiency.

“What is transportation efficient land use?”

Transportation efficient land use integrates land use, housing, employment, and transportation planning in order to create more livable communities, reduce traffic congestion, expand travel choices, embrace market flexibility, and reduce construction and maintenance burdens through efficient and well integrated design of private development and public infrastructure.

“How does transportation efficient land use fit into the overall comprehensive planning process?”

Transportation efficient land use provides the principles around which the comprehensive plan can more thoroughly examine and clearly respond to the transportation and land use opportunities within areas of anticipated growth.

“How is transportation efficient land use accomplished?”

Transportation efficient land use provides the tools for more effective and reliable community development through increased coordination between the comprehensive plan, zoning and subdivision codes, transportation design standards, capital improvement programs, and infrastructure financing strategies.

“What are the benefits of transportation efficient land use?”

Consumer Benefits

- Expanded Housing Choice
- More Affordable Housing
- Easier Entry into the Housing Marketplace
- Better Service to those with Special Needs
- Less Reliance on the Automobile
- Closer proximity to Schools, Civic, Institutional, and Religious Destinations
- Safer Streets
- Improved Transit and Ride Sharing Access
- Proximity to Emergency Services
- Less Time on the Road
- Enhanced Quality of Life
- Reduced Energy Consumption

Transportation System Benefits

- Reduced Trip Generation
- Increased Internal Trip Capture
- Increased Transportation System Efficiency
- Reduced Travel Times and Signal Wait
- Improved Relationship to Regional Transportation Network
- Better Distribution of Pedestrian and Non-Car Trips
- Reduced Per Capita Costs for New Road Infrastructure



Neighborhood Structure and Infrastructure Benefits

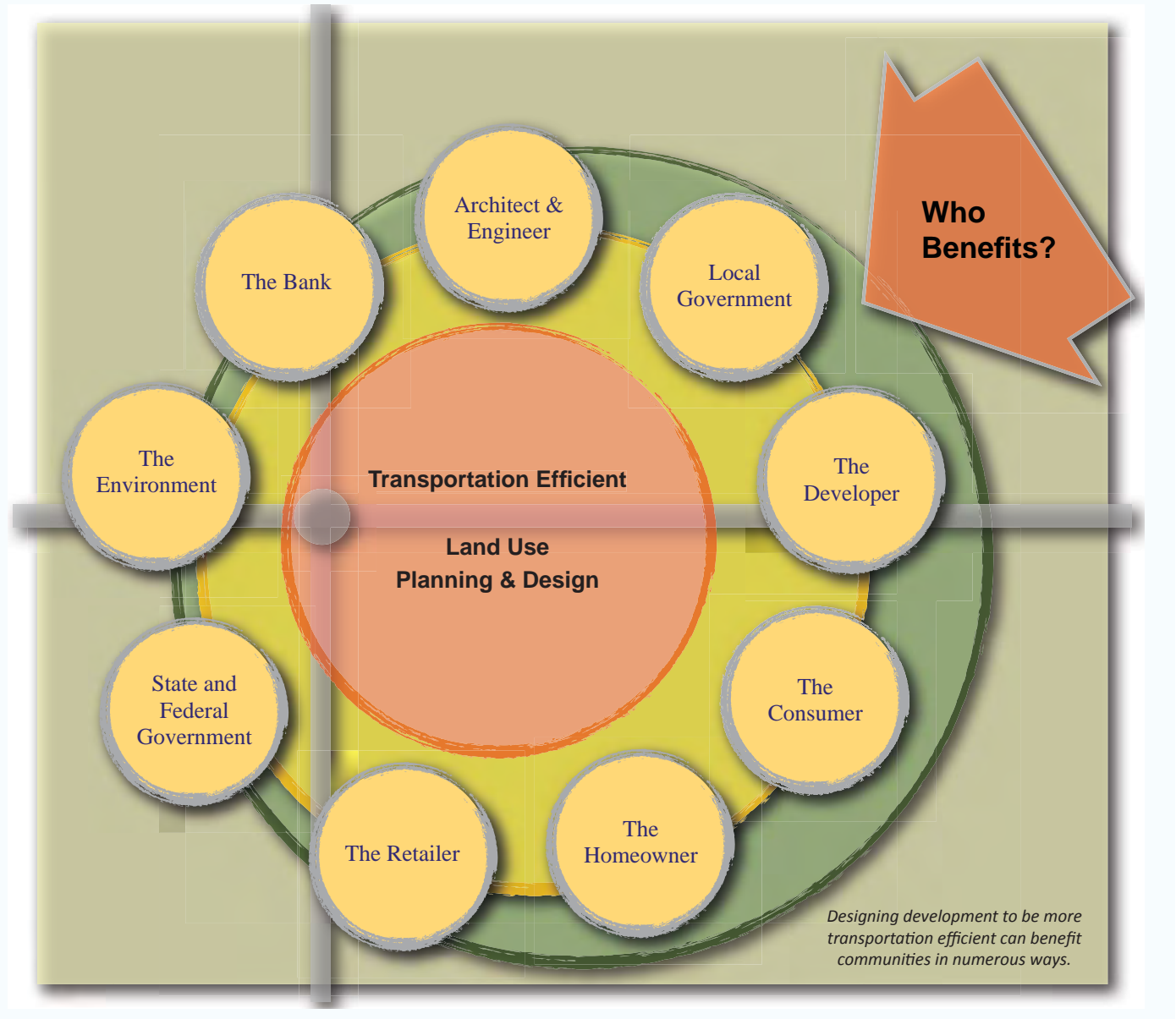
- Improved Organization of Land Uses
- More Efficient Land Utilization Practices
- Traditional, Town- and Village-scaled Blocks
- Reduced Street Widths
- Improved Pedestrian Facilities
- On-Street Parking
- More Efficient Utility Systems
- Environmental Preservation
- Improved Stormwater Management Approaches
- Expanded Travel Choices

Local Government Benefits

- Development that “Pays its Own Way”
- Improved Fiscal Benefits (Capital and Operating)
- Lower Per Household Facility and Infrastructure Costs
- Reduced Transportation System Maintenance Costs
- More Efficient and Manageable Utility Systems
- More Flexible Zoning Mechanisms
- More Flexible Subdivision and Site Plan Standards
- Integrated Standards for Infrastructure Development
- Clearer Rules for Review of Land Use Applications
- Greater Flexibility to Work with the Development Community

State Government Benefits

- Reduced Vehicle Miles Traveled
- Reduced Traffic Impact on State-wide road system
- Reduced Operating and Capital Costs for Road Infrastructure Attributable to Sprawl Development
- Reduced Maintenance Costs Due to a More Compact Transportation Network



I. Introduction

1. Background
2. Foundational Principles
3. Building Successful Communities Through Better Plans and Ordinances



I. Introduction to Transportation Efficient Land Use Planning and Design

1. Background

Transportation efficient land use is a common sense planning and design approach to reducing traffic and unnecessary sprawl in counties, cities, towns, and neighborhoods. It is not a “new idea”, a “movement”, or a “substitute” for other forms of land use and transportation planning. But, in many instances, it’s just a “better idea”. It simply gathers and integrates an existing wealth of practical, cost-effective, and economically productive principles to improve the way we think about, plan, and develop our communities and natural resources.

Benefits of this approach affect both the public and private sector through compact, mixed-use development opportunities that foster individual choice, economies of scale, social and civic interaction, attractive and well-functioning communities, and efficient public infrastructure. As an alternative to conventional, single-use suburban patterns, planning for transportation efficient land use allows greater variety and flexibility in reaching an ever-changing marketplace.



Small setbacks, mixed uses, and pedestrian amenities exemplify development that is more transportation efficient.

Conventional suburban land use was a reaction to a confluence of historic events in this country. In the period leading up to World War II, Virginia towns and cities were generally organized into and developed around neighborhoods that incorporated a mix of land uses within easy walking distance. Community development patterns were based on architectural tradition and local culture.

After the war, local zoning ordinances and institutionalized land use practices ushered in an era of single-purpose, segregated-use, low-density developments that physically separated individuals from where they lived, worked, and shopped. In the 1950s, state and federal government initiatives stimulated the growth of suburbia and automobile dependency with the advent of the interstate highway system. Today, this is how the majority of our nation’s citizens continue to experience the built environment, and the car remains indispensable.

As an antidote to sprawl and the sameness of emerging development patterns, the 1960s ushered in the first of many evolving “movements” in planning and design fields that were intended to capture the imagination and support of both public and private sector planners and stakeholders – “Design with Nature”, “the New Communities Act of 1968”, “Traditional Neighborhood Development”, and “Smart Growth” to name a few.

Transportation efficient land use planning and design draws on the best aspects of these movements, and brings together planners, architects, builders, local governments, and consumers around a set of practices that return Virginia to the wise and prudent traditions upon which its historic towns, villages, and cities were built. In this regard, transportation efficient land use planning and design represents an approach to community building that embraces the past while looking towards the future.

Transportation efficient land use principles integrate the best of 21st century building and technology innovations with time tested community development traditions to yield a variety of both economic and fiscal benefits. The objective is to apply contemporary practices focused on transportation, energy conservation, land use planning, and architecture to achieve environmentally sensitive and economically productive land use patterns. With the addition of §15.2-2223.1 of the Code of Virginia to the well-established legal foundations for comprehensive planning and zoning, the State has now formally recognized the benefits and efficiencies of a local planning process that links land use and transportation.

Given the fiscal demands increasingly placed on state and local governments for road improvements, the majority of future new major and minor collector streets will likely be funded and constructed by private enterprise. Unless new legislation creates other approaches to implementation, these streets will be constructed in conjunction with private sector land development efforts. Based on economics alone, there will be a strong incentive for both local governments and the development community to embrace transportation efficient land use principles.

2. Foundational Principles

The principles of transportation efficient land use share the same foundation of integrating land use and transportation planning as much of the recent legislation at the state, federal and local level. These principles are summarized below. In the following chapters, these principles will be individually examined and amplified with recommendations for prototypical goals, objectives, policies and strategies that may be appropriate for inclusion in local plans.

1. **Appropriate Location and Densities:** Establish viable locations for residential and commercial projects with development densities that respond to anticipated growth by promoting transportation efficient land use principles.
2. **Mix of Uses:** Establish a mix of residential and non-residential land uses within the locality's designated development areas that can create more complete communities and increase transportation efficiency.
3. **Variety of Housing:** Plan for a variety of housing types, including affordable or workforce housing, to meet the range of family incomes expected of future residential growth.
4. **Efficient Lot Types and Geometry:** Encourage better spatial organization through the reduction of front and side yard building setbacks and smaller lot sizes.
5. **Efficient Design Standards and Criteria for Neighborhood Streets:** Incorporate pedestrian-friendly street designs. Reduce subdivision street widths and turning radii at street intersections, and provide standards for enhanced street landscaping, pedestrian improvements, and pavement design.
6. **Neighborhood Connectivity:** Establish connectivity between internal road and pedestrian networks within and between new residential neighborhoods and mixed-use projects.
7. **Local and Regional Transportation Connectivity:** Promote the interconnection of new local streets with existing local streets and roads.
8. **Environmental Preservation:** Ensure the preservation of natural areas and open space in conjunction with the master planning process for mixed-use projects.
9. **Phasing of Development:** Plan for the phasing of new development within designated growth areas that is consistent with anticipated population and employment growth as well as adequate public facilities.
10. **Transferrable Development Rights (TDR):** Evaluate the potential for designated growth areas that embrace transportation efficient land use practices to serve as a "receiving area" for any future TDR program established by the locality.
11. **Fiscal Policy:** Prioritize funding and incentives for housing, economic development, public transportation, and infrastructure projects to encourage transportation efficient land use within a jurisdiction's designated development areas.



3. Building Successful Communities Through Better Plans and Ordinances

Chapters V and VI address the public sector implementation process of land use planning through zoning and subdivision regulations. The mission of both planners and developers should be to achieve a complete and cohesive community. Sometimes, zoning regulations get in the way of this mission rather than support it. This happens when localities do not give sufficient attention to the relationship between the comprehensive plan's land use goals and the implementation tools needed to achieve them.

More often than not, conventional single-purpose zoning districts formulate static rules rather than creating a flexible platform to implement the locality's vision for community growth. Tethered to health, safety and general welfare maxims, the "first generation" of zoning laws in Virginia were instituted to prevent bad developments, but they did not necessarily foster good developments. Many of these early ordinances were instituted at the local level well before comprehensive planning statutes were adopted. Gaps in the linkage between comprehensive planning and zoning still remain today.

The framework for a transportation efficient land use planning approach, as expressed in this document, rests on the assumption that (a) local governments should pro-actively respond to their future growth demands, (b) that the comprehensive plan should thoroughly anticipate and respond to anticipated growth pressures, and that there should be close integration between the comprehensive plan's vision for transportation efficient land use, its zoning and subdivision ordinances, and its capital improvements programs. The various pathways towards achieving this framework are the subject of this document.



Pedestrian oriented buildings set close to streets are often outlawed by conventional suburban zoning.



Communities can be made more efficient by following the example of Virginia's older towns and villages.

II. Planning Principles and Design Best Practices

1. Traditional Neighborhood Development (TND): An Overview
 - a. Checklist of TND Elements
 - b. Other Neighborhood Design Considerations
2. Land Use and Urban Design Elements
 - a. Neighborhoods
 - b. Mixed Use Areas
 - c. Non-TND Land Uses in the TND
 - d. Compatibility: Density and Transitions
3. Design Considerations
 - a. Building and Lot Types
 - b. Building Orientation
 - c. Building Frontages
 - d. Parking
 - e. Public Space and Natural Areas
4. Transportation and Circulation Design Elements
 - a. Network Connectivity
 - b. Thoroughfare Types
 - c. Benefits of Alleys
 - d. Complete Streets
 - e. Multimodal Transportation Options

II. Planning Principles and Design Best Practices

1. Traditional Neighborhood Development: An Overview

The principles of Traditional Neighborhood Development (TND) form the heart of transportation-efficient land use planning and design, establishing the combined functional, physical, and aesthetic patterns for application by community designers, architects, engineers, landscape architects, and traffic planners.

It is a design approach that combines a range of community design elements to create more attractive, efficient, and livable communities. Based on historical town planning principles that were practiced until the emergence of highways and suburbanization in the 1950s, TND provides an alternative to conventional suburban, automobile-oriented planning and design by emphasizing such features as human-scale, compact, and walkable development patterns, mixing of land uses, interconnected networks of streets and blocks, discernible neighborhood centers and accessible open spaces.

By accommodating diverse land uses and housing types while encouraging higher densities than conventional suburban development, TND communities can provide opportunities to live, work, and “play” within reasonable walking and/or biking distances, without the need to get into a car or travel outside of a community in order to satisfy basic daily requirements. At the same time, as described in Chapter III, TND can lead to fiscal and economic benefits by enabling efficient use of infrastructure, contributing to local tax revenue, and creating an in-demand product in the real estate marketplace.



Traditional towns feature homes that are closer to each other, and closer to the street than those found in modern suburbs.



Traditional commercial areas follow a Main Street pattern, with ample sidewalks and multi-story buildings.

A. Checklist of TND Elements

TND is not a one-size-fits-all approach to development; rather, it can be applied to all types of communities - urban, suburban, and, even, rural - and can occur at different scales and in a range of architectural styles. Nevertheless, TND communities do embrace a common set of guiding principles and design elements. The following is a simple checklist of key elements of TND, all of which are described in further detail in the remainder of this chapter:

- a. Pedestrian-oriented street and building design
- b. Proximity to, and connections to, existing developed areas
- c. Human-scale design and layout
- d. A mix of land uses and housing types
- e. Variety of destinations located within walking distance
- f. An interconnected local street system
- g. Availability of pedestrian and bicycle facilities
- h. Reduction of building setbacks and lot sizes
- i. Reduction of street widths and turning radii
- j. Discernible neighborhood centers and edges
- k. Accessible open spaces
- l. Preservation of natural areas
- m. Transit compatibility
- n. Reduced parking footprints and parking located at the rear or sides of buildings





What to Avoid

To enhance transportation efficiency, TND seeks to avoid many of the design elements that characterize conventional, automobile-oriented development patterns. The following elements, typical of conventional suburban and automobile-oriented development patterns, are incompatible with TND:

- Wide streets
- High-speed vehicular travel
- Absence of sidewalks or gaps in the sidewalk network
- Cul-de-sacs
- Lack of a connected street grid
- Separation of uses
- Long blocks
- Excessive curb cuts
- Large surface parking lots fronting the street
- Excessive garage doors and driveways along the street
- Blank walls without windows and doorways
- Barren streetscapes without shade trees or other amenities

B. Other Neighborhood Design Considerations

Although not always included in definitions of TND, the quality of the public realm and the provision of affordable housing options are also important to establishing “complete communities” and merit further mention here.

Public Realm

The quality of the public realm - all of the publicly-owned spaces in between buildings (streets, streetscapes and other public rights-of-way, public facilities, parks, and open spaces) - is a critical element to achieving walkable communities and pedestrian-oriented design. A TND-compatible public realm includes not only a connected network of sidewalks and safe pedestrian crossings, but also streetscapes and public places that enhance the pedestrian experience through attention to eye-level details and amenities such as street trees, lighting, benches, signage, decorative paving and railings, water fountains, and other street elements. All of these elements make streets and sidewalks comfortable and inviting places for pedestrians.

Affordability

The goals of TND - including enabling people to live, work and “play” within a single community, and providing a diversity of housing types - align with the goals for affordable housing. Providing a range of housing types ensures that people of all ages and incomes have the opportunity to, and can afford to, live in a particular community throughout the course of their lifetimes. Moreover, a TND pattern of development offers the opportunity to integrate, distribute and blend in affordable housing throughout a neighborhood, rather than concentrating it in a few housing developments.

Finally, providing the ability to live and work in close proximity to services can contribute to housing affordability by reducing reliance on automobiles and, in turn, transportation-related expenses - a substantial, if not the largest, expense in household budgets. Studies have shown that the transportation-related expenses for residents of compact, mixed-use communities are significantly lower than those of residents of conventional suburban and exurban communities.

While the marketplace has shown that homebuyers are willing to pay a premium to live in compact, walkable communities, the challenge for the future is to provide enough of this type of development to meet the demand and keep TND development truly affordable.

2. Land Use and Urban Design Elements

A. Neighborhoods

Within a transportation-efficient land use context, it is useful to define neighborhoods in terms of walkability. As such, a ½-mile to 1-mile diameter (¼-mile to ½-mile radius) circular area - sometimes referred to as a “pedestrian shed” - is an effective tool for determining the extent and land area of a neighborhood. The ¼-mile radius between the area’s center and edges represents the approximate distance of a five-minute walk and the distance that most people could be expected to walk to a destination before opting to get into a car. It is sometimes appropriate to expand the ¼-mile radius to ½-mile, particularly when a neighborhood is served by transit. It may also be necessary to adjust the boundaries of the pedestrian shed to account for topography, barriers to pedestrian circulation due to existing land uses and infrastructure, and block geometry.



People are usually willing, and able, to walk up to 1/2 mile to reach a destination. This is the “pedestrian shed” around which neighborhoods should be planned. .

What are the Key Elements of a Neighborhood?

Within the pedestrian shed, a transportation-efficient neighborhood should follow a general organizing structure. Key components of a neighborhood include the following:

Center and Edges: The neighborhood should have a clearly defined center and edges, with the center serving as the primary civic focal point of the community. Outside the center, residential uses are located within a 5-minute walk of the center. Offices and neighborhood-serving retail uses are typically located in the center but, in some cases, may also be located at the edge of the neighborhood.

Central Public Space: According to TND principles, the center of a neighborhood should include a public space, such as a civic square, green or plaza that serves as a central gathering place and symbolic center of the community.

Connected Street Network: Neighborhood streets form a connected network to disperse traffic and allow for multiple routes through the community.

Variety of Housing Types: The neighborhood includes a variety of housing options that accommodate a range of incomes, ages and housing preferences and create sufficient residential density.

Civic Uses: Civic uses such as playgrounds and schools should be located within easy walking distance of residences.

Special Civic Sites: Sites with prominent and visible locations, resulting from views along streets or significant topographic conditions, should be reserved for any planned civic buildings in the neighborhood.



Traditional neighborhoods often contain residential uses, commercial uses, and open spaces.

B. Mixed Use Areas

Conventional suburban development is a product of a geometric (often called “Euclidean”) approach to zoning that emphasizes the separation of land uses coupled with rigid lot and building requirements. The resulting development pattern often locates homes and places of business at substantial distances from amenities, services and other frequent destinations, all but requiring the use of an automobile to meet daily needs. For this reason, the single most effective strategy for creating transportation-efficient communities is to allow for a flexible mix of uses within a neighborhood or district. The neighborhood-building advantages of planning principles that embrace appropriate scale and mix of uses include:

- The opportunity to conduct multiple daily activities within a short distance of home and work
- More transportation choices by supporting multiple modes of transportation
- Fewer automobile trips and vehicle miles traveled (VMT)
- More trips made by walking and bicycling
- More efficient use of land and the preservation of natural areas and undeveloped land
- More efficient use of public infrastructure and services, including:
 - transportation infrastructure
 - water and sewer
 - public utilities
 - schools
 - police, fire and emergency medical services
- A diversity of housing options for all ages and incomes
- More vibrant streets and commercial districts by locating businesses and services close to where people live
- More active and better-utilized public spaces as a result of proximity to both residences and commercial uses
- More “eyes on the street,” improving safety and security (real and perceived)



Vertical mixed use puts apartments or offices above retail.

Scale and Mix of Uses

There is no optimal mix or magic formula for planning mixed-use areas. Rather, the composition and scale is dependent on a variety of factors, including a neighborhood’s location, character, market demand, and the quantity of commercial uses that can be supported by an existing or anticipated residential population. In smaller communities, mixed-use development may constitute simply a few neighborhood-serving shopfronts located in the center of an otherwise residential village. In larger, more urbanized communities, entire districts of vertical mixed-use - multi-story buildings with ground floor retail and housing or residential uses on the upper floors - may be appropriate.

Regardless, it is important to allow for a variety of scales of retail and commercial uses in order to meet common household needs, such as convenience stores, post offices, and banks, as well as larger office and retail uses. Moreover, it is important to provide the density of residential uses needed for successful retail to survive and flourish.

Types of Mixed-Use Development

Mixed-use development may be either vertical or horizontal. As in the example above, vertical mixed-use entails including a variety of land uses within a single building, stacked vertically on multiple stories. Horizontal mixed use involves concentrating multiple land uses within close proximity - for example, retail uses located adjacent to office uses and in close proximity to residences.

While vertical mixed is optimal because it uses building space and land most efficiently, it is not always supported within the marketplace and more frequently located in existing city centers. Horizontal mixed-use is another way to diversify single-use districts and allow more daily activities to occur within a particular neighborhood or community. Horizontal mixed-use may be especially appropriate for small towns and villages where multi-story buildings currently do not exist or as a first phase in a longer-term transition to more compact, pedestrian-oriented design.



Horizontal mixed use simply puts residential and commercial uses near each other.

Market Attractiveness

From a market perspective, TND building forms and neighborhoods have been shown to be more desirable and valuable than conventional forms of development. This creates the opportunity for higher profitability for the developer and increased assessment valuations for the locality. In addition, studies have shown that, following the economic downturn and foreclosure crisis of recent years, mixed-use neighborhoods have held their value better than conventional forms of development. Localities, therefore, should take an active role in educating developers and the general public about the benefits of mixed-use development and more compact development patterns.

To facilitate mixed-use development in an uncertain development market, it may be necessary to allow for greater flexibility and let the market determine the mix of uses. A form-based approach to zoning (see Chapter VI) is one way to allow for flexibility while still ensuring that new buildings are compatible with transportation efficient design principles. By emphasizing building form over land uses, a form-based code can clearly define the form of a building while letting the uses within a building be determined based on the market.

C. Accommodating Non-TND Land Uses and Building Forms in a TND Context

Retrofitting existing communities to incorporate TND concepts cannot happen overnight. If the market for development or substantial redevelopment does not exist, it may be necessary to gradually transition to more compact, walkable development. The images on a nearby page demonstrate how the phased redevelopment of underdeveloped properties can be realistically achieved in response to marketplace demands.

In addition, to attain a jurisdiction's desired levels of economic development or to provide essential services such as schools, there may be pressure for localities to accommodate a scale of building forms or uses that do not typically fit within the language of TND. To address these types of challenges, local jurisdictions can consider a variety of strategies, including the following:

Transition Existing Shopping Centers into a More Compact Form

Streetscape improvements around existing shopping center sites can screen parking and establish a walkable public realm that sets the stage for future development with a more compact, town or village-like character. In the long run, large expanses of surface parking provide an ideal opportunity for establishing or connecting a grid of streets. In the interim, pedestrian ways can be integrated into parking lots to begin to establish a pedestrian-oriented environment and pedestrian connections.

Preserve, Buffer and "Repackage" Industrial and Light Industrial Uses

It is often necessary, and appropriate, to protect existing industrial and light industrial uses in order to preserve the jobs and tax base these businesses provide. In many cases, it is appropriate to simply screen these uses with substantial vegetated buffers that separate them from surrounding residential or mixed-use neighborhoods and to "green" industrial uses by addressing ways to provide "low impact design" principles



1. Existing auto-centric suburban corridor.



2. Sidewalks and street trees added.



3. Existing uses adapted to be more TND friendly.



4. New TND uses.

to capture and clean stormwater, ideally as part of a regional (rather than lot-by-lot) approach to managing stormwater.

In addition, it is possible to develop new mixed-use and commercial development adjacent to older industrial and light industrial uses, by orienting development such that new mixed-use development backs up to existing industrial and light industrial uses.

However, it is also possible to “repackage” light industrial and some industrial uses in a different building form, so that they can serve as transitions to adjacent mixed-use districts. Some form-based codes have addressed this type of transition by establishing a “workshop” building form in which light industrial or industrial uses are housed in structures that include workshop or commercial uses fronting the sidewalk, with space further back from the street reserved for more intensive industrial activities and parking and loading located at the rear of the building.

Integrate Schools into Neighborhoods

Integrate schools into neighborhoods to encourage walking and bicycling. As one rule of thumb, at least half of a neighborhood’s residences should be located within a ½ -mile radius of a school. However, current school facility standards require significant amounts of land, which complicates efforts to locate schools within a compact community.

Where feasible, designing schools according to an emerging model of smaller, community-oriented schools may provide an alternative. Where larger schools are required, a local jurisdiction can consider ways to reduce the school footprint, such as joint-use agreements between schools and parks departments for shared use of fields and other recreation facilities. Regardless, it is important to locate schools as close as possible to where people live, in order to encourage children to walk or bike to school, thereby reducing costs for school bus services.

D. Compatibility: Allocating Density and Transitions Between Uses

While gradations of land uses and densities across a community are an important characteristic of transportation-efficient communities, it is important to pay close attention to how density is distributed throughout a community and to ensure graceful and sensitive transitions between land uses and densities. The following steps can help ensure cohesive and compatible land use planning:



TND brings home, work, and shopping into closer proximity, making it much easier to travel between them.

[Respond to the scale and density of surrounding land uses.](#) If surrounding land use is low-density residential uses, ensure a gradation of land use intensity in which building heights and densities step down in scale as a community extends outward. In general, mixed-use development and high-density residential uses should be located at a district's core and should transition to medium-density homes and lower-density homes as it approaches existing lower-density residential areas.

[Match similar land uses and building form across streets](#) to ensure compatibility of facing buildings.

[Shift land uses, densities, and building form at mid-block](#) (for example, at alleys) to ensure that building form and land uses are compatible along both sides of a street.

[Require transitions](#) when a TND district abuts an existing residential district, either through the addition of landscaped buffers and screening or by requiring that the abutting portion of the TND district meet the adjacent district's zoning requirements.

3. Design Considerations

In addition to land use, it is also important to consider the finer-grain details of building form that influence both a sense of place and how a neighborhood is experienced block-by-block. Building height, building massing, the size of blocks and lots, the placement and orientation of buildings relative to the street, the use of the space in between buildings - all of these considerations determine the scale and character of a neighborhood and how it accommodates a variety of people, activities, and transportation modes. This section considers some important aspects of building form, including building and lot types, building orientation, the relationship between parking and building form, and the design of public spaces.



Greater density means that TNDs require greater design coordination.



Small setbacks brings houses closer to the street, and make neighborhoods easier to navigate on foot.

A. Building and Lot Types: Encouraging Variety

In addition to the mixing of land uses and densities at a larger scale, it is also important to encourage a variety of building and lot types within a neighborhood, and even within a single block. With regard to density, a mix of building and lot types can permit sufficient levels of density to support vibrant village, town and urban centers. Moreover, a variety of housing and lot types within a single neighborhood provides opportunities for all ages, income levels and household sizes to remain in a single neighborhood over the course of their lives. Finally, from a community design perspective, variation in building types - as opposed to a “cookie cutter” approach - can create more interesting streets and streetscapes. Specific strategies include:

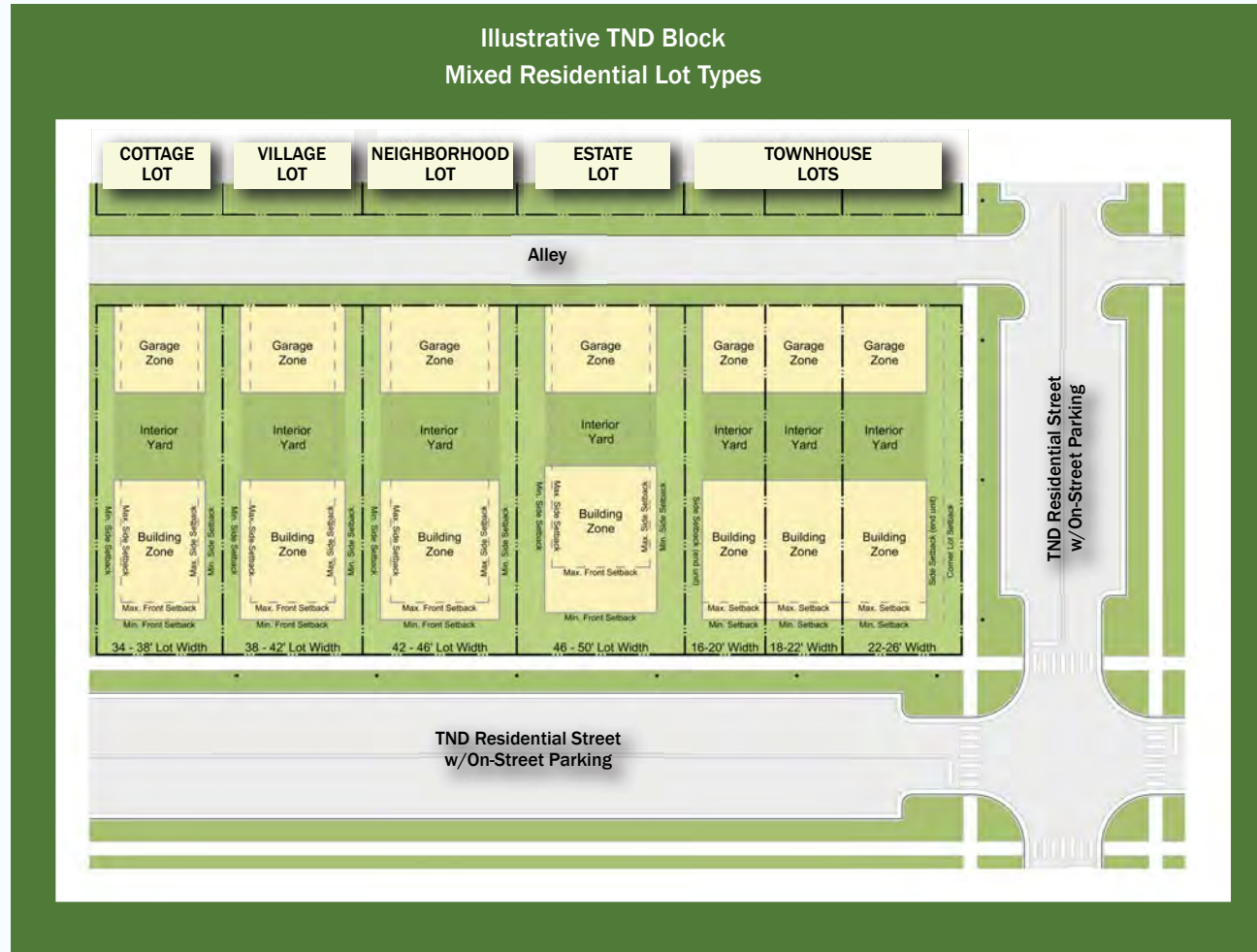
1. *Reduce and cap setbacks* to encourage smaller setbacks from the street and to establish guidance for maximum setback distance.

2. *Provide smaller and more varied residential lot sizes* and configurations to encourage residential density and a continuous, pedestrian-oriented street wall. Lot types may include cottage lots, village lots, neighborhood lots, suburban lots, townhouse lots and multifamily lots, depending on setback distances and the density of residential uses. Other potential lot configurations include “courtyard” lots, in which numerous attached or detached homes are grouped around a common open space, and “carriage house” lots, in which a smaller home (or accessory dwelling units) occupies the same lot as a larger house. Prototype residential lot types adopted by some Virginia jurisdictions are shown in the accompanying examples that illustrate potential lot dimensions, including setback distances, lot depths and lot widths.

3. *Explore the full range of available housing types*, rather than conform to the single typology frequently evidenced in subdivisions of prior generations. A variety of housing types can be compatible with Traditional Neighborhood Development (TND). Higher-density housing types may include apartments (multifamily structures and multifamily units within mixed-use structures), townhouses, and duplexes. Single-family detached homes can range from small-lot single-family residences to larger-lot homes (i.e., at or above 4 dwelling units per acre) or they may take on less-conventional forms such as cottage court configurations, live-work units, or accessory dwelling units.

4. *Provide alley access* (see “The Benefits of Alleys” below) to facilitate rear parking/service access and accommodate the development of smaller and narrower lots.

5. *Define and illustrate a range of building types* desired and permitted in a particular neighborhood. Doing so enables local governments and communities to clearly communicate the types of building forms expected from developers. The accompanying figure illustrates the range of building types specified in one predominantly rural county’s zoning code for a village center area designated for compact development patterns.



The typical TND street is characterized by a mix of lot and house sizes, as well as a variety of house types (including attached and detached homes). Lots are often much smaller than those found in typical suburban developments.





(1) Detached House

A detached single-family residential building type that is developed with open yards on all sides of the structure.



(2) Duplex Building

A two-family residential building type, where the residential units may be arranged one above the other or semidetached by common footing.



(3) Townhouse Building

A single-family residential building type consisting of three or more attached units, each their own front and rear access to the outside, located on a separate lot owned individually, and not located over another unit.



(4) Apartment Building

A building type containing more than two dwelling units on the same lot in which the units, buildings, common areas and facilities are owned by an individual person or entity.



(5) General Building

A building type intended primarily for commercial, office, manufacturing and employment uses.



(6) Mixed Use Building

A building type intended primarily for ground floor commercial uses with upper-story residential or offices uses.



(7) Civic Building

A building type intended primarily for providing education, entertainment, fraternalism, worship, or community services to the public.



(8) Cottage Court

A group of small detached or attached houses centered around a common open space or courtyard.



(9) Carriage House

A smaller dwelling located on the same lot as a detached house. May be located above a garage.

The most transportation efficient communities have a wide variety of buildings and uses, all set close to streets and on small lots.

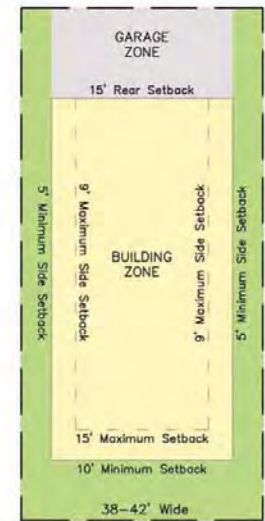
B. Building Orientation: Engaging the Street

Buildings in TND communities should be scaled to pedestrians, such that buildings anchor (or architecturally “engage”) the streets on which they’re located. Front building entrances should be located at the edges of sidewalks, facing onto streets. It is important to ensure that buildings are placed such that they engage the street and sidewalk while establishing a coherent street wall. Strategies for achieving building orientations that contribute to street character and the pedestrian environment include:

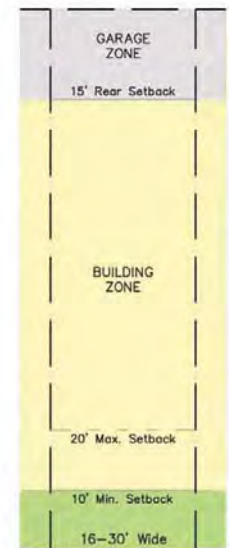
1. *Establish build-to lines or build-to zones*, in lieu of minimum setbacks, to establish a coherent street wall and appropriate relationship of buildings to the street. Build-to lines establish a consistent distance between the front property line and a building façade. Build-to zones establish the area of a lot where a certain percentage of the front building façade must be located, based on both minimum and maximum setback distances.
2. *Ensure that buildings anchor street corners* to accentuate intersections, and to reinforce and establish corners as gateways to particular blocks or corridors. In addition, special corner entrances or incorporation of architectural elements such as taller or more elaborate roof lines can further reinforce corners.

C. Building Frontages: Creating Interesting Streetscapes

1. *Provide adequate “transparency” or window coverage* at street level. One rule-of-thumb holds that a minimum of 70 percent of any ground-floor building wall facing a public sidewalk should be faced with windows and door openings and will be kept free of shelving and opaque displays.
2. *Establish a minimum width of building frontages* to ensure a consistent street wall that engages the street. If build-to lines or build-to zones are established, the minimum frontage may be measured in terms of the minimum percentage of a building frontage that should be located along the build-to line or in the build-to zone. This percentage will vary, depending on land use and neighborhood character. For example, while a 70 percent frontage width might be appropriate for single-family detached housing, a higher percentage (often as high as 100 percent) would be appropriate for mixed-use areas, commercial districts, and higher-density residential areas with multifamily residences or townhouses.
3. *Encourage variation and articulation of building façades* to create an engaging and interesting streetscape. Potential techniques include:
 - Varying building façade materials, textures and architectural features
 - Modulating façades to establish a street wall rhythm
 - Incorporating elements such as expanded window bays, awnings and overhangs, recessed building entrances, porches and balconies to add texture and interest to the streetscape
 - Varying rooflines through the use of different roof styles and elements



Homes face streets and sidewalks, not driveways and parking.



Porches and windows front the street, not garages.



The articulation of build facades provides an interesting and vibrant TND streetscape.

4. *Minimize blank wall areas.* For example, codes for traditional neighborhood districts often establish maximum extents for blank walls, limiting the portion of a building façade without windows, doors, changes in building materials or articulation, in order to break the monotony and put “eyes on the street.”

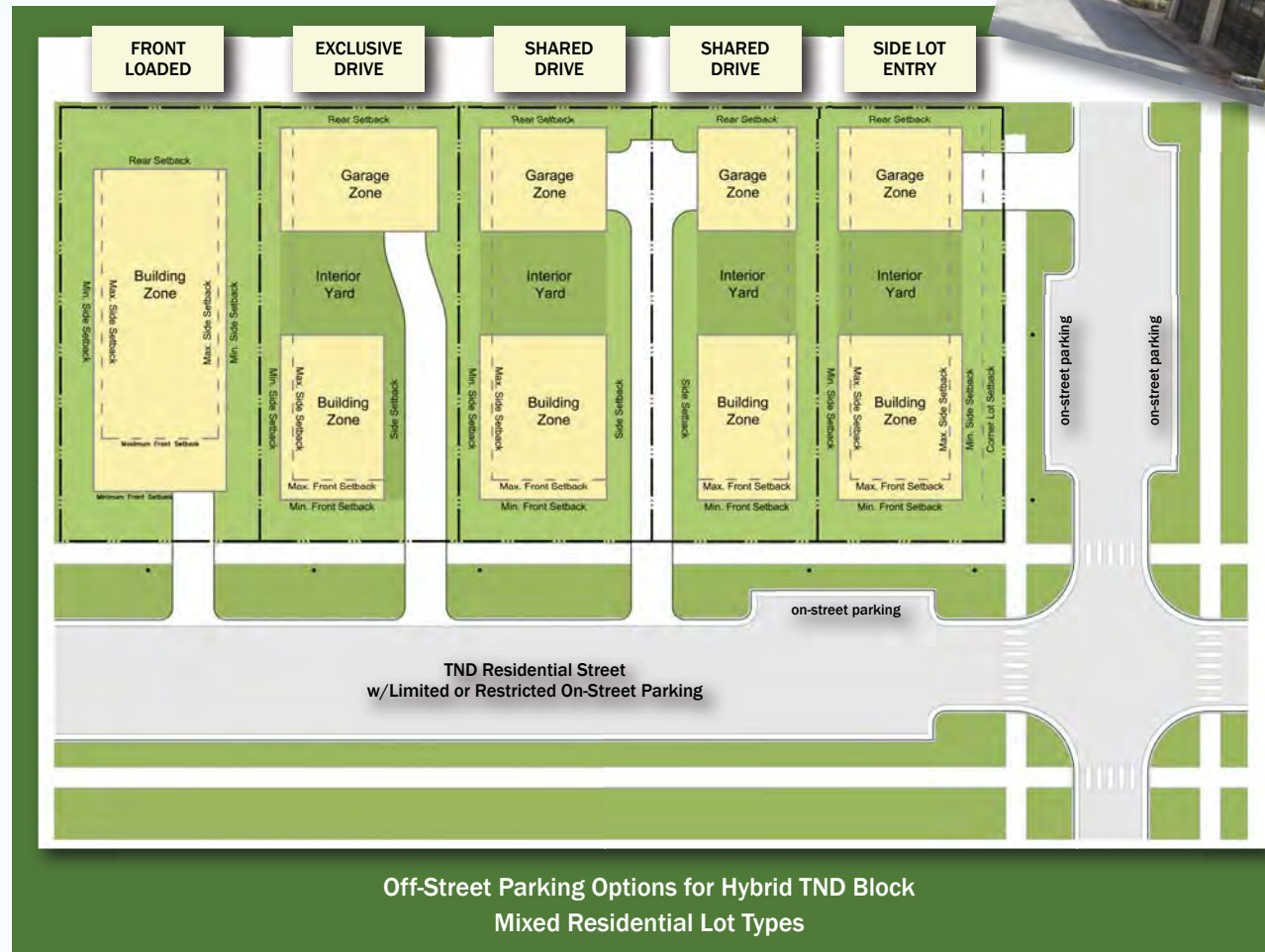
5. *Discourage placing residential garage doors, parking or service areas between the public right-of-way and building frontages.* In addition to disrupting the pedestrian environment with curb cuts and automobile incursion onto the sidewalk, placing the garage fronts and service areas facing the street send a message that pedestrians do not belong there.

D. Parking and the Built Environment

Parking is a critical factor in influencing the form of the built environment. How parking is incorporated into a community - how much is required and provided, where it is located, and how it is incorporated into the block and street - is a critical factor in determining whether a neighborhood can meet the principles of TND. Excessive parking requirements, too many or poorly-located surface parking lots, frequent driveways and parking entrances - such parking decisions can turn a potentially compact and walkable neighborhood into a built environment that is hostile to pedestrians and overtly communicates a deference to the automobile. While ensuring context-appropriate and realistic parking requirements is an effective way to forestall the dominance of parking, there are other design decisions that can help mitigate the impact of parking on the overall built environment. Potential strategies include the following:

1. *Revise parking standards.* Lower parking requirements in areas where walking, bicycling and transit are viable alternative modes of transportation. Calibrate parking requirements with actual demand for parking.

2. *Maximize on-street parking.* In addition to maximizing available space for parking, on-street parking also enhances the pedestrian environment by creating a buffer between the street and the sidewalk. In neighborhoods with commercial uses, available on-street parking not only helps businesses attract customers but also encourages business owners to orient their buildings to the sidewalk and pedestrians.



TNDs feature a mix of on-street parking, garages on alleys, and other arrangements like the shared drives, and back yard garages shown here.

3. Encourage shared parking arrangements. Shared parking can occur in a variety of ways. Parking for daytime uses (such as office buildings) could be shared with nighttime uses (such as theaters and nightlife), rather than building separate parking facilities for both uses. Shared parking arrangements among commercial or civic uses can reduce the number of parking spaces required. When combined with cross-lot access between adjacent lots and internal drives, such arrangements can increase overall connectivity while reducing traffic on adjacent streets.

4. Locate off-street parking at the sides and rears of buildings or provide structured parking. Do not allow off-street parking bays to be located in front of a building alongside the street. Structured parking may be a viable option for commercial uses with a density that can support structured parking.

5. Screen parking areas. Where existing surface parking lots face the street, screen parking with vegetation or walls. A common approach is installing a planted strip with continuous evergreen hedges, but a variety of approaches are possible as long as they result in a more welcoming environment for pedestrians on sidewalks along parking lot edges.

6. Incorporate convenient bicycle parking as part of the overall parking equation. If bicycle parking is placed in visible locations on the street, it communicates the larger message that the neighborhood and its paved areas are not just for cars.

E. Public Space and Natural Areas

Incorporating public open spaces - large or small, active or passive - is an important element in creating communities with a sense of place. However, the selection, location and design of public spaces can determine the ultimate success of these spaces.

In TND communities, while it is important to provide sufficient access to open space for all residents, the quantity of open space is frequently less important than the quality of these spaces - their design, how they contribute to a sense of place and

community, how well-utilized they are, and the manner in which they are integrated into the physical fabric of a community. In this respect, the smallest of public spaces (squares, greens, plazas, linear parks, pocket parks, etc.) are often the most important within a compact, mixed-use community. Such spaces add both organization and variety to the form of a neighborhood, serving as symbolic landmarks and focal points, while providing a respite from the surrounding streets and buildings.



TND open spaces are important parts of the neighborhood.

In compact communities, these public spaces can respond to the buildings and streets that surround them, or they may take advantage of existing natural features within a community. In either case, the following guiding principles and criteria can help local jurisdictions conceptualize and design successful public spaces:

1. **Provide a variety of usable public spaces**, including options for civic greens, plazas or squares, parks and greenways, located at identifiable intersections.
2. **Incorporate public spaces into a larger connected network of open space** throughout the surrounding area.
3. **Locate a significant square or civic green space at the central core of a neighborhood** to provide opportunities for gatherings, festivals, farmers markets, and informal recreation. Specific design criteria for squares and civic greens include the following:

- a. *Locate squares and civic greens at the core of mixed-use centers, bounded by streets or public rights-of-way on multiple sides.*
 - b. *Squares generally function as active pedestrian centers, while greens are generally intended for less-intensive foot traffic. For this reason, the design of squares should include a higher percentage of paved surfaces than civic greens.*
 - c. *Squares and civic greens generally should not include active recreational uses such as ballfields.*
4. *Ensure that a park, multiuse trail or playground facility is located near where people live. These spaces should either be included within, or in close proximity to, residential development.*
 5. *Ensure that all open space is integrated into new development and is easily accessible to surrounding neighborhoods.*
 6. *Incorporate linear open spaces to provide connections throughout the open space network as well as alternate routes to major destinations.*



Open spaces should be both central and well-planned.

7. *Include active recreation areas, such as playing fields and ball courts, within walking distance of residential neighborhoods. Where possible, explore joint use opportunities to utilize school recreational facilities for public use or public recreation areas for school use.*
8. *Take advantage of existing topography, views and vistas, and other prominent natural features, such as water bodies, as the focus for open space amenities.*
9. *Incorporate stormwater management functions into public open spaces. Stormwater management facilities do not need to be stand-alone, isolated, single-use facilities; rather, they can serve as public amenities by providing public access and thoughtfully designing water features and plantings.*
10. *Preserve natural areas and natural features, while maximizing their potential as public amenities. In addition to performing natural functions and serving as habitat areas and corridors, natural areas and natural features - wetlands, forested areas, stream valleys, floodplains, Resource Protection Areas, etc. - can serve as assets to a neighborhood and contribute to its overall character. It is important to not only preserve and protect these areas, but also to consider how they can serve as public amenities within a larger open space network. Natural area opportunities include, but are not limited to, utilizing stream valleys as greenways and providing access to forested areas and wetlands for passive recreation and a chance for people to interact with nature.*



4. Transportation and Circulation Design Elements

The appropriate design of the street network is critical to creating successful transportation-efficient communities. Whether or not a community is pedestrian-scaled and walkable is determined by decisions at different scales of transportation planning: at the transportation network scale, at the street scale and at the block scale. This section explores important transportation elements at each of these scales that contribute to the design of successful transportation-efficient communities.

A. Network Connectivity

Transportation planning has typically emphasized a conventional, automobile-based approach to planning and designing street networks, one based primarily on maximizing roadway volume and capacity to provide for more efficient traffic flow and minimizing congestion. The result of such an approach has been a road system based on wide, multiple-lane expressways, arterials and collectors at a scale that is incompatible with compact design and the needs of pedestrians. As illustrated by a growing body of research, the conventional approach to transportation planning may, in fact, contribute to more, not less, traffic congestion. There is little argument that it requires more energy. On the other hand, research has highlighted the benefits of an alternative approach: connected street networks with narrower streets that are compatible with the design of pedestrian-oriented environments.

Benefits of a connected street network include:

- Shorter routes between destinations and a greater number of potential routes
- Dispersion of vehicular traffic, as opposed to concentration of traffic on a limited number of high-volume thoroughfares
- Fewer overall vehicle miles traveled (VMT)
- Improved integration with other modes of transportation, including walking, bicycling and transit

- Slower, more synchronized vehicle speeds and a safer pedestrian environment
- Smaller block sizes that are more conducive to pedestrians and more adaptable over time from a land use and development perspective

Local jurisdictions, in collaboration with the state where applicable, can employ a number of strategies to create connected street networks and maximize the number of street connections in a particular area. These strategies include:

1. *Limit block sizes.* More compact block sizes increase the number of possible routes to a destination and increase the variety and adaptability of the built environment. Blocks may be square or rectangular, or in some cases more irregularly shaped, but the ideal length of a block in a compact community ranges from 250 feet to 400 feet, particular in higher-density areas. In general, block length should not exceed 600 feet in the most extreme circumstances.
2. *Establish and enforce connectivity standards.* Connectivity may be measured either in terms of the number of street connections per square mile or according to a connectivity index, based on the ratio between the number of street segments and the number of intersections. While there is not an exact formula for ensuring sufficient connectivity, some existing standards provide useful benchmarks. For example, City of Suffolk connectivity standards for development have required a 1.4 connectivity ratio between street segments and intersections. The Leadership in Energy and Environmental Design (LEED) Rating System calls for a minimum of 140 street connections per square mile for projects with internal streets and a minimum of 90 street connections per square mile for projects without internal streets.

3. *Ensure that all new roads include a sufficient number of street connections.* Based on available connectivity standards for compact development, land planners and traffic engineers should collaborate to achieve an optimal plan for neighborhood street connections. It is important to ensure that all streets within a compact community connect with each other and to the streets of immediately adjoining communities. Do not provide for dead-end roads and cul-de-sacs, unless absolutely necessary due to significant development constraints.

4. *Establish alternative routes parallel to major roadways.* Supplementing existing arterial roads with parallel routes and lower-speed, connected grid systems enables these arterial roads to serve external (regional) traffic, while the adjacent routes serve internal (local) traffic. Establishing a supplementary road network that is pedestrian-friendly in turn reduces the need for the automobile to reach destinations within a community.

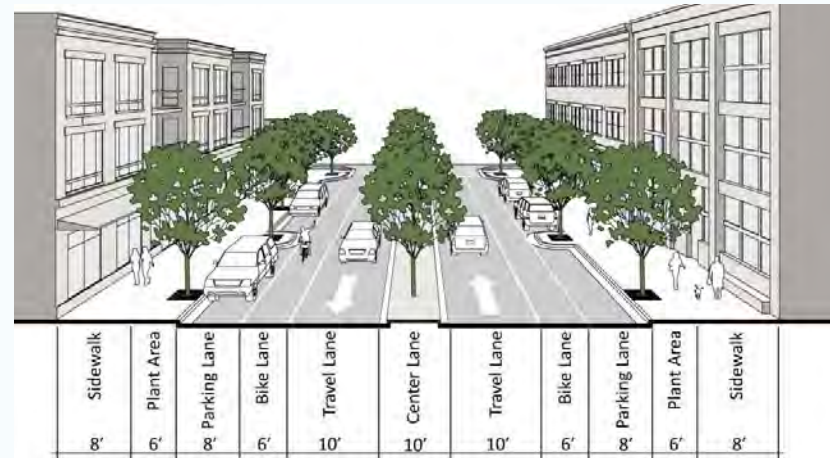
B. Thoroughfare Types

Hierarchy of pedestrian-friendly street types with appropriate widths.

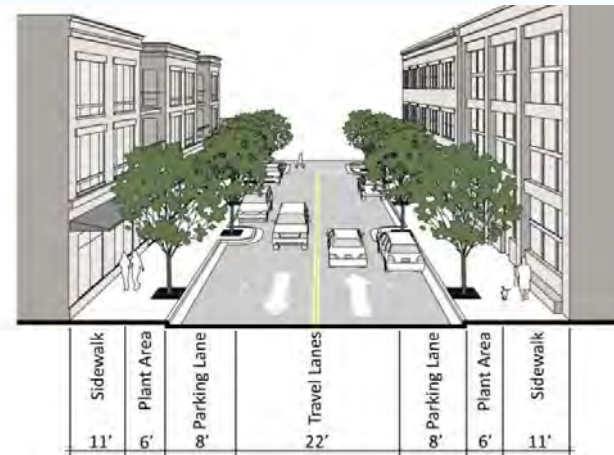
In conventional transportation planning, the hierarchy of roadway classification is based on collector and feeder roads and a roadway’s traffic flow capacity. In a TND context, however, the hierarchy of streets is based on the relationship between streets and building form, with a particular emphasis on the pedestrian and on accommodating multiple modes of transportation, thus linking transportation policies with land use and urban design policies and standards.

Streets in compact communities are narrowed from conventional widths to human-scale by reducing both the number of lanes and the width of lanes to as narrow as 9 to 12-foot travel ways. In addition to including specifications for curb-to-curb road features, such as lane and right-of-way widths, TND street typologies should also address “street space” - everything from sidewalks, street trees, utility infrastructure, and planting areas to the position of buildings relative to the street (build-to lines and build-to zones).

Depending on the characteristics (rural, suburban, urban) of a locality, TND street types will likely vary depending on local terminology, the number of street categories



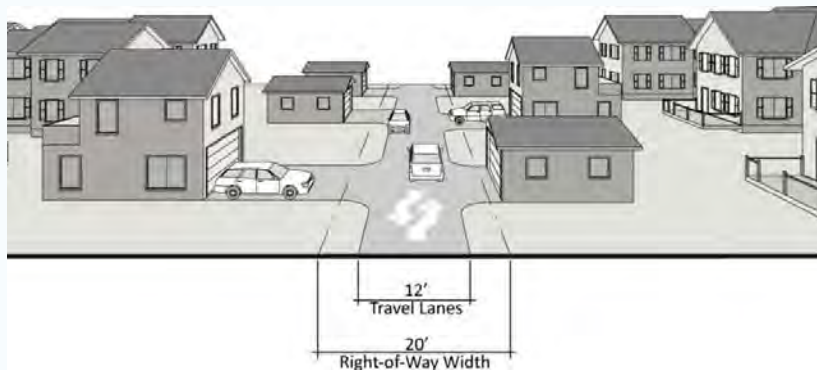
TND town center or commercial avenue.



TND mixed use or transitional area street.



TND residential neighborhood street.



Residential neighborhood alley for garages, parking, and other service functions.

that apply to a particular community, and specifications such as street widths and travel lanes. However, most TND street types are based on a common language of street typologies that typically includes the following (source: Institute of Transportation Engineers (ITE), *Designing Walkable Thoroughfares*):

- **Freeways, Expressways or Parkways** are high-speed, controlled-access thoroughfares with grade-separated interchanges and no pedestrian access. The street types are not typically associated with compact communities; rather, they serve a means of connecting compact communities within a larger region. Parkways are typically distinguished from freeways and expressways by the provision of landscaping on both sides of the roadway and as part of a landscaped median area.
- **Boulevards** are major thoroughfares, often associated with mixed-use and commercial areas that typically carry large volumes of traffic and require a large right-of-way width. Boulevards are relatively low-speed (35 mph or less), accommodate on-street parking, and safely accommodate pedestrian and bicycle traffic. In some cases, boulevards may include a frontage or access road separated from the main roadway by medians (frequently referred to as “multi-way boulevards”).
- **Avenues** are connector streets linking mixed-use centers to residential areas. Rarely wider than four lanes in width, avenues typically carry high volumes of traffic at low-to-moderate speeds (25-35 mph). The land uses adjacent to avenues generally include commercial, mixed use and residential uses.
- **Streets** are thoroughfares that provide access to a variety of districts, ranging from commercial and civic centers to residential neighborhoods. Narrower than avenues, streets generally include two travel lanes. There may be multiple categories of neighborhood streets, depending on the density of surrounding land uses and the expected number of trips generated:
 - o **Main Streets**, the widest type of streets, are located in mixed-use areas.
 - o **Major Neighborhood Streets** are major streets serving predominantly residential areas.

o *Minor, or Local, Neighborhood Streets* are the narrowest and most common types of streets, serving predominantly residential areas. These can be further divided into sub-categories for one-way and two-way streets, streets with varying on-street parking configurations, and minor streets that serve varying use mix and densities.

- *Alleys* are mid-block rights-of-way providing access to the rears or sides of buildings that front a thoroughfare. Alleys carry slow-moving traffic (approximately 5 mph) seeking access to parking areas, utilities, and service and loading areas located in the interiors of blocks.

The accompanying street sections illustrate the key elements and proportions of different thoroughfare types, including typical right-of-way and curb-to-curb widths, parking, and streetscape elements as well as building placement and orientation. Additional examples are included in the Appendix. It should be noted that Virginia Department of Transportation (VDOT) subdivision street regulations provide for opportunities for TND street design flexibility on a case-by-case basis.

C. The Benefits of Alleys

Mid-block alleys are critical to creating compact, pedestrian-oriented community design—without them, the pedestrian environment is both less safe and less appealing. Alleys enable rear access to buildings, thereby minimizing the number of curb cuts and associated conflicts between vehicles and pedestrians on sidewalks. They also enable the relocation of certain utilitarian functions and street elements - such as power lines, transformers, telephone poles, storm drainage improvements and utility boxes - to the interiors of blocks, thus removing both potential obstructions and unattractive or unwelcoming visual elements from the pedestrian environment.

Alleys are flexible in that they may serve residential, commercial or mixed-use neighborhoods. In residential areas, alleys provide access to the rear or side of residences and accommodate functions such as off-street parking, garage access, trash pickup, and infrastructure such as utility lines and storm drainage. In commercial and mixed-use areas, alleys not only accommodate trash pickup and utilities, but also provide access to service and loading areas so that these functions do not disrupt the pedestrian environment at the fronts of buildings. Alleys also enhance safety by provid-

ing alternate routes and rear access for emergency vehicles and, when conceived as “green alleys” and constructed with permeable paving, can minimize stormwater runoff.

Appropriate alley widths serving predominantly one-way vehicular movements range from paved surfaces of 8’ to 12’, with 20’ to 30’ private easements or public rights-of-ways.

Alleys do not come without questions from both the public and private sector. State and local regulations will dictate whether or not alleys may be accepted into the public domain for dedication and maintenance. But many ordinances are silent on this aspect of alleys. In many communities, the concept of alleys has been long forgotten, and there is little local hands-on experience with the beneficial aspects of alleys as a neighborhood access system. Utility operators likewise are unfamiliar with this concept. VDOT categorically does not accept alleys for dedication, leaving the developer and the locality to negotiate ownership and maintenance issues. Property owners’ associations are typically ill equipped to manage neighborhood alleys, and occasional market resistance in some locales must be overcome.



Alleys allow parking, trash collection, and other service functions to be neatly organized out of sight.

D. Complete Streets

A new planning term has been coined to help recognize the multifaceted characteristics of streets that are built with neighbors and neighborhoods in mind. The idea of complete streets serves as a useful lens for planning and designing streets and streetscapes because it brings together many of the elements discussed in this chapter. Simply put, complete streets are streets that address the needs, safety and comfort of all potential users of a street, including pedestrians and bicyclists, motor vehicles, transit vehicles and passengers, children, the elderly, and people with disabilities.

While not all elements of a complete streets policy are relevant to every context, these elements can serve as a checklist for thinking through decisions pertaining to the streets, the larger transportation network, and the public realm. Complete street strategies might include, but are not limited to, the following:

- Design narrow streets that pedestrians can comfortably cross
 - Provide sidewalks on both sides of all new and existing streets, and ensure an appropriate sidewalk width based on the level of use expected
 - Remove potential obstructions and safety hazards from sidewalks, including utility boxes, lamp posts and telephone poles, uneven or cracked pavement, etc.
 - Provide frequent and safely designed at-grade pedestrian crossings employing signalized intersections and four-way stops
 - Ensure that all sidewalks, sidewalk ramps and pedestrian crossings meet the needs of the elderly and disabled and comply with current Americans with Disabilities Act regulations
 - Allocate additional space for outdoor cafes, vendors and other activities that contribute to street vitality and a sense of place
- Incorporate street furniture, such as benches and water fountains, to contribute to a comfortable pedestrian environment
 - Plant, and allow sufficient space for, street trees to provide for shade along streetscapes
 - Where transit is available, design safe and comfortable transit stops and ensure that these stops are accessible to passengers, well-lit and conveniently located
 - Incorporate bicycle lanes and routes as part of the street right-of-way
 - Provide bicycle racks at key destinations
 - Employ traffic calming measures, such as curb extensions, curb return “bulb-outs”, raised or painted crosswalks, and other measures to slow traffic and enhance pedestrian safety
 - Limit the number of private or commercial curb cuts along a street; where possible, locate vehicle parking as well as service and loading areas behind buildings with access from alleys
 - Allow on-street parking along streets



E. Multimodal Transportation Options

Encapsulated in the concept of complete streets is the idea that neighborhoods should provide a range of transportation options. While not all modes of transportation may be relevant to all communities, transportation-efficient communities are by nature multimodal in that they can accommodate walking, biking, and transit.

Walking and Biking as Transportation Modes

In transportation-efficient communities, multimodal transportation entails providing streets that meet the needs of automobiles, pedestrians and bicyclists alike. Therefore, considering walking and biking as priority modes of transportation, in addition to automobiles, is a critical first step to establishing multimodal communities. Providing continuous sidewalks, incorporating formalized bike lanes or integrating trails or greenways with a connected street network can all contribute to a multimodal transportation system. In addition, walking and bicycling play an important complementary role to successful transit service, providing connections to and from transit for many riders.

Transit Readiness

While public transit can contribute to pedestrian activity and reduce traffic congestion, a sufficient level of residential and employment density is required for transit to become feasible. In some communities, particularly fast-growing suburban communities, transit may not be a short-term possibility, but it may be a realistic option in the long-term as neighborhoods develop to greater densities and range of uses. For this reason, it is important to plan neighborhoods and thoroughfares with an eye toward future possibilities and to visualize in advance how transit could fit into the fabric of a community. For example, when constructing new roads, some communities aim to be “transit-ready” by designating portions of a public right-of-way that could one day accommodate transit vehicles. Further, making a community “pedestrian-ready” is another important prerequisite for successful accommodation of transit within a community.

Transit-Oriented Development

In communities already served by transit - particularly rapid transit (rail, light rail, bus rapid transit) - proximity to transit enables concentrations of higher-density TND development, also known as transit-oriented development (TOD). TOD can be viewed as a higher-intensity form of TND, one that provides robust mix of housing, employment and retail services that, in turn, contribute to transit ridership and the overall

viability of transit. Both the principles and benefits of TND are the same; however, successful TOD requires a higher density and greater, more highly-integrated mix of land uses to be successful. TOD must be coordinated with transit stations and routes, and not simply placed adjacent to transit.



Compactness and mixed use make non-car transit possible.

III. Benefits of Transportation Efficient Planning

1. Transportation Benefits
 - a. Transportation Connectivity
 - b. Reduced Trips
 - c. Non-Car Trips
 - d. Commuter Savings
 - e. Transit Compatibility
 - f. Safety
2. Land Use and Infrastructure Benefits
 - a. Streets
 - b. Parking
 - c. Infrastructure and Utility Efficiency
3. Fiscal Benefits for Localities
4. Housing Market Benefits
5. Comparative Transportation Analysis

III. Benefits of Transportation Efficient Land Use

Introduction

The shape of American towns and cities has changed over time, with a major shift in American town planning coming in the late 1940s, when suburbs as we now know them today were developed. These new real estate projects placed new homes outside of existing towns, where they could only be accessed by car, rather than close to, or within, existing towns where walking or bicycling to destinations was possible. The new suburbs were largely made up of only one type and style of home, rather than the mix of home designs and sizes common in older villages.

Suburban development also strictly separated uses so that homes, shops, and offices were all in different locations that had to be driven to. This separation of uses was in contrast to the mixed-use character of older towns and cities, where a resident might find a convenient grocery store at the end of a residential block. Most importantly, suburban development put houses on large lots, while older towns had been relatively compact.

While suburbanization brings certain benefits, like big yards and the freedom of driving when and where one wants, this pattern of development has had adverse effects over time. The large lots of suburban development consume much more land than



Typical suburban development separates uses and makes walking to daily destinations impossible - driving is the only option.



When development is designed to mix uses and provide for a variety of transportation modes - including walking - traffic is reduced.

more compact traditional forms of building. Because of this, suburban development has consumed farmland and natural areas quickly.

This trend also means that each new suburban development is farther and farther from existing towns, making for long drives between home, work, shopping, and other needs. These long drives are often plagued with traffic as suburban cul-de-sac streets put the majority of trips onto large regional collector roads that quickly become congested.

The ill effects of suburban development have also been felt by counties whose resources have been stretched by the utility, public safety, and maintenance needs of increasingly distant and sprawling suburbs.

A positive response has been the efforts of some architects, engineers, and planners to design a new form of real estate development that draws on the features of successful cities and towns of the past. Alternately called Traditional Neighborhood Development or Transportation Efficient Development, it attempts to build mixed-use communities that function as villages rather than as disparate parts, to place uses close enough to each other to allow walking or bicycling in addition to automobile travel, and to build all of this at a convenient, attractive, and functional human scale.

This chapter details the many benefits of transportation efficient development patterns that can result from the application of the principles outlined in Chapter II. It demonstrates how Virginia communities can reverse some of the negative effects of suburban sprawl by encouraging this form of development. This form of land use can shape changes to traffic and the way people travel, to the provision of road and utility infrastructure, to quality of life and safety issues, to the availability of different housing types, to the financial realities of building developments, and to funding public services. These benefits have been divided into four main areas:

1. Transportation Benefits

More compact and interconnected development, in addition to a mix of uses, means that residents travel shorter distances, and have greater opportunities to travel by foot or by bicycle. All of these things mean that traffic can be greatly reduced when development is laid out more compactly and efficiently.

2. Land Development and Infrastructure Benefits

Compactness also brings efficiencies to the growing cost of providing water, sewer, and other infrastructures in comparison to the longer distances associated with suburban development. Traditional Neighborhood Development (TND) communities require less road building, more compact utility systems, and less plentiful parking facilities.

3. Fiscal Benefits for Localities

Local governments can receive significant benefits from reductions in road miles to be maintained, less traffic, lower utility costs, tax base increases, transportation savings for school busing and trash collection, and other factors.

4. Housing Market Benefits

Many real estate developers recognize the growing market preference for TND real estate due to its benefits over conventional suburban development in commuting times, housing variety, walkability, aesthetic quality, and other factors. TND can deliver better project sales and ultimately higher home values. The housing consumer gains expanded housing choice in terms of type, ownership vs. rental, and cost.

1. Transportation Benefits

A. Transportation Connectivity

The TND pattern of property development is different from typical suburban development in two important ways. First, TND streets are designed with as many connections as possible. This is much more like the grid pattern of older towns and cities than is seen in late 20th century suburbs that use a cul-de-sac pattern with very few connections. Second, TNDs are designed to be compact and to have a mix of residential and commercial uses, while most suburban development is widely spread out, and works to separate residential and commercial uses into separate pods of development.

The TND grid pattern is designed to safely accommodate vehicles, pedestrians and bikes, with an emphasis on placing commercial, civic, and residential uses in convenient proximity to each other. The application of transportation efficient planning concepts has the potential to introduce significant enhancements to a developing area's existing transportation network and land use framework. This will result in new development and redevelopment generating fewer, and shorter, vehicular trips as compared to status quo, low-density suburban land use patterns.

Compact Development vs. Sprawl:

Households living in compact developments with even modest increases in land use density and mix, accessible destinations, and interconnected streets reduced vehicle miles traveled by as much as 60% compared to typical suburban sprawl.

The Urban Land Institute "Land Use and Driving" (2010)

Coordinated land use and transportation patterns can offer significant benefits to localities experiencing residential, commercial, and employment growth. The evolution of TND planning over the past 25 to 30 years is due in part to its many transportation benefits when compared to conventional suburban planning and development patterns. As addressed in Chapter I, the most successful, and certainly the best

known, land use and transportation planning approach is Traditional Neighborhood Development. In this chapter, the terms “transportation efficient land use” and “traditional neighborhood development” (or TND) are used interchangeably.

The enhanced transportation connectivity that gives TND so many transportation advantages over typical suburban developments works in two ways. By employing a grid of streets to make trips within the development shorter and easier, local trips are improved. Also, by encouraging the interconnection of streets between adjacent TNDs, longer out-of-development trips rely less on existing collector roads, thereby improving transportation at a larger, regional level.



The proliferation of cul-de-sac streets concentrates traffic on a few main roads, causing congestion

The Grid

The Grid is the essential underlying pattern of roads for transportation efficient communities and neighborhoods. The key difference between TND street patterns and those found in conventional large lot rural and suburban subdivisions is the TND's focus on providing a connected grid of streets. This grid pattern distributes traffic among a well planned network of small streets rather than concentrating it on a few large collector roads. Technical traffic analysis models reveal that a system of small, interconnected streets can have more overall traffic capacity than the same

number of lanes combined into a large collector street. By adding alternative and parallel interior routes, the overall capacity of suburban street systems can be greatly improved.

In fact, it is turning movements at intersections, not travel lane volumes, which mostly control the functional capacity of a street system. Specifically, waiting to make left hand turns is the critical factor that slows traffic at major intersections. Complex collector intersections require multiple lanes, a variety of turning lanes, and traffic signal cycles for a variety of movements, all leading to longer waits at traffic lights and reduced system capacity.

The typical TND network reduces the loading of left hand turning movements by distributing traffic through a larger number of intersections, allowing the entire system to carry a greater load. The overall goal of the transportation network should be to plan for sufficient intersections within the community in order to stay below traffic levels that warrant signalization. When the TND pattern spreads traffic over several smaller roads, traffic at these intersections may fall below rates at which signalization is warranted, or, if a signal is necessary, its cycles will be less complex and less time consuming. The net benefit of the TND transportation system is fewer travel lanes, fewer traffic signals, and fewer traffic accidents, while actually increasing overall system efficiency.

The Local Network

Large lot suburban subdivisions are often self-contained, having a single entrance from a major road. This means that to visit an adjacent development, a resident would have to travel on the collector road from one major entrance to another, adding unnecessary traffic to this road. The large entrances of these developments can also become major points of traffic congestion.

With TNDs, connections to adjacent developments are encouraged as part of an overall grid street system. In this system, a TND resident can access adjacent developments using internal streets built by the TND developers instead of using an external collector road that must be improved at public expense. An interconnected TND system also benefits by accommodating some level of diverted traffic from nearby collector roads. In a locality that grows by building multiple, coordinated TNDs, traffic can be shared over many roads rather than crowding a single collector.

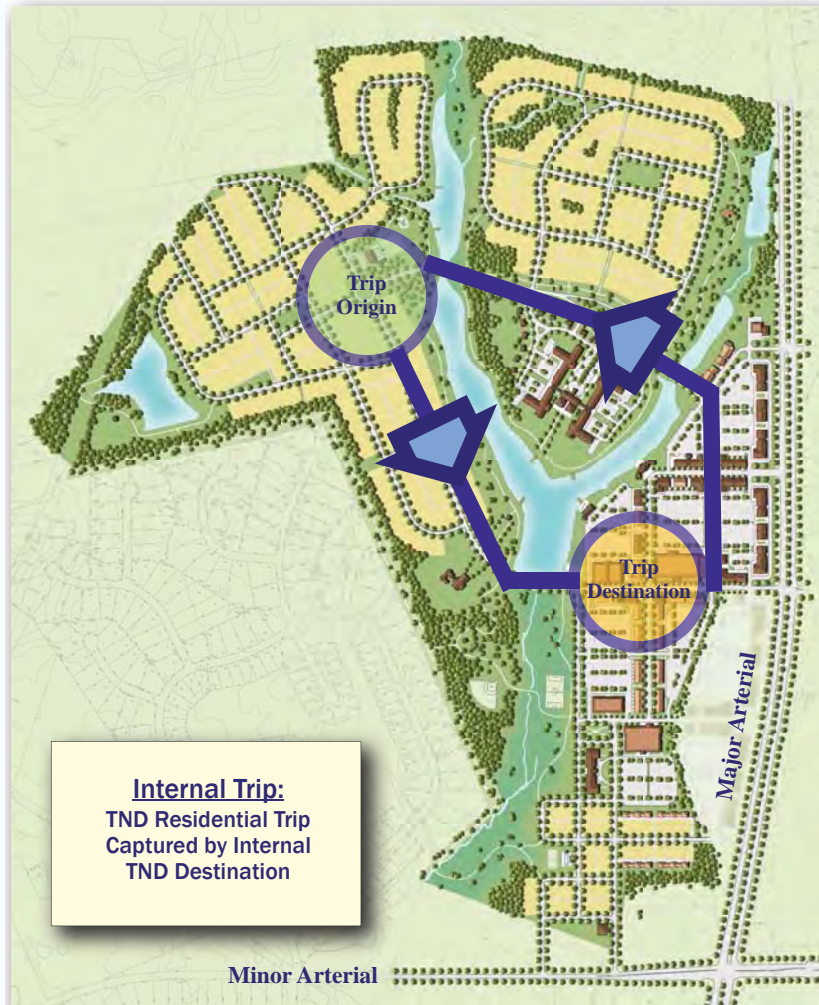


- Transportation Efficient Land Use:**
- Street Grid
 - Less Traffic
 - Efficient Utilities
 - Less Pavement
 - Walkable
 - Higher Property Values

- Suburban Land Use:**
- Disconnected Streets
 - More Traffic
 - Inefficient Utilities
 - More Pavement
 - Not Walkable
 - Lower Property Values



The design of the "grid" neighborhood street system must respect the lay of the land while affording internal connectivity.



B. Reduced Trips

In addition to distributing traffic more efficiently, a master planned TND community can also reduce the overall traffic produced, when compared to a typical suburban development containing a similar number of houses. The TND street pattern described above presents the opportunity to contain trips within the development through internal capture, and potentially relieve traffic outside the development that relies on the arterial road network.

Internal Capture

A major focus of TND communities is a mix of uses that combines residential, civic, institutional, and commercial uses into one project, on one site. A resident of a typical TND community should be able to complete certain daily tasks, like grocery shopping, dropping a child off at school, or going out for a meal, without leaving the community. In contrast, these same tasks in a single use exurban or suburban community would require leaving a residential development and driving on an arterial highway or major collector road to a commercial development. Trips that are made without leaving the TND are called internal capture. These are trips that are shorter, more accessible, safer, and, in some cases, may not require a car at all.

When analyzing traffic impacts for new developments, conservative Virginia Department of Transportation (VDOT) guidelines allow for up to 15% of trips by TND residents to be considered internally captured. This means 15% less traffic placed on existing external roads. The greater the rate of internal capture, the greater the level of savings in right of way requirements, existing road widening, turn lanes, and signalization. Actual case studies comparing TND to conventional exurban and suburban projects in Virginia and other states have quantitatively demonstrated even better rates of internal capture, with 25% to 30% of trips remaining within the TND. These traffic projection techniques and trip characteristics will be examined in greater detail later in this chapter.

Case studies to accurately calibrate internal capture rates require a level of extensive field work and analysis that is rarely employed by today’s traffic engineers and urban planners. The proper approach is to employ traveler interviews and other survey techniques to document transportation benefits and quantify the characteristics of home-based trips within a given community. This involves time consuming, individual interviews with community residents about their travel habits. Further, in newly developing mixed-use communities that have not been fully built-out, it is difficult to

get an accurate measure of the full benefits of internal capture. Unfortunately, few studies exist of fully developed TNDs.

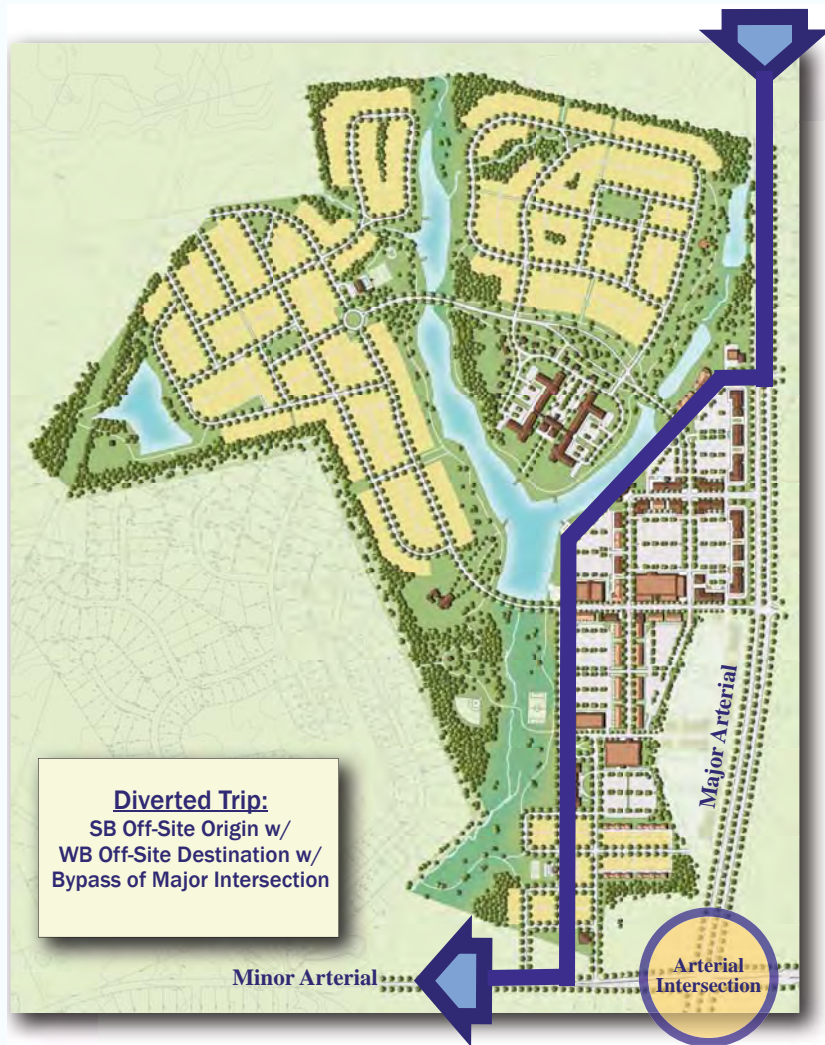
In one of the few studies of a successful, mature mixed-use development, it revealed a relatively high ratio of residents employed within the boundary of the planned community, approximately 46%. The daily average for home-based trips with destinations within the planned development averaged 35% while home-based trip ends with origins within the community averaged 39%. In other words, approximately 4 out of 10 trips to residences originated within the community. When retail shopping center trips within the community were evaluated, it revealed that approximately two-thirds of the retail destination trips originated within the overall planned community during the midday and evening peak hours. Internal trip capture was determined to be 51% on a daily basis, with 45% and 55% internal capture during the AM and PM peak periods. While these results reflect results derived from only one particular planned development, they reflect the potential for enhanced internal capture rates in future communities that embrace transportation efficient land use principles.

Pass-By Trip Capture for TNDs

Pass-by trips are vehicular trips made as intermediate stops on the way from an origin to a primary trip destination. Pass-by trip reductions consider trips, typically nonresidential, drawn from the existing traffic stream on an adjacent street, recognizing that trips drawn to a site would otherwise already traverse the adjacent street regardless of the existence of the site. Suburban collector roads often exhibit a high number of these pass-by trips because of the prevalence of strip commercial uses and business frontage along these roads. Pass-by trip reductions allow a percentage reduction in the forecast of trips otherwise added to the adjacent street from the proposed development. The reduction applies only to volumes on adjacent streets, not to ingress or egress volumes at entrances serving the proposed site.

Relative to a mixed-use project, pass-by trip rates for retail land uses essentially translate into a (modest) reduction in the gross retail trip generation factor for a given use, allowing for the total retail trips to be discounted. The traditional method of pass-by trip estimation is regression modeling based on methods described in the Institute of Transportation Engineers (ITE) Trip Generation manual. However, pass-by trips for TND and mixed-use developments are typically larger, due to the overall mix and quality of non-residential development, than those experienced in conventional, scattered development.





Trip Diversion for TNDs

Trip diversion represents a generally unrecognized benefit of enhanced TND connectivity under certain conditions. This benefit is typically realized with TND projects located adjacent to, or in close proximity to, an arterial or major urban collector intersection where new internal street alignments could capture, transfer, and divert TND-generated traffic that would otherwise be distributed through the existing intersection. This capture component is not typically included in standard internal capture ratios. However, it demonstrates the added traffic benefit of well located TND projects that provide an enhanced level of interconnectivity benefiting locations contiguous to major intersections. Thus, employing a diversion rate is location-sensitive and not appropriate in areas where the project’s location and interior street system are not capable of providing bypass relief to the minor artery at the intersection under observation.



Greater route choice means a distributed, rather than concentrated, traffic pattern.

C. Non-Car Trips

The design of traditional neighborhood developments is intended to create communities that are not dependent on automobile travel alone. The development of suburban single-use developments, cul-de-sac streets, and shopping centers with seas of parking has made travel by car a necessity rather than a choice in these places. In most cases, a suburban family must own a car for each member of the household, and long, traffic-choked commutes to work have become a fact of life. The larger these auto-centric suburbs grow, the more traffic increases, and the more time is spent driving, even to move short distances and accomplish basic tasks.

This certainly hasn't always been the case. Cities and towns existed and prospered long before cars existed. Even once cars became popular in the early 20th century, cities still functioned in a way that made walking possible and, oftentimes, even preferable. Other modes of transit also remained prominent, with many early suburbs organized around train or streetcar stops. The density, mix of uses, and connected streets that are key features of TNDs in many ways attempt to recreate older towns where walking to a corner store or main street were possible.

TNDs should ideally place new residential development within a walkable distance of new and existing commercial development. In most cases, this means a commercial core or town center, with residential uses arranged around it. All or most of the TND's residential uses should be within walking or bicycling distance of this center. While this doesn't mean that cars aren't necessary in TND communities, it does mean that certain trips, for shopping, dining out, or visiting neighbors, might be short enough to consider walking or bicycling. Any walking or bicycling trips that arise from the TND's proximity to a commercial core represent a direct reduction in traffic on TND streets as well as on nearby collector roads.

The number of trips made on foot or by bicycle, and thus without a car, will of course vary widely depending on the features of the

TND, as well as factors like weather. However, case studies of TNDs reveal high levels of non-car trips, especially to carefully designed nearby town centers for basic commercial needs. A study of existing TND communities showed that among people who were surveyed while shopping and dining in a TND town center area, as many as 18% had traveled there on foot. This represents an immediate 18% reduction in traffic over single-use suburbs where no walking trips are possible due to long distances and the absence of pedestrian facilities between residential and commercial area.

D. Commuter Savings

Because the TND's density and mix of uses puts daily shopping, employment, and entertainment needs within closer proximity to residential areas, these necessary trips can be much shorter than they would be in a sprawling suburban configuration. This shorter trip distance, combined with the traffic-reducing benefits of TND mean that TND residents may spend significantly less time driving than the residents of other suburbs.

The close proximity of residences in TNDs may also create opportunities for carpooling when longer trips are necessary, as with commuting longer distances for work. Reduced trip time, reduced trip distance, and carpooling opportunities can all contribute to lower fuel costs to TND residents, an especially important feature as increases in fuel costs and commuting distance have made fuel expenses a larger and larger portion of many suburban household budgets.

Travel Reduction for TND Resident Workers: A Case Study

To accommodate this new employment growth, the combination of (1) regional growth trends, and (2) continued reduction in the level of service on the local arterial and collector road corridors will place greater residential development demands and impact on outlying land. Rather than continue the proliferation of low-density suburban development, future TND projects can offer the potential for traffic reduction.



Transportation studies of TND and conventional subdivisions performed by the University of North Carolina and other sources revealed that the average household TND trip distance was approximately 25% less than that created by the average suburban subdivision, with an average daily trip length reduction of 12 to 18 miles. The TND household made 9% to 11% fewer vehicular trips per day than the conventional residential household and owned 25% fewer automobiles per household.

The following case study of a suburban Virginia county makes this point: Employment growth in the county over the next 20 years is projected to be almost 3000 new jobs. Future employment will be distributed over a wide range of occupations, the locations for which are subject to county planning and zoning oversight. Approximately 60% of new employment will be in retail, service, and office sector jobs, with the balance employed in industry, manufacturing, warehousing, government, and education. The table nearby summarizes the range of retail, service, and office land uses, comparing the projected distribution for both the TND form of development and the status quo form of suburban development that has been ubiquitous in the subject county, as in many suburban locations, over the past generation.

While in-county employment levels are expected to increase by an additional 3000 workers over 20 years, the US Census reveals that approximately 80% of all current employed residents work outside of the County. Work trip patterns aren't particularly heartening: 85% of the County's residents, approximately 5800, drive to work alone. Only 12% car-pool. Compared to similarly located jurisdictions, the county's local employment sector did not expand far beyond its current boundary: In-commuters anchored only one-third of the total County employment base. On the other hand, in-commuters represent approximately the same percentage of the county's employment base (18%) as compared to the number of County residents who also work in the County.

While the Census provides no statistical data for average travel length for in-commuters to this jurisdiction, the TND trip reduction factor of 12 miles observed in a well documented case study provides a very conservative benchmark that can be employed to assess the employment-related travel benefits of TND development. Average employment trips may be even longer for more outlying suburban areas. The following table presents mileage estimates for work trip (ie. place of residence to place of employment) reductions for a prototypical TND project compared to a conventional subdivision that lacks both proximity and connectivity to places of work. Estimates are provided for only employment trips and do not include potential trip savings to the county from outlying areas for shopping, education, recreation, and other purposes.

TND Resident Employment Trip Reduction Estimates

TND vs. "Status Quo" Employment Patterns

	% Distribution	Projection Period		
		2010-2020	2020-2030	2010-2030
In-County Employment				
Growth Increment *		1248	1748	2,996

Scenario 1: TND Resident - Average Daily Employment Trip Mileage Reduction

TND Residential/GP UDA Employment Capture = 25%; assumed one-way mileage reduction = 12 miles.

		miles	miles	miles
TND Commercial and Office	60%	4,493	6,293	10,786
Non-TND Commercial	20%	1,498	2,098	3,595
Government and Education	20%	1,498	2,098	3,595
Average Daily Reduction		7,488	10,488	17,976
Average Annual Reduction		1,797,120	2,517,120	4,314,240

Scenario 2: TND Resident - Average Daily Employment Trip Mileage Reduction

TND Residential/GP UDA Employment Capture = 40%; assumed one-way mileage reduction = 20 miles.

		miles	miles	miles
TND Commercial and Office	60%	11,981	16,781	28,762
Non-TND Commercial	20%	3,994	5,594	9,587
Government and Education	20%	3,994	5,594	9,587
Average Daily Reduction		19,968	27,968	47,936
Average Annual Reduction		4,792,320	6,712,320	11,504,640

Two scenarios are evaluated for both average daily and annual residence-to-work reductions. Scenario 1 assumes that (a) 25% of the estimated employment sector during the 2010-2030 projection period will be both working and residing within TND projects, (b) the TND resident portion of the employment sector will displace an equivalent number of commuter employees, (c) the net mileage reduction for the average displaced commuter trip will be 12 miles (one-way), and (d) the average work week is 5 days consuming an average annual 48 week employment period. Scenario 2 assumes that (a) 40% of the county employment workforce that is added between 2010 and 2030 will be absorbed by TND resident/workers, and (b) a 20-mile one-way commuter trip/employee will be displaced. With this county lacking commuter-targeted transit service and organized carpooling opportunities, all commuter trips are assumed to be via private vehicle.

As indicated in the table, the more conservative Scenario 1 estimates that the trip reductions resulting for the TND work trips (place of residence to place of employment) will yield approximately 4.3 million fewer miles traveled per year for the TND-based workforce, while Scenario 2 estimates a savings of 11.5 million miles. The economic benefit to an employed TND resident is meaningful: In Scenario 1, the average TND resident/employee would travel approximately 5760 fewer miles than their commuter counterpart. With gasoline prices at \$3.60/gallon and 20 mpg fuel efficiency, the resident worker would save over \$1000 per year in work-related fuel expenditures.

The results for Scenario 2 would yield annual savings of 9600 miles traveled and over \$1700 in fuel expenditures. The realization of the assumptions in Scenario 2 would result in a total annual fuel reduction for TND resident/workers of roughly two million gallons, which further translates into benefits that are somewhat more difficult to quantify, such as personal quality of life, lower drive times, highway safety, natural resource conservation, congestion reduction, lower maintenance costs, parking cost savings, and reduced emissions.

E. Transit Compatibility

The benefits of public transit are well established, including reductions in traffic and parking demand, as well as savings to local residents through reduced fuel and other automobile costs, and time spent commuting for other tasks. However, transit cannot deliver these benefits when combined with the very low densities and sprawling land use patterns of typical suburbs. A transit stop must be located within a short walk of a substantial number of homes or businesses in order to make the transit system useful to residents.

The compactness of TND development makes public transit a viable and attractive option. A typical TND town or neighborhood plan is organized around a town center or main street where density or activity is highest. Places like these are ideal locations for transit stops with service to other nearby centers, or to farther off employment in city centers. See the VA Department of Rail and Public Transit’s “Transit Service Design Guidelines” for additional information on accommodating transit.

Type of Transit Service	Residential Density Threshold (dwelling unit/acre)	Residents Per Acre	Employees Per Acre
Local Bus (30 minute-1 hour headway)	7	18	20
Frequent Bus (10-15 minute headway)	15	38	75
Light Rail Transit (5 minutes headway)	9	23	125+
Transit	12	30	N/A

Higher density is necessary to support mass transit services.

School Bus Routes

Even in small jurisdictions where overall public transit is not yet an option, some transit often does exist in the form of school busing. TNDs have the potential to benefit school busing with concentrations of housing and shorter lengths of streets between them. Even better, if schools are located within the TND, allowing some student to walk to school, the need for busing may be substantially reduced overall, resulting in the need for fewer buses and reducing busing costs.

F. Safety

Safer Streets

The inherently slower speed of TND streets, when compared to highways and suburban collector roads, translates into greater safety for drivers and pedestrians alike. With cars slowed to more reasonable in-town speeds, pedestrians are more easily seen by drivers and have more time to cross streets to reach their destinations. Slower automotive speeds also increase safety for drivers, with damages and injuries reduced when collisions do occur. A study by Swift and Associates determined that the safest streets were those built 24 feet wide with two narrow travel lanes. Despite this, many suburban zoning codes require streets to be built at a minimum of 36-44 feet wide.

Emergency Response

Another safety issue presented by sprawling and disconnected suburban streets is their effect on emergency response by fire and rescue services. Low-density suburbs mean longer distances to travel between fire and rescue facilities and some homes, while the disconnected nature of cul-de-sac streets means traveling indirect routes to answer calls. The traffic congestion caused by suburban patterns of cul-de-sacs and collectors further complicates the ability of responders to quickly travel to the location of an emergency.

The proximity and connectivity of TND communities has the potential to shorten emergency response times by providing more direct routes, shorter routes, and less traffic. The multiple routes available in a grid street pattern also preserve the ability of responders to reach emergencies when some routes are blocked.



2. Land Use and Infrastructure Benefits

Introduction

Developing in a more compact way to access the many transportation benefits of dense, mixed use development also offers the opportunity for the development of more efficient infrastructure and capital facilities. Traditional Neighborhood Developments (TNDs) feature higher residential and commercial densities; four or more dwelling units per acre for single family residences, and even higher for town houses or apartments.

These design differences mean that TNDs require less pavement, but, equally important, shorter connections for utilities — water, sewer, drainage, communication infrastructure — to serve a given number of homes or businesses. The savings in paved area and pipe length, for example, have the potential to deliver substantial financial benefits to developers and maintenance savings for localities.

The combined effect of the infrastructure savings is to reduce the cost of building TND developments as compared to conventional suburban developments. The economic benefits of potential infrastructure savings have been measured in a 2009 study for the EPA to be in the range of 32% to 47%.

Infrastructure Savings:

Reductions in infrastructure costs due to TND development patterns range from 32 to 47%, with the extent of TND cost savings based principally on density.

EPA, Smart Growth & Conventional Suburban Development: Which Costs More? 2009

This illustration presents a hypothetical 400 foot residential block, typical of TND communities, with typical lot layouts for both a TND block and a conventional residential subdivision. On the north side of the street, it depicts a mix of residential lots that are much more compact – both in length and in width – than a conventional rural or suburban block containing the same number of homes, as represented on the south side of the block.

This means more homes organized in a safe and efficient pattern on a given length of street. TND principles encourage mixed housing types within an appropriately scaled block. The result is that individual residential lots in this denser configuration have, on average, narrower lot widths than do conventional lots. Further, the grid orientation of proportioned blocks and shorter neighborhood streets reduces the often meandering interconnections between suburban subdivisions.

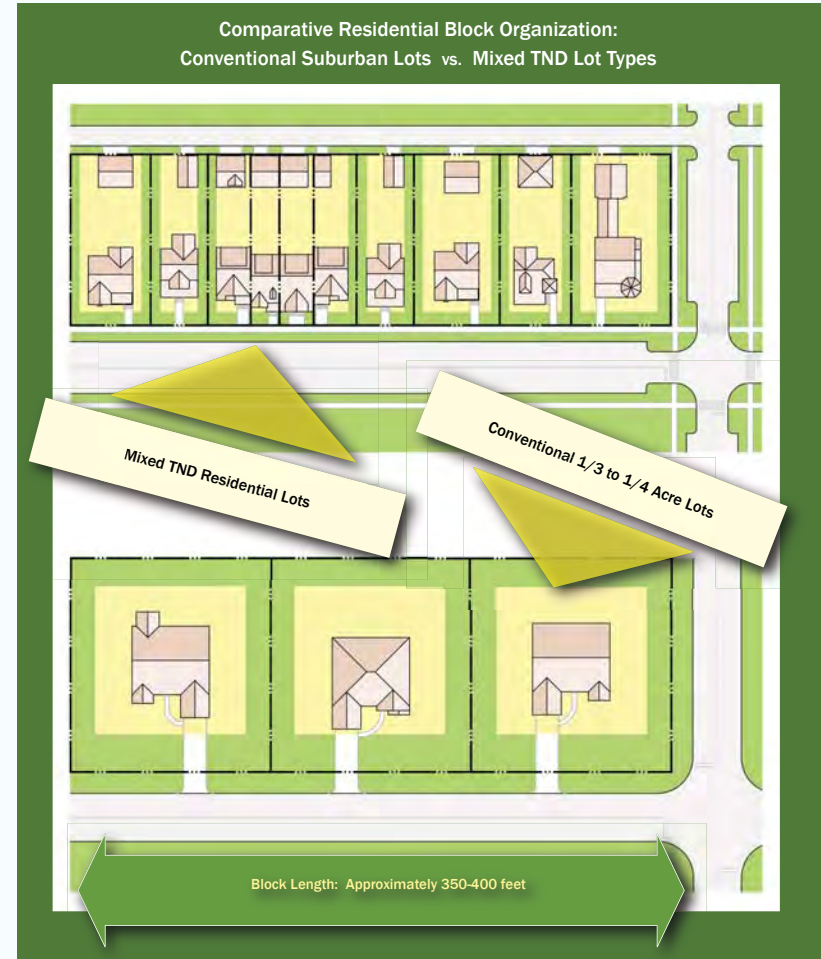
As the nearby diagram shows, an arrangement of conventional residential subdivision lots – 1/3 to 1/4 acre each with 100'+ frontages – are sited to front on a 400-foot section of street, typical of an average city or town block length. The resulting yield is only 3 houses. Under a TND development pattern though, the block accommodates a mix of dwelling types, with lots from 20-feet wide for townhouses to 50-70-feet wide for single family dwellings. In this TND lot arrangement, the same 400' length of street accommodates 10 houses. This degree of TND compactness will expand housing “choice” while improving the efficiencies of key components of infrastructure, including streets, parking, and utilities.

A. Streets

While the sections above describe how the compactness of a TND can result in shorter trips and less traffic, as well as how narrower streets can have significant benefits in traffic and pedestrian comfort and safety, these same factors also work to reduce the size and expense of building and maintaining the street infrastructure.

Reduced Street Length

In the hypothetical block described above, we see more houses built along a given length of street than in suburban construction, due to the TNDs overall density and smaller, narrower residential lots. The denser configuration of TND lots allows many of the transportation benefits covered earlier, but can also deliver cost savings to developers and localities, and reduce the environmental impact of development. Road



A TND's mix of smaller lot types means more homes per block than typical suburban planning, and the potential for less street to build and maintain.



TND residential streets typically feature narrower travel lanes, on-street parking, landscape zones, and sidewalks, as well as homes located closer to the street.



TND commercial or mixed use streets also feature narrower travel lanes, on-street parking, and sidewalks, often with builds located right behind the sidewalk.

building costs include grading, sub-surface preparation, and paving, and potentially curbing, sidewalks, streetlights, trees, and other features included in the street design, and can be extremely expensive.

By serving an otherwise equal number of homes or businesses with fewer linear feet of street, these expenses can be reduced. While this savings will be seen initially by a property developer, state and local government will also see savings in the event that these streets are eventually dedicated to public use and publicly maintained.

Shorter lengths of new streets also mean less impervious surface area, an environmental benefit that could reduce stormwater runoff, siltation, and erosion, while allowing more rainwater to soak naturally into the ground to replenish groundwater supplies.

Reduced Street Widths

In addition to requiring fewer linear feet of new streets, TNDs are typically designed around much narrower street cross sections than those found in conventional suburban subdivisions. In many suburban areas, lane widths are a minimum of 12-16 feet (excluding gutter pans), while TND streets typically specify lanes of 9-11 feet. These narrow streets serve to slow traffic, increase safety for pedestrians, and help meet the community's goals of higher density. In the same way as reduced street length, this reduced street width can help to lower infrastructure costs associated with road grading and paving, and further reduce the paved surface area associated with this form of development.

B. Parking

On-Street Parking

Parking in suburban developments is often provided by private surface lots and driveways accessing garages at the front of residences. TND development replaces some of this parking with spaces located along streets. This means less overall pavement dedicated to parking since parking lots provide vehicle spaces as well as travel aisles, while on-street parking uses the travel lane to serve the aisle function. Many conventional residential suburbs are actually planned for on-street parking, but with ample private driveway access in front of each home, the on-street spaces are severely compromised and rarely used, being located a considerable distance from the residence. With on-street rather than driveway parking, parking is handled in a more attractive way, front yards can be shallower, bringing buildings closer to the street, and pedestrian access is improved.

Off-Street Parking

While on-street parking typically serves the vast majority of parking needs within a TND, in central town centers or commercial areas, some additional off-street parking may be necessary. In these cases, generally held TND design standards encourage parking to be placed interior to commercial blocks, leaving shop fronts at the street edge, and unattractive parking somewhat hidden. Even in these cases though, parking needs within the TND will be lower than in suburban strip commercial areas due to pedestrian and non-car trips. As mentioned in an earlier section, TND case studies have found that among shoppers in TND commercial areas, up to 18% did not arrive by car. This means an equal 18% reduction in parking needs, thereby saving costs and reducing paved surface area.

C. Infrastructure and Utility Efficiency

Shorter Connections

In addition to transportation benefits coming from the shorter lengths of street required in the TND form of development, shorter TND blocks and streets can also serve larger numbers of homes with shorter lengths of utility infrastructure. As with savings in street improvements, more residences on a block will be served by a given length of utility service for sewer, water, electric, cable, and other services. Storm drainage systems can be proportionally reduced by virtue of reduced pipe length, as well as through smaller lot sizes, and reduced impervious surface area.

In addition to shorter utility mains within shorter TND streets, the narrower streets and small setbacks of TNDs allow for shorter lateral stub-outs to individual lots and buildings for water, sewer, electricity, gas, and other utilities. In the block example above, a reduction in the setback of houses from the street from 30 feet for suburban lots to 15 feet for TND lots means a total reduction of 50% in the length of the service laterals that take utilities from in-street mains to the home.

While TND street systems may demand a more complex engineering approach to infrastructure design, the greatly reduced lengths of essential improvements can markedly reduce capital and maintenance costs on a per lot basis for both construction and maintenance.

For TNDs to achieve the desired intent, it will be beneficial in many jurisdictions for private utility companies, quasi-public authorities, and local governments to rethink and revise suburban engineering and service standards for infrastructure systems. This is not a problem that can be solved by a single governmental agency. Coordination and compromise amongst all entities that serve consumers must be reached in areas of engineering and construction standards.

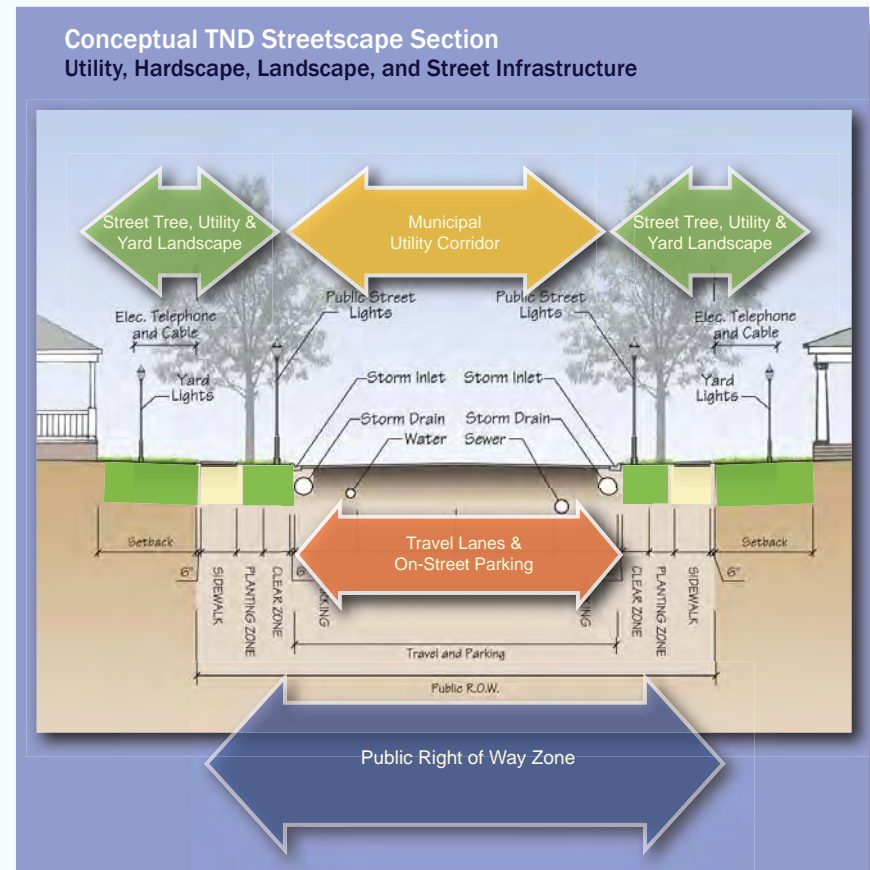
Consider the following obstacles to the objective of creating a TND neighborhood with narrow streets, ample pedestrian improvements, on-street parking, houses closely located to the street and attractive landscaping: In most locales, water and sewer mains are required to be placed within segregated trenches and separate easements, often up to 20' wide each. VDOT regulations typically discourage these utilities from being located linearly within its dedicated pavements, forcing utilities outside the public street right of way. Similarly, local engineering regulations for storm drainage conduits easements prohibit sharing trenches or even being located within close proximity with other utilities. Quasi-public agencies—gas, telephone, electric, etc.—are highly resistant to coordinating and sharing easements. Further, these agencies rarely allow the placement of their infrastructure within public rights of way. Subdivision street right of way regulations place limitations on the location of street trees closely paralleling travelways as well as within roundabouts and center medians. Local governments tend to prefer curb collection of trash over collection services provided in alleys. Power companies typically will not locate transformers and meters to the rear of residential lots. These “obstacles” were rarely encountered as streets developed in our historic Virginia towns.

Engineers and contractors recognize that these conflicts are more often created by defensive bureaucratic procedures than by any technical rationale. The net result is that the desired esthetic and functional benefits of transportation efficient land use are severely compromised. It will be essential for all public and private agencies, operators, and departments to embrace a new engineering paradigm that can accommodate the compact infrastructure placement, coordinated utility alignments, shared easements, reduced rights of way, and other features of TND density and construction.

Stormwater Management and BMPs

Stormwater management (SWM) and Best Management Practices (BMPs) are discussed in greater detail in Chapter VI. SWM/BMPs within mixed-use development present both benefits and challenges for compact, mixed-use development. Storm drainage solutions for compact TND projects require a different design approach

than what has typically been applied to the suburban land use model. This would embrace a comprehensive strategy for the entire TND community, with the potential for land use efficiencies, environmental improvements, and fiscal benefits from shared participation by both the public and private sector.



3. Fiscal Benefits for Localities

The transportation and infrastructure benefits of Traditional Neighborhood Development aren't just important because they can make these systems, and entire communities, more efficient, but also because these efficiencies can provide significant monetary benefits to localities and public services.

In both urban and rural settings, inefficient land use practices like sprawl have led to disproportionate capital and operational pressures for public agencies and service providers, including costly and inefficiently planned transportation facilities, water and sewer systems, schools, and emergency services. While it may be real estate developers who finance the initial construction of new communities, including their road and utility systems, it is important to remember that these systems are, in most cases, turned over to local authorities for future maintenance. Inefficiencies within these systems increase future maintenance costs for localities.

In addition, external effects like increased traffic in the larger region of a new development or increased needs for school busing or emergency services must also be absorbed by local authorities, often with no input or contribution from developers. Despite the fact that conventional suburban development puts pressure on municipal services and budgets, it has gone on for decades due to market conditions that make it easy to build, and profitable for developers. Promoting TND growth can help to reduce some of these pressures.

With the movement toward traditional neighborhood development now decades old, many fiscal benefits of transportation efficient land use to local and state governments have emerged. Jurisdictions with mature TND communities reap fiscal rewards in the form of increased revenue, as well as lower expenditures. These monetary advantages apply to new TND development, TND redevelopment, and older compact communities.

- The close proximity of neighborhoods to public services and facilities, including fire stations, police, rescue services, schools, and libraries, located within TNDs translates into lower public operating costs and reduced energy expenditures. For example, significant energy savings are achieved for school-related transportation as well as trash and leaf collection by virtue of lower vehicular miles traveled.

- Redevelopment areas planned for higher density uses revitalize underutilized properties, catalyze similar real estate enhancements to neighboring properties, make use of existing public infrastructure, share publicly-funded conveniences with other private uses, and produce higher revenue/expenditure ratios.
- The market value of TND real estate has been shown to be higher than similar real estate products located in an exurban or suburban environment, leading to higher assessment values and increased real estate tax revenue.
- TND planning and zoning negotiations frequently incorporate proffered improvements for public uses that would otherwise be financed entirely by the locality, including school sites, water mains, and other improvements.
- The state and municipal maintenance costs for compact, TND-styled public streets and related transportation facilities are significantly lower on a per capita basis.
- Infrastructure for, and services provided by, other public and quasi-public entities, including cable television, gas, electric, and postal service, can be more efficiently planned and implemented in a unified TND master plan.
- Where public improvements are developed in concert with private enterprise, initial construction costs are often significantly lower.
- Reduced public administration efforts and plan review costs are achieved where TND projects are approved subject to a detailed master plan, coordinated and phased capital improvements, and a thorough set of design and construction guidelines.



4. Housing Market Benefits



The dream of home ownership has played a prominent role in American culture, and played a part in developers' efforts to build outside of cities and town, on land that was inexpensive and plentiful, in turn producing homes that were plentiful and inexpensive. While this report focuses in large part on government regulation of land use, private sector real estate markets will continue to play the majority role in how and where homes and businesses are built.

The benefits of TND, and alternatively the costs and inconveniences of typical suburban development, have not been lost on real estate developers and home buyers. Today, changing demographics, changing economics, and changing preferences are increasingly making compact and transportation efficient TND communities a more profitable and more sellable form of development, adding positive market benefits to a development strategy that also has so many transportation, infrastructure, and municipal benefits.

Within the community of developers, builders, property agents, and mortgage bankers, real estate is often defined as a product. As with any product, peoples' desire to buy is subject to national and local trends, individual needs, aesthetic tastes, convenience of use, and affordability. Housing markets must continually react to the changing needs and wants of home buyers, but are also subject to land use regulations that often have been updated to embrace contemporary standards. Many local regulations, including zoning and subdivision codes, continue to prescribe suburban design standards for road construction, lot size, and segregation of uses, despite the benefits and desirability of alternative patterns.

The TND form of development has more widespread benefits than just that of stimulating transportation efficient land uses; it stimulates market-responsive development that offers the developer, the locality and the housing consumer that could not otherwise be achieved via conventional zoning practices: private

sector flexibility (within reasonable limits). TNDs are not for everyone, particularly those who prefer exurban or suburban living within homogenous neighborhoods, but many individuals and families do desire these types of communities, and real estate markets can derive significant benefits from this market sector.

- The TND's focus on providing a variety of housing types within a single community means that apartments, town homes, and single family homes in a variety of sizes are available to the housing market. This housing choice is especially important in existing suburban areas where the vast majority of available real estate is made up of large single family homes on large lots that may not suit all buyers.
- The availability of a variety of homes in a mixed-use community makes entry into the marketplace easier for first time homebuyers.
- By providing a variety of housing options, including smaller and more affordable options such as town homes and apartments, a TND development appeals to a much broader spectrum of home buyers and renters.
- In TND communities where walking or bicycling to some destinations is possible, residents may have much lower transportation costs, and a willingness to invest more in home buying.
- TND developments providing village centers with commercial uses, civic spaces, and other non-residential uses, appeal to housing consumers looking for amenities in addition to housing.

- Compact development that puts works, schools, shopping, and other necessities into easier reach can be seen by buyers as superior to scattered suburbs that will require longer commutes, and are often willing to pay a premium for this convenience.
- The incorporation of commercial, civic, park, religious, or other non-residential uses within residential neighborhoods can encourage a sense of community and engagement with neighbors that some buyers find missing from isolated suburban enclaves.
- TND development emphasizes aesthetic quality in buildings, landscapes, and other features that can attract buyers and demand premium prices.



The design and amenities of TND communities are in high demand.

5. Comparative Transportation Analysis: TND vs. Conventional Development

A. Introduction

The primary transportation goal for the TND form of land use should be to promote appropriately scaled, interconnected streets that supplement and enhance the existing arterial highway and local street system. As addressed in this report, this will require new and upgraded transportation infrastructure. Equally important are traffic engineering strategies that reduce traffic volumes.

Fundamental to the bottom-line evaluation of TNDs, the key question to be addressed is: “Will traditional neighborhood development result in greater or diminished traffic demands and corresponding impacts on the locality’s existing highway network when compared to the “status quo” forms of development as evidenced over the past several generations?” In this pursuit, the overall aim is to establish a strategy to (1) reduce pressure on existing arterial corridors, (2) improve the function of the existing secondary road network, and (3) expand options for traffic originating within the designated development area to be distributed to new streets and intersections that serve the larger region.

Prior research reveals that traffic patterns influenced by well-planned TNDs significantly reduce external traffic on adjoining local streets and arterial corridors when compared to traffic created by single-purpose “destination” patterns of land development. Destination land use patterns (e.g. sprawl) are represented by isolated residential lots and isolated commercial establishments that have no means of interconnectivity other than via existing arteries.

B. TND Traffic Demand Projections

It is the primary purpose of this section to introduce an easy-to-use method to evaluate the daily and peak traffic volumes that will be generated by future demographic and employment demands resulting from growth within a locality. This will be helpful in comparing the relative impacts of transportation efficient land use (TNDs) and conventional suburban land use. Regardless of whether these demands are physically satisfied by a jurisdiction’s “status quo” land use patterns of prior generations, or by more compact TND forms of mixed-use within designated development areas, the demand-based land use projections represent the independent variable in calculating future increases in traffic volumes.

A technique known as the “simple method” is employed to assess comparative trip levels that are linked to the community’s future population and employment growth projections and resultant land use mix scenarios (see Chapter IV and Appendix for population and employment projections.) There is no consensus amongst state transportation agencies and private sector traffic consultants on the techniques and factors that are used to calculate the traffic a TND project contributes to the surrounding local and regional road network. This is, and will continue to be, the subject of debate between traffic planning experts that extends beyond the scope of this guidebook. In spite of the years of technical research, real world experience has shown that traffic modeling is not an exact science. Moreover, the character, location, and impact of each and every project is different.

However, for the purposes of demonstrating the transportation benefits of TND projects, the qualitative and quantitative factors and other assumptions employed by the “simple method” allow for an adequate “big picture” comparison between (1) compact, mixed-use TND forms of development and (2) suburban-styled development patterns characterized by conventional subdivisions and destination uses. Other methods, such as the SANDAG Mixed Use Trip Generation Model v. 4.0, are also reliable.

Further, while this method is an imperfect tool for use in project-specific traffic impact analysis (TIA) - such as VDOT 527 studies - it works well at a macro-level to assess comparative impacts of varying forms of land development. The technique compares and contrasts growth-generated scenarios and the resultant traffic volumes that would be introduced to a jurisdiction’s external transportation system by:

- (1) conventional approaches for development of future TND land uses, assuming that these uses were located (scattered) throughout the locale, absorbing the predicted levels of population and employment growth, and

- (2) the same amount of TND-defined growth absorbed by compact, mixed-use forms of development within a locale’s designated development areas.

The focus of this analysis is to assess the impact of new traffic that would escape from these two development models into the existing transportation system. The comparative analysis examines the impacts of only town- and village-scaled residential and commercial uses that reflect transportation efficient land use planning principles. In order to better understand the traffic consequences of the new demographic growth that would benefit from a TND location, the “simple method” approach does not attempt to calculate estimates for (1) existing land uses and projected background traffic, and (2) future land uses created by non-TND uses (large footprint retail, manufacturing, warehousing, government, and education). The traffic from these, along with projected system growth, would be added to fully assess system components in a formal, project-specific traffic analysis.

While there are many factors that can influence the future traffic volumes, this method reveals the potential of TNDs to reduce external vehicular trips attributable to future growth. Since TNDs, by virtue of their compact density, distribute internally generated traffic within a more narrowly defined geographical area, the localized traffic benefit is realized through the distributed trip patterns via interconnected street patterns. This also reduces the concentration of net traffic demands on the external street system at single points of intersection. In contrast, the model reveals that the same development density scattered throughout a much larger geographical area does not benefit from reductions resulting from shared land use patterns.



C. Application of the Simple Method: A Case Study

To illustrate this approach, the simple method was used to evaluate both the 2010-2020 and 2010-2030 projection periods for a real, but unnamed, Virginia county. This locale offers a good model for TND vs. “status quo” land use comparisons inasmuch as it has been on the cusp of a metropolitan region’s growth pressures for the past generation. However, with relatively few exceptions, its land use trends are reflected by scattered, sprawl development practices, with little effort to advance public water and sewer initiatives for the few areas that have been designated for development by the adopted comprehensive plan. With little secondary street connectivity and lacking a bona fide transportation improvements plan, this county relies heavily on existing arterials and interstate corridors to absorb the vast majority of its local and regional travel demands.

For the TND model, an internal trip capture rate of 30% and, based on the specific location of the locale’s designated development area, a blended pass-by/diversion rate of 25% was used for commercial and 5% for residential and office land uses. For the “Status Quo” model, a 6% internal capture rate was employed for traffic created by conventional residential development, with a 25% pass-by capture for commercial uses and 5% for office uses. Because conventional suburban development very often includes a single entrance from a major collector, no diversion was assumed for the status quo land use scenario.

During the 2010-2020 timeframe, new traffic generation attributable to residential and commercial land uses based on historic land use-generated traffic patterns was predicted to create 25,000 daily vehicle trips, approximately 22,000 of which could be distributed to and directly impact the locale’s arterial and interstate corridors. Of this amount, roughly 2200 vehicles per day represent pass-by traffic.

When applying the TND model to the same timeframe, the external impact was an estimated 15,400 vehicles per day, or approximately 74% of the predicted conventional levels. Peak hour generation for the TND model was 1508 vehicles per hour, compared to 2154 per hour for the status quo trip count, resulting in a reduction of approximately 41.6% when compared to the predicted TND levels and a reduction of 26.1% when compared to the status quo levels. The similar percentage reductions are forecast for the extended twenty-year projection period. The technical “simple method” spreadsheet findings are presented in the Appendix.

While these comparisons represent a best case/worst case evaluation, the TND model clearly establishes the benefits of comprehensive planning strategies that incorporate transportation efficient land use.



Compact, mixed-use development, even at this small scale, can significantly reduce traffic.

D. Conclusions

The benefits discussed here show that local governments can see significant improvements in transportation, infrastructure, and ultimately finance, by promoting Traditional Neighborhood Design over more typical suburban development:

- TNDs can lead to shorter and less congested trips, and provide direct reductions in vehicular traffic by making it possible for people to walk or bicycle in some instances.
- TND density can also reduce the costs of building and maintaining road and utility infrastructure systems, as streets, pipes, and wires have less distance to travel in order to serve larger numbers of people.
- TND transportation and infrastructure benefits translate into fiscal benefits to governments, making roads and utilities less expensive to provide. At the same time, the market benefits of TND show growing demand for this type of development, and subsequently better profitability for developers, and a stronger tax base for localities that embrace these communities.
- Quality of life in TND communities is difficult to measure but may also be considered a benefit. TNDs tend to stimulate greater levels of positive neighborhood interaction, with residents experiencing a sense of belonging within their community. This perceived community vitality can serve to attract new residents and businesses, as well as to further promote the marketability of the TND concept for future developments.
- Residents may also experience health benefits from walking or bicycling within the community in ways that aren't seen in conventional suburbs where appropriate facilities are not present, or where greater travel distances and high speed traffic discourage anything but automobile travel.
- The enhanced design of TNDs, including street trees, civic spaces, street lighting, coordinated streetscape elements, and higher levels of

landscaping may also contribute to the quality of life in a TND by making the community more aesthetically pleasing and more enjoyable.

- While localities would be wise to promote these many benefits, it should not be forgotten that local governments do not build real estate projects. Private sector real estate development will ultimately produce the homes and businesses that will define the community's future shape. Successful TNDs require a high degree of cooperation between localities and developers. Thus, the challenge to local government leadership is to ensure that developers and individual property owners appreciate the value of working hand-in-hand to ensure that growth in future decades is planned to ensure success.
- TNDs incorporating transportation efficient land use practices possess great opportunities to accommodate higher density economic development, residential neighborhoods, civic facilities, and a coordinated network of internal streets that will reap benefits – social, physical, and economic – for both the private and public sectors.



The TND's mix of residential, commercial, and civic uses can improve transportation while delivering economic benefits.

IV. Planning for Growth

1. Comprehensive Planning in Virginia
2. Transportation Efficiency and the Comprehensive Plan
3. Goals and Objectives for Transportation Efficient Land Use
4. Amending the Comp Plan
5. Planning for Improved Transportation Efficiency
6. Comprehensive Plans and the Transect
7. Small Area (Neighborhood) Plans
8. Projections: Planning for the Future
 - a. Data Collection and Analysis
 - b. Projecting Future Housing Demands
 - c. Determining Land Needed for Residential Growth
 - d. Projecting Future Employment Demands
 - e. Determining Land Needed for Employment Growth
9. Net and Gross Density
10. The Future Land Use Map

IV. Planning for Growth

Virginia is a diverse Commonwealth with jurisdictions ranging from densely populated cities and growing suburbs to sparsely settled rural counties. Local planning policy and the level of resources available for planning naturally vary in response to the unique character, culture, political climate, and marketplace realities of each jurisdiction. Even though every locality in Virginia shares common tools to plan for growth and development (such as a comprehensive plan, zoning ordinance and subdivision ordinance), the variation among these documents shows that each community addresses issues of growth and development differently.

However, there are some common approaches to planning for growth and evaluating existing land use policies that can help any locality develop more transportation efficient land use policies. This chapter focuses on a range of transportation efficient zoning and subdivision standards and guidelines that may be adopted into local regulatory frameworks.

In addition to laying out a vision for growth, the comprehensive plan should influence day-to-day decision making as individual land development applications are considered or as public funds are allocated toward improvements. In urban areas, planning policies might promote transportation efficient design options to encourage infill development and redevelopment. A rural area might promote more compact new development as a way to concentrate growth to support agricultural land preservation.

These approaches will vary based on community type (rural, suburban, urban) historic development patterns, population distribution and development density, the existing transportation network, growth potential depending on planned and proposed infrastructure and overall support (both in terms of financial resources and community acceptance) for planning as a tool to guide development.

1. Comprehensive Planning in Virginia

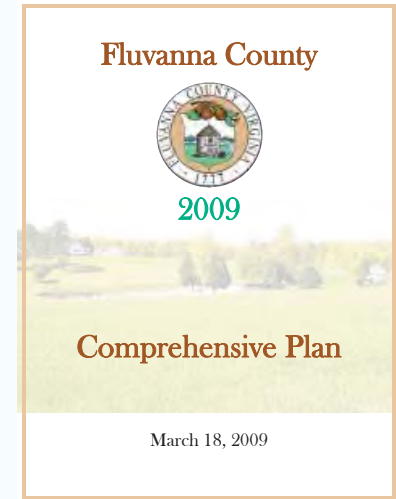
For decades in Virginia, every jurisdiction has been required (§15.2-2223) to prepare and adopt a comprehensive plan that describes the community's vision for the future and how it plans to achieve that vision. The locality must review the comprehensive plan at least once every five years, to determine whether amendments are needed. The comprehensive plan should be based on careful studies of existing conditions, trends of growth, and probable future requirements of the community. It typically contains recommended goals, objectives, policies and strategies for the intermediate to long-range future of the locality.

The comprehensive plan is not only a guide to help achieve the community's quality of life, but also to create more transportation efficient land use patterns. In this pursuit, the comprehensive plan is developed, amended, and updated through a process that includes public meetings and promotes public input. This is an opportunity for residents, business owners and landowners to periodically evaluate current development and determine what is desired in the future. It is also an opportunity to discuss important links, and, often missing links, between transportation, land use patterns, neighborhood design, and development.

2. Transportation Efficiency and the Comprehensive Plan

A transportation system operates most efficiently when it provides a connected network of transportation modes serving a mix of land uses in close proximity. Policies in a community's comprehensive plan can either support or hinder mobility and accessibility. A mix of land uses, and land use densities, can lead to shorter trip distances, a better blend of jobs and housing within a community, and an increase in the use of alternative modes of transportation (walking, biking, transit) as different destinations are brought closer together.

Also, by providing a range of transportation choices beyond cars, individuals who do not drive are provided with travel opportunities, and some amounts of congestion and pollution can be eased. By contrast, separating land use types and/or reducing densities increases dependency on motorized transportation, thereby increasing congestion and the demand for additional roadways.



Comprehensive plans aim to guide the next 20 years of land use decisions.



3. Goals and Objectives for Transportation Efficient Land Use

Comprehensive plans provide the opportunity to combine land use, transportation, infrastructure, and public facility issues to create a concise statement of a community's vision for the future. Many comprehensive plans segregate statements of community goals and objectives into the various chapters that make up the document (i.e., land use, transportation, utilities, facilities and services, etc.). This approach does not acknowledge the interrelated nature of the plan's various elements. As Virginia communities prepare the next generation of comprehensive plans, they should incorporate goals that more thoroughly integrate transportation and land use.

The following is a sample set of goals and objectives based on the principles of transportation efficient land use that can be incorporated into a comprehensive plan. Goals like these should be adapted and developed with community input to fit the unique needs and desires of each locality. Once adopted, these types of goals and objectives can guide the preparation of more detailed planning policies, subsequent zoning regulations and design guidelines (see Chapter IV) that promote transportation efficient land use and design.

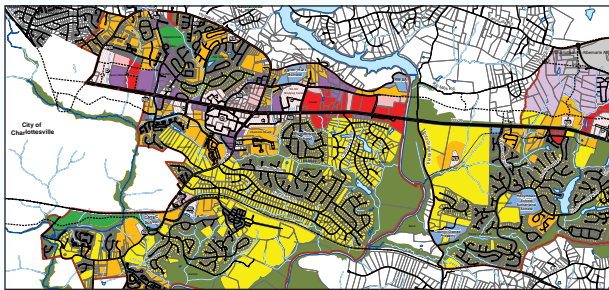
1. **Appropriate Location and Densities:** Promote transportation efficient land use by identifying appropriate locations for residential and commercial development with development densities and patterns that enhance mobility and accessibility within neighborhoods and throughout the overall transportation network.
2. **Mix of Uses:** Plan for a mix of residential and non-residential land uses that support and enhance the existing community, fulfill unmet community needs, complement existing business and industry, and provide a range of living, employment and recreational choices for existing and future citizens.
3. **Variety of Housing Types:** Promote neighborhood vitality and stability by offering a variety of housing types, including affordable and workforce housing, to meet the needs of existing and future residents at all stages of life.
4. **Innovative Development Alternatives:** Encourage compact development by amending land use regulations to allow innovative development alternatives such as traditional neighborhood development, form-based zoning districts, cluster development, etc.
5. **Pedestrian Friendly Street Designs:** Develop and adopt design standards and regulations that foster a strong sense of place and reflect traditional development patterns by promoting human scale, and pedestrian oriented neighborhoods through such mechanisms as reduced building setbacks, lot widths, smaller lot sizes and reduced front and side yard setbacks, reduced street widths, reduced turning radii at street intersections, enhanced street landscaping, pedestrian improvements and pavement alternatives.
6. **Network Connectivity:** Support development standards for streets and other transportation improvements with a focus on developing a continuous, connected network that can accommodate automobiles, pedestrians, bicyclists and future transit and enhance mobility by providing convenient and safe connections between road and pedestrian networks in new and established communities.
7. **Environmental Preservation:** Protect critical environmental features from development and where appropriate, incorporate natural features as design elements in new development projects to improve livability, provide recreational opportunities and preserve open space in new communities.

8. Phasing of Development: Promote the phasing of large development projects, if needed, to ensure that there is adequate infrastructure to support anticipated population and employment.
9. Development Incentives: Explore public and private incentives to encourage more concentrated development within designated growth areas which may include designating the area for priority funding for projects related to housing, economic development, public transportation and other capital improvements.

4. Amending the Comprehensive Plan

Virginia law has long required that the comprehensive plan be reviewed by the local Planning Commission every five years. While the 5-year review process is a statutory requirement, many Virginia localities can (and should) benefit from more frequent reviews as community needs and growth demands pose new opportunities to better manage land use and capital requirements. Localities that amend their comprehensive plans more frequently typically address particular issues or geographic areas (see following section on Small Area Planning). Interim reviews are sometimes also necessary to incorporate new laws that must be addressed in the comprehensive plan.

Amendments to a comprehensive plan are also subject to public hearing prior to adoption. Most localities seek extensive public involvement when a local comprehensive plan is updated, especially when the update is relevant to the entire community. Periodic reviews of the comprehensive plan provide an opportunity to improve transportation efficiency through land use policies.



5. Planning for Improved Transportation Efficiency

Localities across Virginia have taken steps in recent years to incorporate transportation efficient land use principles and traditional neighborhood development guidelines into their planning and regulatory frameworks. Rural areas have found this beneficial to reduce pressures on agricultural lands. Suburban jurisdictions have embraced higher densities as a means of accommodating growth with limited resources, while urban centers have promoted targeted areas for revitalization and redevelopment. Many locales are just beginning the process. In all cases, a key step is to begin with an inventory of the existing policy context.

An initial review of existing land use documents will identify the relevant plans/policies that influence land development and transportation policies in a community. This typically includes a reevaluation of comprehensive plans, zoning and subdivision ordinances, area plans, bike and pedestrian plans, public facility manuals, service plans, etc. This type of review can highlight regulations and policies that either support or discourage transportation efficient land uses and development patterns. A review of peer locality documents and national and regional planning initiatives is also useful to identify innovative programs, policies and guidelines that have been successfully implemented in other places to promote transportation efficient land use patterns.

Local governments that have adopted plans that generally support transportation efficient land use and other compact growth principles may need more specific language to promote and implement transportation efficient land use patterns. Where development patterns and connections to transportation systems have not been identified, local officials will have to determine the extent to which review and modification of plans and policies may be necessary.

As funding for new roadway projects has decreased, planning for transportation efficiency has gained momentum across the country – frequently supported by the many successful examples of historic, walkable-scale town and village centers around the nation. While many localities have designated specific areas for certain types of development on their future land use maps, new efforts to unify planning and regulatory documents have led to innovations in the way communities plan for growth and development. A growing number of communities are recognizing that the physical form and character of development influences transportation choice, economic development and neighborhood vitality.

In response to form-based planning principles, the next generation of implementation tools are incorporating zoning mechanisms that emphasize form over the specific land use in order to promote a more efficient, but flexible, mix of land uses. However, attention to detail underlies these planning efforts: Future land use maps are being supplemented by small area (specific) plans that address both future street and infrastructure design guidelines that promote mixed uses and pedestrian friendly development.

What does your plan say...

- *...about transportation choices? Does it call for public transit, bike lanes or car sharing?*
- *...about pedestrians and walkability? Does it encourage walking and does it call for sidewalks or walking paths? Or about walking to get from our homes to our school or workplace?*
- *...about land use? Does it support mixing land uses? (Can commercial and retail buildings be built right next to residential buildings? Is ground floor retail or office encouraged in multi-story residential buildings?)*
- *...about making housing more affordable for all income groups? Or providing workforce housing? Or about the sizes of homes or of lots?*
- *...about “community character” or the look, feel and style of buildings, or the look and feel of streets and parks? Or about historic buildings and local heritage?*
- *...about preserving trees, or open space or protecting farmland? Does it say anything about special areas of natural beauty?*
- *...about encouraging development in established communities (vs. new development on undeveloped land in areas far from the heart of the community)?*

6. Comprehensive Plans and the Transect

Comprehensive plans across the country are beginning to employ transect planning, a widely embraced planning concept that seeks to more thoughtfully respect existing land use patterns while better organizing those planned for the future. This is not a “new idea” but, rather, one that unifies a range of formative planning principles that permits local governments to more effectively grasp the “big picture”. A number of Virginia localities, including the City of Richmond and Albemarle County, have revised their comprehensive plans by applying transect principles. In the transect approach, land uses of different intensities are shown along a continuum, ranging from environmentally sensitive conservation areas, to low intensity settlement patterns (usually rural or agricultural), to the most intensive uses (village, downtown or other compact urban centers).

This provides a common sense approach to designating uses on the Future Land Use Map by formulating land use patterns that (1) are sensitive to organization of general use categories by geographical location, (2) recognize infrastructure capabilities and facility availability, and (3) emphasize form and intensity over specific land use with a given transect category. The guiding principle of this type of planning is that the farther out land is from the community’s center, the less density would be recommended by the comprehensive plan or allowed by zoning.

For comprehensive planning purposes, land use gradients are typically defined by and organized into six planning areas, ranging from natural areas to dense urban environments, although not every community will have each area. Each land use classification within a gradient has specific policies guiding building types, development form, densities, road design, setbacks, and lot types, etc. The gradients may be generally classified, as follows:

1. **Natural Areas and Preservation Areas** (characterized by little or no development and sensitive environmental areas)
2. **Rural Farmland Areas** (very low residential densities that are directly associated with agricultural activities)
3. **Outlying Residential Areas** (large lot residential tracts adjacent to rural and conservations areas)



4. **Suburban Neighborhood Areas** (medium residential densities within traditional subdivisions and mature communities with public utilities areas and, optimally, located on the edge of a developed village or town)

5. **Mixed-Use Neighborhoods** (medium- to high density residential and mixed-use areas within close proximity to the central city, village or town center areas)

6. **City/Town/Village Center Areas** (highest residential densities coupled with a “downtown” that includes commercial development, transitional, and economic development uses; with the goal for the majority of uses to be within walking distance)

The transect-based approach to planning is appropriate for a comprehensive, community wide plan overhaul or for use in a particular geographic area. It is particularly conducive to transportation efficient land use planning because the densities and intensities are clearly spelled out, and because it generally encourages a mixture of uses in each transect, thereby reducing the number of potential trips generated by development in the most compact and highest density areas.



7. Small Area (Neighborhood) Plans

Another way to weave principles of transportation efficiency into the comprehensive plan is through a small area plan that closely examines a particular geographical area contained within a larger locality. From one jurisdiction to the next, the small area plan may be referred to by different names—neighborhood plan, sector plan, development area plan, or specific plan—but the objective is the same: A small area (or neighborhood) plan frequently examines key land use and transportation issues at a much greater level of detail than typically found in local comprehensive plans. Further, the small area plan is a bona fide means of meeting the state-mandated requirement to review and if necessary, update the local comprehensive plan every five years. Albemarle County and many Virginia cities offer good examples of this approach to comprehensive plan updates.

Similar in status to a comprehensive plan, this more detailed planning process typically focuses on high-priority strategy areas that may be subject to development pressures. The small area plan illustrate conceptual designs for varying land use options and build out scenarios for the designated strategy areas. These options should reveal opportunities and limitations that could potentially result from the development of these areas. Thus, to a certain extent, they provide a test case that can be used to evaluate future zoning applications for private development and companion community infrastructure. The plan’s outputs should address recommendations for phasing, community facilities, and infrastructure that illustrate how the selected area could develop over time. Traditional Neighborhood Development (TND) concepts are easier to envision on a small scale and in a targeted area.

Small area (neighborhood) plans that promote transportation efficient design can be developed for a downtown, a key corridor, or around a transit station, but may also be used in undeveloped areas located within designated growth areas. In these cases, transportation efficient land use principles can be defined to provide more detailed guidance to property owners or developers,

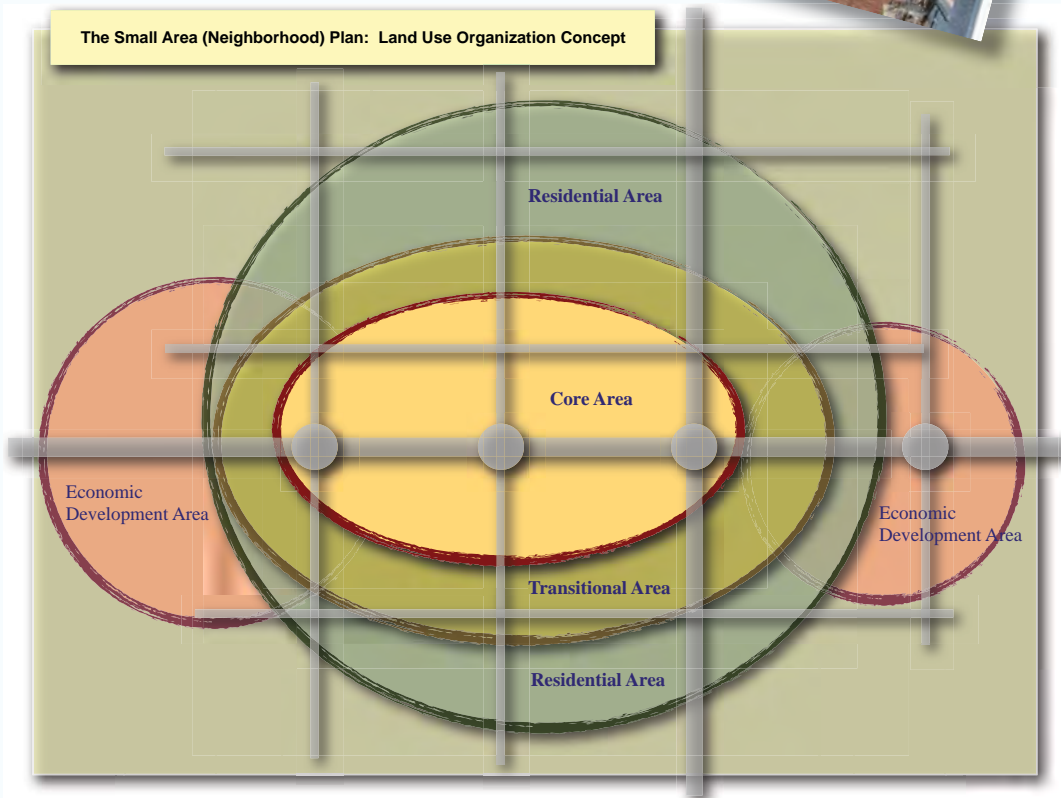
such as how streets, transit alignments and stops, and pedestrian and bicycle routes should be configured to ensure travel choices and good access to an area. A small area plan can also include specific urban design and land use design guidelines, including dimensional standards for parcels and blocks, and illustrations showing general configurations of building heights and volumes.

A small area plan may be employed to coordinate development with planned public improvements, such as the extension of a sewer line into an undeveloped area or for special land use activities such as a new airport or extension of a light rail line. It can be officially adopted as an amendment to the community’s





The Small Area (Neighborhood) Plan: Land Use Organization Concept



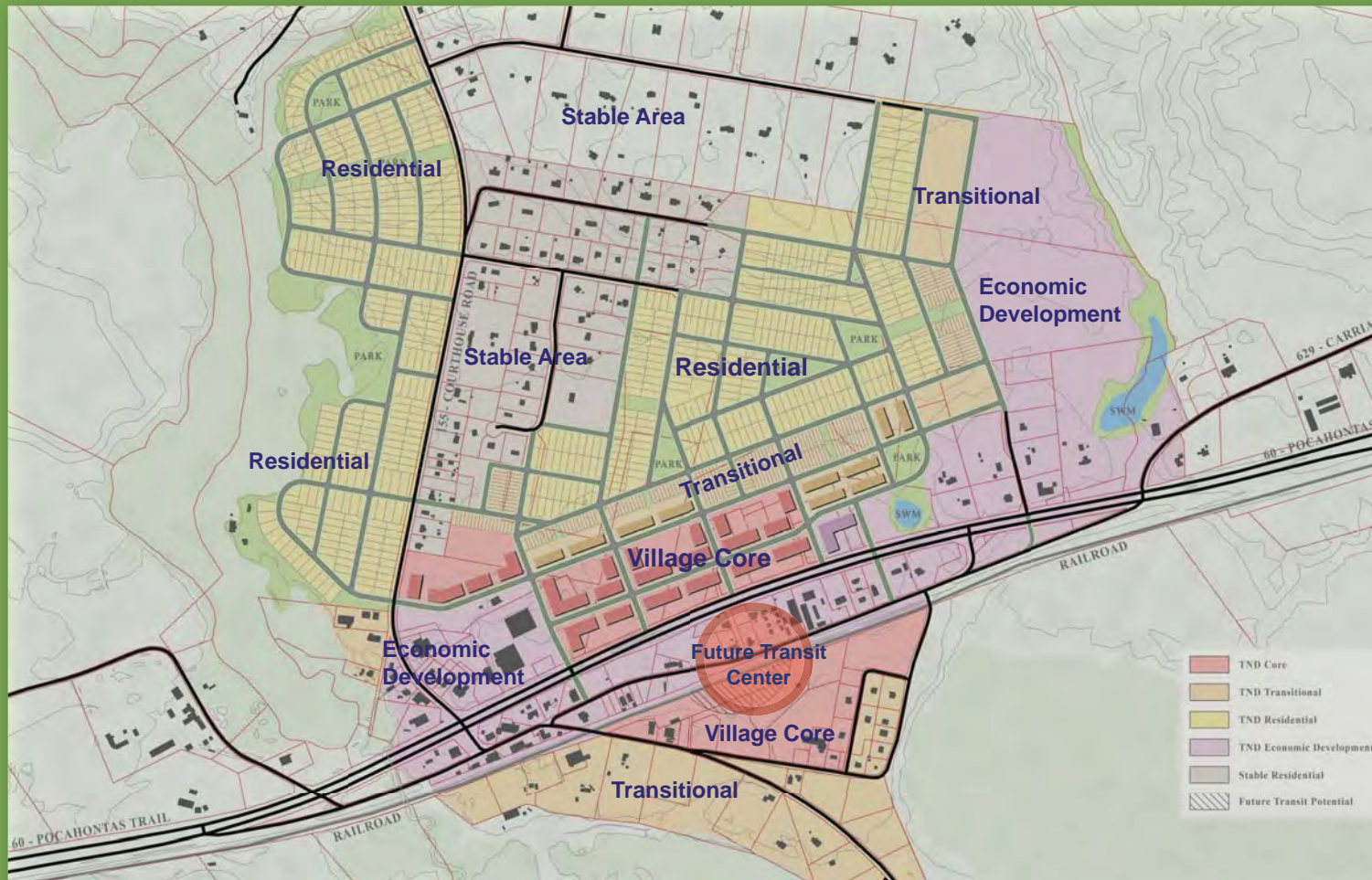
While suburban development is often strictly separated by land use, TNDs are more often organized by intensity of use, regardless of the type of use.

comprehensive plan with elements appropriate for integration into the capital improvements program. The plan would evaluate preferred land uses and development patterns, seeking a cooperative approach among property owners to identify recommended transportation improvements, access points, and to provide guidance on how best to ensure these improvements via future rezonings.

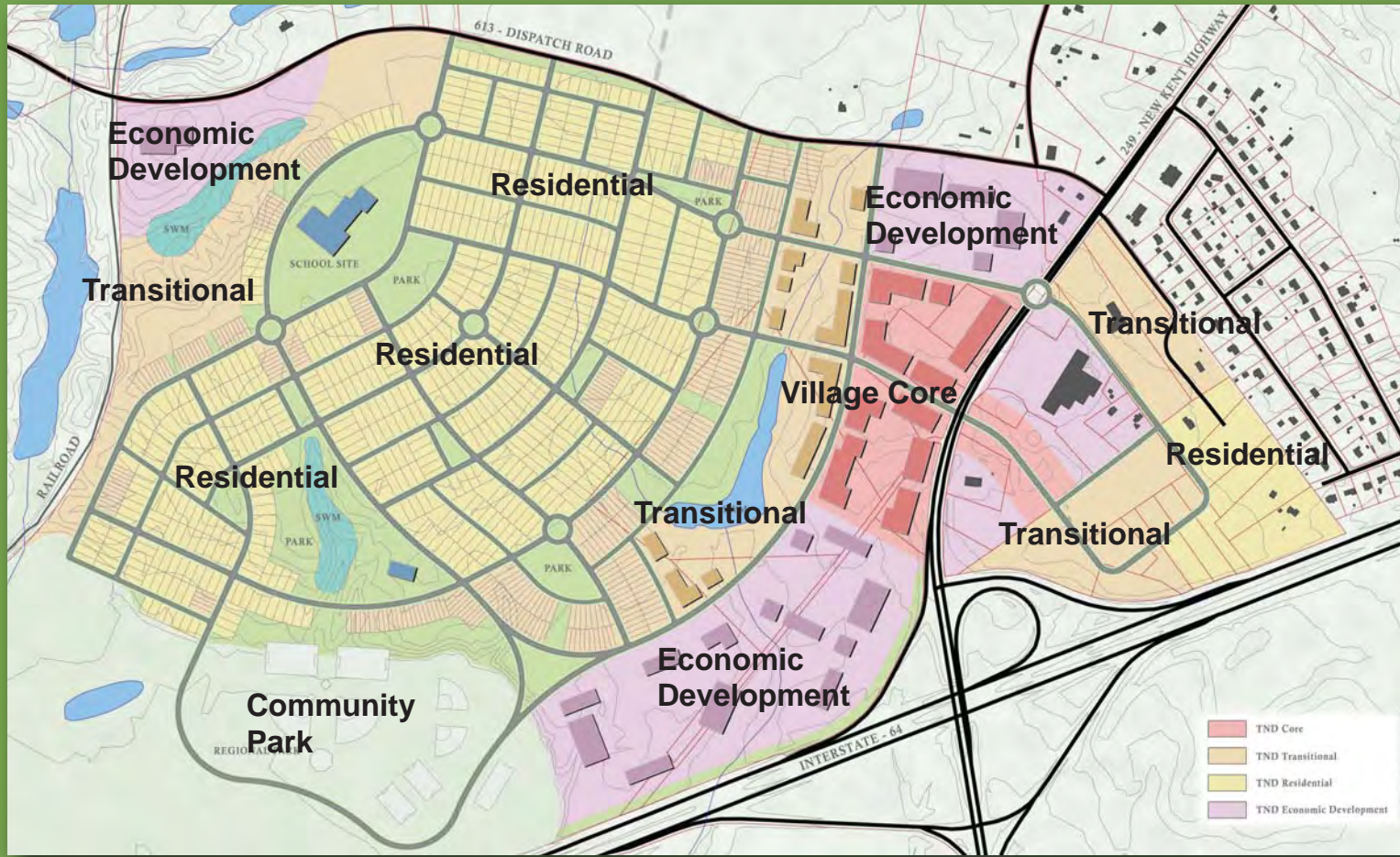
In addition to transportation and land use elements, the plan should consider potential demand for education, emergency services, open space and neighborhood parks, commuter parking/transit, public utilities, and other public facilities. The planning effort should also include a careful documentation of the environmental and terrain limitations that would affect the potential to achieve the small area plan's build-out capacity.



Successful plans define core and residential areas, and the transitions between them.



Small Area Plan for an Existing Village



Small Area Plan for Greenfield Site

8. Projections: Planning for the Future

To translate its vision into a plan that is not only comprehensive but comprehensible, localities must have some sense of how much growth is expected so that the needs of existing and future residents can be met. Although gathering data is usually straightforward, projections are not easy and, often, unreliable. Good decisions about how today's data will be translated into predictions of future growth will require a concerted effort by local government. This section addresses basic approaches to residential and employment projections that can be adapted to local demographic conditions.

A. Data Collection and Analysis

Essential to all aspects of planning, the quantity, distribution, characteristics, and demands of the future residents and jobs must be assessed. Thus, the planner is challenged to engage in the process of demographic projections, the predictive task that involves both art and science. Understanding the relationship between projections of population and employment, and corresponding housing demand, is critical to planning how and where a community can grow, the best form for new growth, and what transportation infrastructure is needed to support growth.

One part of planning for transportation efficient land use requires determining the amount of land needed to absorb future growth and identifying where there is capacity to accommodate anticipated development. Ultimately, decisions about the pattern and location of projected growth should be incorporated into the future land use map adopted as part of a local comprehensive plan.

An early step in the process of planning for growth is to choose an appropriate time-frame for forecasting development. A 15-25 year planning horizon is typical for most local comprehensive plans in Virginia even though the formal review of the comprehensive plan is required every five years. Hindsight and experience have shown that state-prepared populations that look beyond 5-10 year timeframes often amount to little more than an educated guess. But, this does not diminish their importance, and localities must undertake the additional work to refine macro-level predictions. Planning timeframes can vary depending on the scope of the planning effort (county-wide, small area or strategic issue), the availability of data sets, the unique comprehensive plan cycle in a given community, political or market influences, and growth dynamics that may influence urban, suburban and rural areas differently.

For areas that are part of a Metropolitan Planning Organization (MPO), consideration should be given to coordinating the time frame for the comprehensive plan with the time frame used in the MPO's travel demand model (and vice versa). If these two time frames are the same, it allows much greater facility in estimating and ultimately integrating transportation and land use patterns of the future.

What is the difference between an Estimate and a Projection?

Estimate: Current or past count of population, jobs, houses, etc. based on several data sources which may include census data, survey data, building permit, birth and death data etc. Example: Weldon Cooper Center Annual Population Estimates

Projection: A forecast of population, housing, jobs, etc. based on a study of existing data in combination with assumptions about future trends and influences. Example: Virginia Employment Commission Projections

*Estimate = Past and Present
Projection = Future*

What is the difference between a Census and a Survey?

Census: A count based on responses from 100% of a population (ideally). Example: U.S. Census conducted every 10 years

Survey: Estimate for entire population based on responses from a statistically significant representative portion of a population. Example: American Community Survey prepared by the U.S. Census Bureau every 1 to 5 years depending on community size.

Population Estimate and Forecasting Resources

Weldon Cooper Center: The Demographics & Workforce Group produces population estimates, including the official estimates of total population for localities that are used throughout the Commonwealth for decision-making and fund allocation. <http://www.coopercenter.org/demographics/virginia-population-estimates>

Virginia Employment Commission: State and local projections are produced by the Virginia Employment Commission and distributed through the Virginia Workforce Connection website (Click on Labor Market Information. On the next page, click “Demographics” under “Labor Market Analysis” in the left hand column.) <https://www.vawc.virginia.gov>

U.S. Census Bureau: Census estimates for counties, towns, cities and states are produced and distributed by the U.S. Census Bureau every 10 years <http://www.census.gov/popest/estimates.html>. The U.S. Bureau also conducts the American Community Survey on an ongoing basis which provides estimates and community characteristics on a 1, 3 or 5 year basis, depending on community size <http://www.census.gov/acs/www/>.

Once the comprehensive plan’s “horizon year” is established, localities can begin obtaining population estimates and projections from public sources including the US Census Bureau, the Weldon Cooper Center for Public Service, and the Virginia Employment Commission (VEC). Information is also available from Virginia’s regional planning districts although this data is typically obtained from the primary sources listed above.

The Demographics & Workforce Group of the Weldon Cooper Center for Public Service in Charlottesville, Virginia, produces official annual population estimates for all Virginia cities, towns and counties for non-Census years. State and local population projections for cities and counties are produced by the State Demographer and published by the Virginia Employment Commission. Population projections by locality are available in ten year increments through the year 2030 (i.e. 2020 and 2030). The

VEC does not currently prepare population projections for Virginia’s individual incorporated towns so other projection methods will need to be explored for these communities (see the Appendix for technical employed for the Town of Orange.) Population and employment projections may also be obtained from private data sources, such as Woods & Poole, Info USA, or Nielsen.

Alternative Approaches for Projecting the Population of Towns

Regional Extrapolation: Lacking VEC 2020 and 2030 projections, the Town of Blacksburg derived the Town population forecasts from the County’s population projection figures. The Town assumed that it would continue to capture a proportional share of growth equal to that captured by the Town over the past 10 years. The County compared the share of growth the Town captured over the last 10 years (according to the latest available Census estimates) and allocated that proportion of the County’s population projections to the town for the next 10 and 20 year periods.

Peer Locality Comparison: The Town of Orange, examined the VEC population projections for Orange County, other communities located within the Planning District, and other “peer” localities that currently have or have had growth rates similar to the Town. In addition, secondary sources, including estimates prepared by Neilson and Claritas, were considered. The Town then developed population projections based information derived from these sources.

The VEC population projections are based on an average of several extrapolation techniques and suggest what future population would be if both historical statewide and local trends were to continue. They may attempt, but do not always effectively incorporate local knowledge or the application of professional judgment regarding whether those trends will change significantly in the future.

For any given locality, particularly in small communities, projections may turn out to be considerably higher or lower than what common sense and local indicators may suggest is reasonable. When this occurs, local government staff, project stakeholders

and elected officials should determine whether, or how, to use the projections and what adjustments might be appropriate. For the planner desiring to reflect upon the potential impacts of the unpredictable, its best to employ a range of alternative “futures” that present a low/middle/high range of demographic growth. The methodology and assumptions used to project levels of future development should be fully described in either the body of the planning document or an appendix.

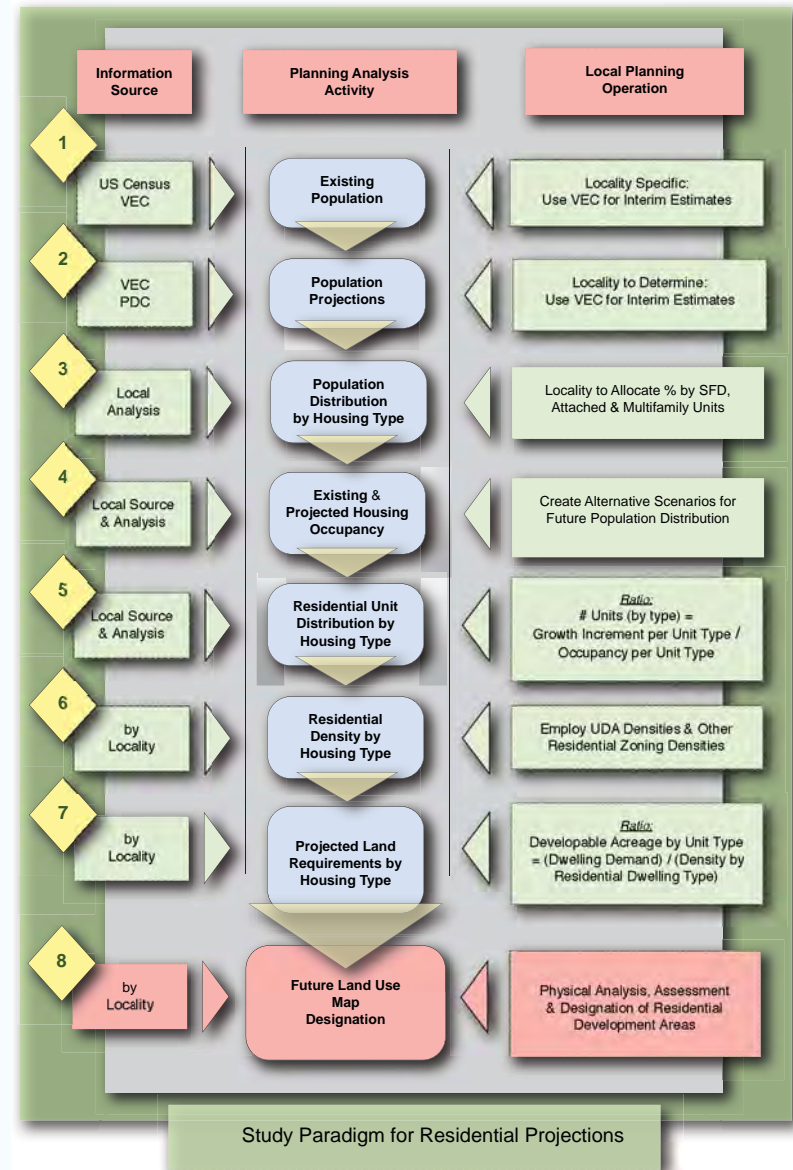
B. Projecting Future Housing Demands

While the transportation efficient land use is intended to offer future residents the choice to live in higher density neighborhoods, high density residential growth in many Virginia communities has not been the trend in past decades. A key element in planning for transportation efficient growth is to more accurately project future housing demands. Thus, it is a critical component of any comprehensive planning process to translate population projections into realistic estimates of future housing in terms of quantity, unit type, and price. Without a better handle on this, the assignment of land use categories to the future land use map is little more than guess work.

This effort must be accomplished within the context of (1) the realities of marketplace demands, (2) the capability of local housing providers to supply these demands, (3) the locality’s housing policy, and (4) the adequacy of the future land use map to designate sufficient areas to allow the marketplace to function. However, this process begins with an arithmetic exercise that distributes future population growth in terms of probable housing product types (single family, townhouses, multifamily, elderly, etc.) as well as housing product price points (affordability) and preferred living environments (rural, suburban, village, etc.)

A number of studies have demonstrated the impact of housing type and location on transportation efficiency. Providing a mixture of housing types and densities in locations with supporting transportation facilities and urban design features has the potential to shift driving trips to other modes such as walking, biking or taking transit.

Local comprehensive plans typically include future land use maps that (a) identify preferred locations for new development, and (b) policy language that provides guidance about what housing types and densities are desirable given the unique character, goals and attributes of the community. Housing forecasts can be effectively employed to develop and assess more compact land use alternatives that depart



from a jurisdiction's "status quo" development patterns. Thus, with proper attention to demographic trends and projected housing needs, the locality's future land use map can be refined to promote transportation efficient land use and design.

Forecasting housing demand can be fairly straightforward since it is typically based on population projections. The most basic approach is to use population projections in combination with the estimated household size for the jurisdiction. Estimates of average local household size are released as part of the U.S. Census every 10 years. At present the average household size (or dwelling occupancy) for Virginia is approximately 2.5 residents/household and single family detached dwellings are by far the most common housing type. However, national trends confirm that household size and dwelling size are both decreasing. More current household size data may also be available for localities as part of the American Community Survey (ACS) released annually by the U.S. Census Bureau.



Forecasting demand is essential to plans for future residential density.

Population projections in combination with estimated household size can be used to forecast a preliminary estimate of the number of units needed to support expected population growth. Using the State average occupancy figure, if a community is expected to grow by 10,000 people in the coming 20 years and the estimated average household size is 2.5, the community will need at least 4,000 housing units (10,000 people/2.5 people per household) to accommodate the projected population growth. This figure doesn't differentiate between varying household sizes that are unique to specific residential dwelling types.



Housing type mix will be an important part of housing forecasts.

Virginia localities seeking more up-to-date housing estimates should adjust annual population estimates prepared by the Weldon Cooper Center by using current year-to-date estimates and applying dwelling unit occupancy figures derived from local sources. Estimates can be updated and further refined between decennial U.S. Census periods using local occupancy or building permit data where available.

Larger localities, or those with more planning resources (such as a staff demographer, planning research department, or with public school planners), often prepare detailed estimates of household size and character for various housing types (apartments, single family detached dwellings and single family attached dwellings). This provides a much more accurate and useful approach than just applying the Virginia average for all housing. Knowledge of individual housing type occupancy can enhance the predictions of housing unit demands and, hence, land absorption requirements for specific unit types at varying density levels.

Planning for future housing needs has physical, economic, and social implications. It also requires a certain amount of educated guesswork in predictive modeling exercises: Future population demands for particular residential types could vary broadly based on national building conditions, local housing preferences, housing affordability, bank lending patterns, age and income levels of new residents, proximity to jobs, employment security in the marketplace, regional influences, and the like. Therefore, assumptions used in predictive modeling exercises need to be carefully assessed and identified.

As localities assess whether current land use policies sufficiently address future demand, it opens up the opportunity for a more informed planning discussion and evaluation of future development options. Local planners could choose to make age, income, and other demographic assumptions about the type of housing that those people will demand in order to calculate a more sophisticated estimate of future housing affordability (for example, 33% of people will live in single family detached houses, 33% will live in townhomes and 33% will live in multifamily apartments). Likewise, planning policies could promote a particular mix of housing to encourage housing diversity and affordability.

When this method is used, it is important to keep in mind that the total future dwelling demand is a function of the marketplace, which, in turn, dictates the distribution of dwelling types, densities, and occupancy rates by dwelling type. The results allow for testing of different distributions, thereby yielding varying results in total housing demand. For example, if 100% of the future residents seek to live in higher occupancy single family detached residences, there will be fewer dwelling units than if 100% of the residents lived in smaller (low occupancy) multifamily units. For a more in-depth discussion, the appendix provides a case study for a Virginia jurisdiction that recently assessed its future housing needs in terms of the anticipated market-driven demand for individual housing types.

C. Determining Land Needed for Future Residential Growth

The key factor influencing the amount of land needed to accommodate predicted growth is development density. Density is a fundamental consideration when planning for transportation efficiency, as higher densities allow for shorter trips, influence potential transit ridership, and establish walkability. Density alone, however, does not dictate a change in travel behavior. The careful integration and balance of density, along with diversity of uses and community design, further allows for the creation of mixed-use centers of activity where residents, employees, and

other visitors have opportunities to move around efficiently by a variety of travel modes.

Many of Virginia's historic towns and villages reflect a 4 unit per acre, or higher, density standard. In practice, higher density usually just means new residential and commercial development at a density that is higher than what is typically found in the existing community.

To promote transportation efficient development, areas designated for future growth should ideally represent the total land area needed to accommodate the projected population and employment demands. This allocation should be pegged to higher densities that support efficient transportation. To calculate land area needed to accommodate future growth, a community must make fundamental assumptions about the density of future development. In some communities, density recommendations may be articulated in the locality's land use policies (via future land use designations) or, by default, through individual zoning district requirements. Further, a community might examine current patterns of development using aerials or Geographic Information System (GIS) analysis to establish the foundation for their density assumptions. For comparative analysis, it is helpful to examine the already permitted, by-right densities for housing in communities throughout the state. This reveals that definitions of density in various locales may vary widely.

Higher density means that less land will be required to meet projected development demands. As an example, if the anticipated demand for housing were determined to be 4,000 units, the acreage needed to accommodate a single family residential use at a density of 4 units/acre would be 1,000 acres compared to 333 acres if all of the housing were developed as multifamily housing at 12 units/acre.

A locality may choose to explore one or more possible housing mix scenarios in order to arrive at the most probable estimate of housing demand given local preferences about development patterns and feasible density levels. Further, determining appro-



appropriate locations for compact development or higher density, mixed use development depends on other considerations such as infrastructure availability and road capacity as well as political and environmental constraints.

Negative Attitudes Towards Density

In the public realm, the notion of density is often mistakenly correlated with negative attitudes; density does not just refer to high-rise. Rather, the definition of density depends on the context in which it is used. From one locality to the next, the perception of density is a “moving target” and, for the layman, it is often difficult to distinguish between a one unit per acre subdivision and one that has three units per acre.

For many suburban communities, the popular mixed-use town centers being developed around the country are considered higher-density development by relative standards. In Virginia, subdivisions with single-family detached houses on one-acre lots are fairly common. In one locale, this density may be considered on the low side, while in a contiguous county it would be viewed as excessive when a similar project is proposed.

In many suburban Virginia communities, single family houses on quarter-acre lots (resulting in about three dwellings per acre) would be categorized as higher density. Many historic towns and villages in Virginia have a developed density at their core of four or more units per acre. Single family houses on quarter-acre lots are considered the minimum necessary to create a reasonably walkable area that looks and feels like a traditional neighborhood.

Thus, density must be integral to the application of transportation efficient land use principles. As the realities of the local marketplace and broader economy impact 21st century housing choices, one underlying responsibility of the planning profession is to better inform all stakeholders on the “density question”.

Permitted Densities Allowed by Residential Zoning District Category			
Jurisdiction	Single Family Detached	Townhouse / Attached	Multifamily
Albemarle	6-9 du/acre	10-15 du/acre	15-20 du/acre
Botetourt	4-5 du/acre	8 du/acre	16 du/acre
Chesterfield	Up to 8 du/acre	Up to 16 du/acre	Up to 25 du/acre
Danville	4-7 du/acre	8 du/acre	8-24 du/acre
Fairfax	4-9 du/acre	12-20 du/acre	20-30 du/acre
Fauquier	4 du/acre	7 du/acre	8-13 du/acre
Fredericksburg	4-8 du/acre	12-16 du/acre	30 du/acre
Williamsburg	Up to 8 du/acre	Up to 14 du/acre	8 - 14 du/acre

D. Projecting Future Employment Demands

Population growth is often tied to a robust regional or local economy. Planning for non-residential growth is an essential factor for a complete community and providing jobs near housing is one of the most effective means of promoting transportation efficient land use. Future employment projections must take into account the wide variety of business sectors that create the employment marketplace. Employment projections are often a product of complex models and are more complicated than population and housing projections because there are significantly more variables.

However, in the comprehensive planning process, employment projections are essential in determining if a locality has sufficient land available to accommodate and absorb projected non-residential growth in locations that support overall land use goals.

The Virginia Employment Commission (through the Occupational Employment Statistics (OES) program) undertakes basic analysis and projections for labor market trends

for localities throughout the state. The OES program is a survey of the businesses in Virginia relative to the occupations of the people they employ. It is a segment of the long-term Industry and Occupational Projections that are prepared every other year. These data are aggregated at the state and Workforce Investment Board levels. Labor Market data can be obtained for cities and counties (towns are included as part of a county), planning districts, metropolitan statistical areas, or statewide. The information can be downloaded and compared on the VEC website or viewed as part of the Community Profile.

The community profile provides a snapshot of demographic and employment characteristics for a variety of planning scales (City/County, metropolitan area, State). As part of the community profile, VEC compiles both short- (2 year) and long-term (10 year) employment projections by industry and occupation. In addition to the total numbers for each industry and employment as a whole, it reports an overall percent change and an annual percent change which can be used to extrapolate employment figures for a period longer than what is reported.

Recently, the VEC and the U.S. Census Bureau partnered to produce a new workforce data series that would possess a dimensional quality. The Local Employment Dynamics (LED) OnTheMap tool provides an easy-to-use interface for creating, viewing, printing and downloading workforce related maps, profiles, and underlying data. OnTheMap is based on 2002-2009 employment statistics and is a unique resource for mapping employment locations within a specified geography, as well as travel patterns of workers and identifying small-area workforce characteristics.

For localities in Northern Virginia, Metropolitan Washington Council of Government's Cooperative Forecasting program provides regularly updated population, household, and employment forecasts for use in planning activities. Data is available by Transportation Analysis Zone (TAZ) and inputs to much of the work done by the Transportation Planning Board and other state, regional, and local organizations. This work also assists local governments in assessing their own plans and forecasts.

The above sources are recommended as a starting point for local planners. While there are a number of employment projection techniques available with varying degrees of sophistication, the following discussion addresses a basic approach. Ideally, employment projections should estimate the number of new jobs anticipated by sector. The results can then be placed into use categories like warehouse/ distribution, high-tech manufacturing, office, retail, medical, etc., each of which will have particular spatial requirement ratios for employees, typical floor area ratios for land utilization by sector, and overall land area needs.

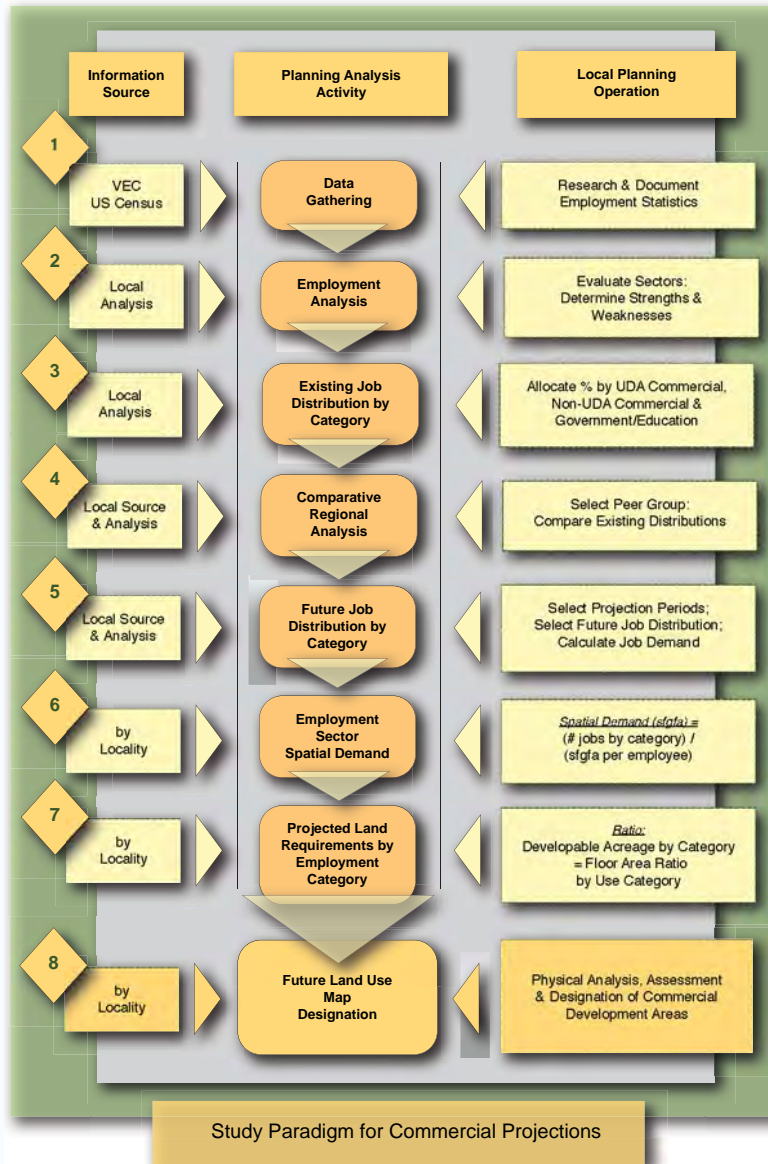
When working with employment projections, it is important to recognize that the current distribution of jobs among various industries may not continue in the future. As a community experiences suburban and urban growth, internal and commuter job sectors take on a different look and distribution. In anticipation of this, a locality may benefit from studying the growth and employment trends of peer jurisdictions – localities within similar regions with equal, or slightly larger, populations. In doing so, the locality can make informed assumptions about how its own employment market may change as it grows.

Employment Estimate and Forecasting Resources:

Virginia Employment Commission: State and local projections are produced by the Virginia Employment Commission and distributed through the Virginia Workforce Connection website (Click on Labor Market Information. On the next page, click "Demographics" under "Labor Market Analysis" in the left hand column.) <https://www.vawc.virginia.gov>

Local Employment Dynamics (LED) On the Map: National and state projections are produced and distributed by the U.S. Census Bureau. <http://lehdmapp.did.census.gov>

*Metropolitan Washington Council of Governments (MWCOC): The Cooperative Forecasting and Data Subcommittee (CFDS) is a technical subcommittee to the Planning Directors Technical Advisory Committee (PDTAC) and the Region Forward Coalition. The committee is responsible for preparing 25-year population and employment forecasts at the traffic analysis zone (TAZ) level for the entire metropolitan Washington region. http://www.mwcog.org/committee/committee/default.asp?COMMITTEE_ID=36
<http://www.mwcog.org/committee/>*



E. Determining Land Needed for Future Employment Growth

Once employment sector projections are developed for the selected planning horizon, land area requirements can be calculated. Again, approaches to this vary in detail, but planning-level estimates can be generated using rules-of-thumb. The projected growth levels in each employment sector (retail, mixed-use, industry) can be translated into the probable square footage of gross building floor area per acre of developable land for the particular use. Reasonably accurate estimates of the number of jobs per acre can also be calculated based on an analysis of existing businesses in the locality or region. Optionally, this ratio and the land absorption requirements can be synthetically derived employing industry-specific estimates.

With respect to the latter, the following data would be needed to do such an analysis:

- Business or sector type.
- Typical floor area ratio (FAR) of building by business or sector type.
- Number of projected full time equivalent (FTE) employees by sector for the planning period.
- Typical spatial demand requirements per employee by business or sector.

From this data the average square footage of required building space per job and floor area ratio can be applied to various business types and/or geographic areas. If this data does not exist or is not readily available, an alternate method is to use general rule of thumb planning estimates provided by a reliable source, such as the Planner’s Estimating Guide or the Urban Land Institute. While not all-inclusive, the following spatial requirements per employee are offered as a general guide and are based on findings on density from studies of the Urban Land Institute. These can be used as a starting point and can be supplemented with more use-specific ratios depending on the degree of specificity desired.

- Retail = 197 square feet/employee
- Mixed commercial = 624 square feet/employee
- Industrial = 724 square feet/employee

Using the number of jobs, average square foot/job, and desired floor area ratio, a basic estimate of jobs per acre can be calculated using the following formula:

$$\text{Jobs/Acre by Sector} = \frac{\text{Floor Area Ratio} \times 43,560 \text{ SF/Acre}}{\text{Employees/SF GFA}}$$

$$\text{Land Area Demand by Sector} = \frac{\text{Projected Employees by Sector}}{\text{Jobs per Acre by Sector}}$$

Lacking specific employment projections for the planning timeframe, another simple method for calculating future employment is to calculate the commercial square footage needed to support the future population. Sixty square feet per new person is a general rule of thumb that can be applied to the new population growth to determine demand for commercial (retail, restaurant, and service) square footage. Using the example above, the same 10,000 new residents would generate the demand of 600,000 square feet of gross floor area of neighborhood-, community- and regional-level commercial space.

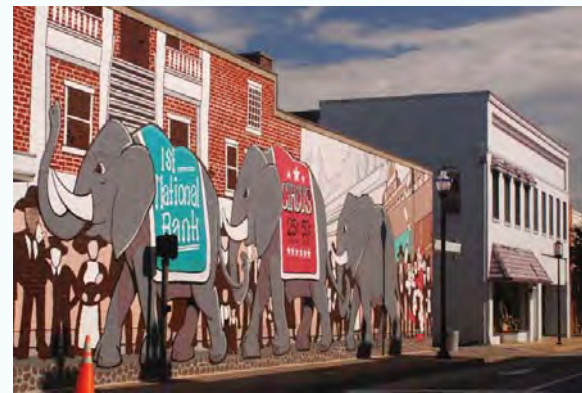
9. Net and Gross Density Determination

Net and gross development densities that are sensitive to terrain and environmental site conditions should also be considered in both comprehensive planning and zoning decisions. In many high-growth locales, there may not be an abundance of prime properties remaining without physical limitations that will adversely impact active development. This leads to a potential disconnect in adequately matching demographic demand with land development capacity. Terrain analysis to assess remaining build-out capacity should be an integral part of the comprehensive planning process, particularly in developing communities with pressures on land supply and public facilities.

There is wide variation among local zoning codes as to what types of environmental constraints, such as water bodies, wetlands, steep slopes, and floodplains are included or excluded from density. Road rights of way are also often excluded from den-

sity calculations as are lands protected by conservation easement. Likewise, public parks, other public lands, and schools, may not be considered for the purposes of calculating future land development capacity.

As a general rule of thumb, features such as public roads, easements, recreation and open space, and environmentally constrained areas typically account for an average of 25% to 30% of the gross land area within a project. Using the example in the previous section, if a community determines that 10,000 new residents are expected in the coming 20 years, there would be a need for 4,000 new housing units and 600,000 square feet of commercial space. Based on a development mix of 80% single family detached units at a density of 4 units per acre, 10% townhomes at a density of 8 units per acre, 10% multifamily dwellings at a density of 12 units and commercial development at a .40 FAR, the projected land area required for the new growth would be 1,310 gross acres although the net developable area would be 917 acres.



Traditional Virginia Main Street density and uses in Martinsville.

Illustration:

Conversion of Residential and Commercial Demand into Developable Acreage

Comprehensive Plan Demand Projections:

Total Projected Residential Dwelling Demand:	4000 units
Total Projected Commercial Demand:	600,000 sf/fga

Projected Housing Distribution and Density:

Single Family Residential:	80%	4 du/ac
Townhouse and Attached:	10%	8 du/ac
Multifamily and Condominium:	10%	12 du/ac

Projected Commercial Distribution and Density:

Conventional Retail Commercial:	50%	0.20 FAR
TND Retail Commercial:	25%	0.40 FAR
Other Economic Development:	25%	0.25 FAR

Calculation of Developable Acreage:

Residential

Single Family Residential:	$80\% \times 4000 / 4 \text{ du/ac} =$	800 acres
Townhouse Residential	$10\% \times 4000 / 8 \text{ du/ac} =$	50 acres
Multifamily Residential	$10\% \times 4000 / 12 \text{ du/ac} =$	33 acres

Total Residential Developable Acreage: **883 acres**

Commercial

Conventional Retail Commercial:	$50\% \times 600,000 / 0.20 / 43,540 =$	34 acres
TND Retail Commercial:	$25\% \times 600,000 / 0.40 / 43,560 =$	9 acres
Other Economic Development:	$25\% \times 600,000 / 0.25 / 43,560 =$	14 acres

Total Commercial Developable Acreage: **57 acres**

Total Demand-Based Developable Acreage: **940 acres**

10. The Future Land Use Map

The future land use map is typically employed to depict the type and location of uses by land use category. Using projection techniques described in the previous section, the locality can determine the net and gross land area needed to accommodate future growth. Demand-based acreage calculations are a valuable tool in guiding decision makers on how much land should be recognized by the future land use map for eventual development. The allocation of too little land stifles the competitive marketplace, while too much designated land opens the door for scattered, disjointed development patterns.

The locations selected to serve as growth areas can be either undeveloped land or infill/redevelopment properties. In either case, these areas must be carefully chosen to match realistic demand projections for future land uses with both existing and proposed facilities and infrastructures. Designated growth areas must also either provide or be planned for infrastructure and utilities that support projected levels of development. The physical organization and location of demand-based acreage allocations should be sensitive to transportation efficient design principles in a way that best promotes the community's vision for future growth. To maximize transportation efficiency, growth areas should be located based on:

- Proximity to existing and planned transportation facilities,
- Availability of public water and sewer systems,
- Proximity to villages, towns or other areas of existing development, and
- Avoidance of environmentally sensitive areas, such as wetlands, flood plains, and steep slopes

Local planners can use Geographic Information System (GIS) mapping to identify these features (existing/planned transportation facilities, public water/sewer, environmental areas, etc) to establish preliminary areas that may be appropriate for future development. If several locations are identified as potential development areas they can then be evaluated using objective criteria to compare the relative merits of various locations against each other and, then, vetted through the public process to identify preferred growth areas.

During the selection process, a community might choose to designate a general area on a map that is based on utility service areas, natural features or other boundaries that are not necessarily based on property lines. Conversely, the growth areas may be drawn using existing property lines, in order to foster a unified development pat-

tern and relate to patterns of existing ownership. In addition, a community could choose to select a growth area where redevelopment opportunities exist in an effort to revitalize underdeveloped properties, or it may choose to locate growth in undeveloped areas that are nevertheless well served by utilities and close to existing communities so that new growth can be catalyzed in this way. See Chapter V for a more in-depth discussion of the public process.

12 Steps to Designating Areas for Growth

1. Consider the overall planning policy framework within your community.
2. Inventory existing population and employment conditions and analyze future trends:
3. Calculate population, housing and employment demand.
 - ☐ Compare demand with estimated development outlined in the plan
 - ☐ Identify land use patterns and densities established in the planning framework
 - ☐ Assess infrastructure capabilities
4. Calculate gross and net acreage based on future population and employment projections
5. Develop goals and objectives to guide transportation efficient land use.
6. Prepare a set of alternative locations for the future land use map.
7. Evaluate future land use map alternatives.
8. Conduct public workshops and/or meetings with stakeholders
9. Select the preferred locations for community growth areas.
10. Prepare Small Area Plan for each designated growth area.
11. Adopt future land use map and comprehensive plan amendment.
12. Monitor and periodically update the growth area plans – during five-year comprehensive plan updates, etc.

Conclusion

Comprehensive plans provide the opportunity to fully integrate land use, transportation, and other infrastructure and public facility issues to support the compact, mixed-use development that fosters transportation efficiency. Policies that allow for a variety of land uses, a better blend of jobs and housing, and an increase in land use densities, can lead to shorter trip distances and increase options for walking, biking, and transit because destinations are closer together, and the built environment is more conducive to alternatives to automobile travel. Also, policies that support a range of transportation choices beyond the automobile provide greater freedom for individuals who cannot or do not drive or own a car.



Growth areas should allow for higher density where infrastructure can support it.

V. Engaging the Public

1. Public Engagement Principles
 - a. Engage Stakeholders at All Critical Levels
 - b. Define the Goals for Engagement Early
 - c. Begin the Engagement Process Early
 - d. Include Venues that will Encourage Thoughtful Ideas
2. Tools for Public Engagement
 - a. The Public Engagement Tool Kit
3. The Importance of Education
 - a. Educate Stakeholders
 - b. Educate and Learn From the Real Estate Community
 - c. Engage and Educate Elected and Appointed Officials
4. Planning in an Anti-Planning Climate
 - a. Typical Issues and Answers
 - b. Strategies for Addressing Issues

V. Engaging the Public

Public engagement - the process of discerning the will of the people - is an important part of any planning change. Citizens of a community have a right to timely and accurate information about new development or new regulations that will affect them and their properties. The public hearing processes that govern most major actions by local governments, including comprehensive plan and zoning changes, exist to give citizens a forum to have their opinions heard. Unfortunately, engaging the community is sometimes viewed as something that one has to do, rather than wants to do. Staff, developers, and elected officials may fear public hearings and other public events because of controversies that may arise.

Proper public engagement should begin well before official public hearings. By creating early opportunities for both education and input, planners can defuse rumors, identify and address a variety of issues, and ultimately improve the success of any planning effort. Defining and implementing an honest, informative, and focused engagement process has become an essential part of the process of planning for community growth using new patterns of land use and development.

The process of engaging the public can take many forms, from focus groups to workshops and charrettes, public forums, events and presentations, surveys and opinion polls, and a variety of one and two-way electronic-communications, using emerging social media tools.

The process should strive to provide multiple opportunities for communication that can capture a diverse range of participants (young and old; ethnically, educationally, and economically diverse; community and business focused; and both citizens and public representatives), and clearly and honestly define the benefits and potential costs of the proposed action, and allow for ongoing feedback.

1. Public Engagement Principles

In initiating a public engagement process, there are several overall principles that should be taken into account from the beginning of the planning effort. The overall principles of successful outreach include the following:



Public involvement takes many forms, and at many project stages.

A. Engage Stakeholders at all Critical Levels

At the beginning of the planning process, identify the key stakeholders - those individuals who will be critical to the success of the effort or who could, conversely, effectively stop any progress if they wish to do so, as well as those individuals whose support will be critical to the successful implementation of the plan (the plan “champions”). At a minimum, it will be crucial to involve these individuals from the beginning of the planning process.

- Carefully define all key stakeholders at the outset of the planning process and determine the most effective strategies for establishing communication links with them. Stakeholders typically include existing community leaders, business leaders, representatives of active interest groups, elected and appointed officials, community developers and realtors, and agency representatives.
- Understand the community’s values as they relate to the plan, and structure engagement strategies in ways that address these. For example, is this a community that is worried about attracting more jobs to the area and keeping young people in the community; or, is the community primarily concerned about the impacts of growth on their overall quality of life, including potential impacts on traffic, property values, schools and other public facilities? Define the major issues

that are likely to arise, identify the people who will be most concerned about these issues, and focus engagement strategies on addressing how the planning process will affect these issues.



B. Define the Goals for Engagement Early in the Planning Process

At the beginning of the planning process, identify the goals and outcomes that can be achieved through public engagement; then, design an engagement strategy that is best tailored to elicit that information. Clearly identify the respective roles of various stakeholders and the public at the outset of the project. The following questions might help guide the process of goal definition:

- What role should the public play in this process – is it primarily advisory, or will public feedback determine the final outcome?
- Will it be necessary to educate people about the purpose and benefits of the plan before seeking their input? If so, how can this education process focus on the issues and concerns of the various communities in the jurisdiction?
- What are the key demographic groups that it will be important to involve in this project, and what are the best ways to solicit input from these groups?



C. Begin the Engagement Process at the Beginning and Keep Communicating

The most frequent mistake that planners make with regard to engaging the public is waiting too long before beginning the process. If stakeholders, including a broad range of community leaders and other community activists, believe that decisions have been made behind their backs, they enter the engagement process from an angry and combative position. This places the planner on the defensive, and immediately places the project in potential jeopardy.

- At the beginning of the project, design an engagement strategy that will inform and involve key stakeholders while providing opportunities for public input along the way.
- Keep the planning process moving forward by designing an engagement strategy that focuses on next steps. What kinds of input do you need at this point in the process to allow the plan to move successfully to the next phase?
- Provide multiple ways to keep people informed about the project as it progresses.
- Initiate outreach to the broader community through the use of attitudinal surveys to capture the views of the silent majority, using online survey media (such as “Survey Monkey”), jurisdictional websites, newspapers, and other forms of survey dissemination.
- Describe ideas clearly, simply, and visually.

D. Include Venues that will Encourage the Thoughtful Development of Ideas

During some phases of a project, the most appropriate ways to engage the public may be through more formal communication strategies - open houses, presentations, surveys, website postings, and so on. However, at other times, the best approach might be to invite the public to brainstorm ideas with the planning team, in workshops, multi-day charrettes, on blogs, or through other collaborative venues. During the process of developing a Small Area Plan for one jurisdiction, for example, the planners were able to successfully diffuse the negative attitudes of several community representatives through a hands-on task that asked participants to develop

alternative land use and density plans for the area using individual “building blocks” representing varying densities of residential, commercial and open space uses.

- Include venues that allow time for small group discussions and open discussions about ideas and opinions. Remember, you don’t have to agree with or embrace every idea that is generated, but you want to capture the ideas that will enrich and guide your project.

2. Tools for Public Engagement

There are a wide variety of engagement tools available for planners - many that are standard and have been used for decades, and others that are emerging and growing exponentially through internet and other social media communication options. The “tool kit” that you choose to use for any given project should be defined after considering the kinds of information and feedback that you will need to achieve a plan that is responsive to the community’s stated needs as well as the project’s goals and purposes. For most projects, you will likely want to use a variety of tools to obtain the input you need at different project phases, and to engage a broad range of people in the planning process.



Charrettes invite the public to actively pitch in with pens on paper.

A. The Public Engagement Tool Kit

There are generally three categories of community engagement techniques that can be used effectively at various points in a planning process. These include:

- On-going tools that are used to inform/educate, and solicit input: these are largely communication tools that allow members of the public to become aware of a project, stay informed as the project proceeds, and provide on-going input.
- Data collection tools: these techniques allow members of the public to provide their views and opinions, as well as identifying issues and concerns; they also provide an opportunity for planners to observe and document behavior in order to assess whether what people say is consistent with what they actually do.
- Special events, meetings and workshops: these venues provide opportunities for members of the public to collaborate and brainstorm, be creative, and develop their own directions in addressing one or more planning issues.

The tools that are most appropriate to use for each of the above purposes are listed in the following chart, along with a description of the ways in which each tool can be used most effectively.

ENGAGEMENT TOOLS	EFFECTIVE FOR:
Ongoing Tools to Inform/Get Input	
▪ Project Website	Project updates, surveys, announcements
▪ Social Media: Facebook, Twitter, etc.	Inform, get input, create a “buzz”
▪ Media Coverage/Newsletters	Inform, announce
▪ Community events: Farmers’ Markets, etc	Creating awareness, surveys, crowdsourcing
▪ Virtual meetings	Reaching those who can’t attend in person
Data Collection Tools	
▪ Google Mapping	Target areas of interest
▪ Videos and Photographing	Document what is happening
▪ Focus Meetings: Engaging specific groups: kids, older people, bike commuters, etc.	Learn about specific issues
▪ Surveys	Gather opinions, visions; identify issues
Special Events/Meetings/ Workshops	
▪ Workshops, charrettes, presentations	Creative education, brainstorming, feedback
▪ Walking/biking tours	First-hand feedback
▪ Key stakeholder meetings/interviews	Education, feedback
▪ Project Advisory Group meetings	On-going guidance
▪ Open Houses and Meetings	Education, feedback

3. The Importance of Education

Central to an effective public engagement process is education. In the best planning and development processes, education works in multiple directions and is mutually beneficial for all involved. Broadly defined, education can include:

- Educating stakeholders on the planning process, and important issues, so that they can make informed decisions about the future of their communities.
- Educating local elected and appointed officials on transportation-efficient development.
- Educating developers and financial institutions on the benefits and market potential of mixed-use, compact development, and enabling them to learn from others who have developed and financed successful projects.

A. Educate Stakeholders

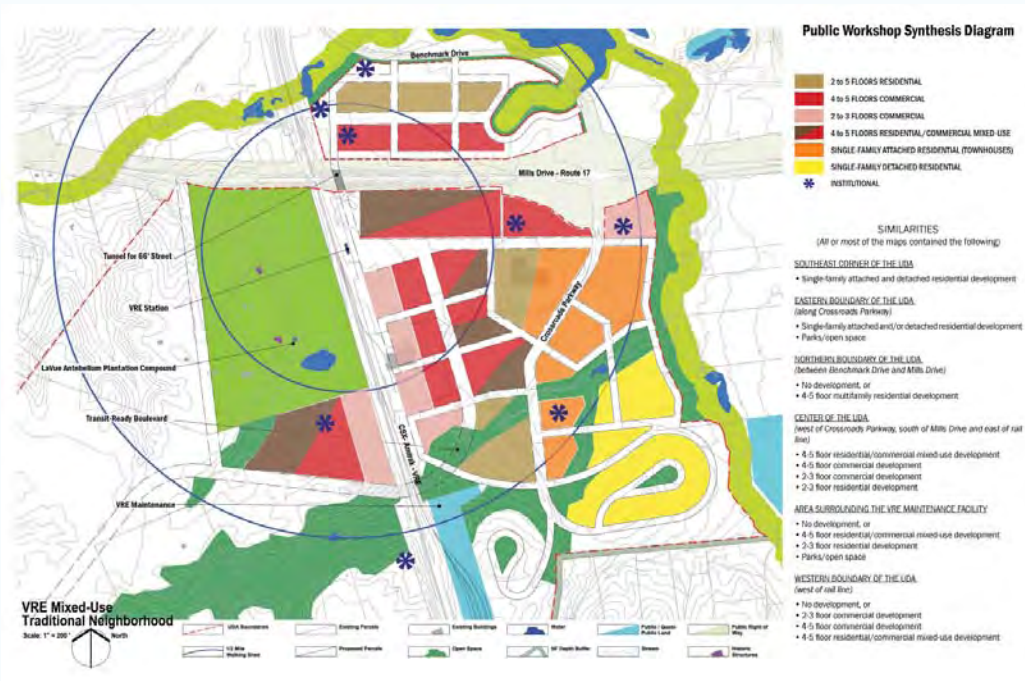
Proposing compact, higher-density development in a community often elicits fears, resistance and a lot of questions. In such cases, it is necessary to engage people on these issues to allay concerns. This includes:

- Helping stakeholders visualize what transportation-efficient development and different densities and FARs look like. This will help people focus and get beyond the theoretical.
- Letting stakeholders be the designers by developing their own development concepts using a variety of “construction tools” (blocks, squares of paper, legos, and computer visualization tools). Doing so helps people understand concepts better, imagine how compact development could be possible in their community, and decreases negativity.
- Explaining clearly the critical elements of compact communities and those elements that may be flexible.

- Presenting information visually in a variety of ways. For example, some community stakeholders may be new to planning and design issues and may have trouble reading maps. Therefore, supplementing maps with photographs, sketches and renderings can increase people’s understanding of a development concept.

B. Educate, and Learn From, the Real Estate Development Community

It is also important to engage developers and lenders in the education process, both educating them on the benefits of compact development and learning from them. One challenge to introducing compact and mixed-use development in many communities is often the local development community’s lack of experience with these kinds of development projects. Moreover, in a climate of growing distrust of government, it also helps to employ representatives of the development community, and the private sector in general, as advocates for planning and devel-



Workshop mapping should be presented as clearly and concisely as possible.

opment strategies. Developers and lenders can also help educate planners to ensure that plans, as they evolve, are more effectively implemented. Specific strategies include:

Education sessions for developers and lenders

Developers and lenders may stick to a single development product and may be afraid to step out of their comfort zone, even if it ultimately makes financial sense to do so. Moreover, the complicated financing and partnerships required for compact, mixed-use developments may seem daunting or not worth the effort.

For these reasons, a local government might consider organizing education sessions for developers and lenders on mixed-use development and financing, in order to provide developers and lenders with the tools and motivation to step out of their comfort zones. These sessions are most effective when participants have an opportunity to learn from their peers, particularly larger developers who have had success with Traditional Neighborhood Development (TND). This is also an opportunity to help these groups understand the market for mixed-use and compact development.

Developer Panels

Developers and lenders can serve as a valuable “reality check” to help ensure that a plan is implementable. Organizing a panel of development community experts in an advisory role during a planning process is one way to receive valuable input from developers. Through these panels, localities can receive input on key factors for encouraging a region’s developers to invest in an area and, subsequently, receive specific feedback on draft land use and urban design concepts in order to ensure that a plan is realistic and implementable.

C. Engage and Educate Elected and Appointed Officials

Last, but not least, it is important to ensure the ultimate decision-makers - elected and appointed local officials - have a sufficient understanding of transportation-efficient communities to make sound decisions and justify them to constituents. Several strategies for educating local officials include:

- Holding work sessions with local official, beginning early in the planning process, to “bring them along”, and to receive their buy-in as the specifics of a planning effort take shape.
- Organizing site tours to existing TND communities to enable decision makers to experience comparable development projects first hand and compare them with other communities. This will help to identify preferred and transferrable development approaches. These tours could include opportunities to interact with local officials and developers to better understand lessons learned, pitfalls to avoid, and strategies for implementation.
- Inviting local officials to attend, and observe, public meetings so that they can hear what people have to say about the project – including future visions and goals, concerns and issues, and strategies for implementation.



Education can help to illuminate the planning process for laymen.

4. Planning in an Anti-Planning Climate

With the onset of difficult economic conditions nationwide, an anti-planning sentiment has begun to dominate the planning (and anti-government) dialogue in many parts of Virginia. For many, planning is an easy target and has become the tip of the iceberg underlying larger state and federal governance concerns. This is especially apparent in the strongly negative reaction to such terms as Smart Growth, Sustainability, Compact Development, and Livability. While polls have shown that a majority of people are in favor of these concepts (source: Ford Foundation poll, 2010), those who do react negatively are sometimes vocal and may attempt to command the conversation at public meetings and events.

A. Typical Issues and Answers

There are several common issues that have been raised at meetings across Virginia when planning issues – especially those dealing with density, mixed-use development, and designated growth areas. In some cases citizens are rightfully concerned about growth and the changing look of their communities, while in other cases common myths and misunderstandings are perpetuated. Below are some of these common misconstrued issues, along with the plain facts that address them:

- o *My property rights are being taken away.*

This form of development provides greater flexibility to property owners to pursue the “highest and best” use of their property, expanding rights as well as economic opportunity.

- o *This is a socialist plot; it is unconstitutional.*

The local planning process is about democracy, having a say in the future of your community, and preserving your constitutional right to own private property. Planning for compact development in no way forces anyone to live in a particular place or in a particular way, unless they choose to.

o This is part of the United Nations' Agenda 21.

This planning process is a local decision-making process that has nothing to do with the United Nations or Agenda 21. Agenda 21 is a non-legally-binding United Nations policy document, adopted by 178 countries in 1992, that offers recommendations on settlement patterns, poverty reduction and environmental protection goals. Agenda 21 has no legal mandate in this country.

The comprehensive planning ethic in Virginia pre-dated Agenda 21. Neither the local planning process nor anything in state or local law is aimed at implementing Agenda 21.

o This project will end up costing me more money for new roads, highways and schools.

Compact development reduces the cost of providing infrastructure and public services by utilizing existing infrastructure and concentrating new development strategically to enable more efficient public infrastructure and services. Compact development patterns will require fewer new roads and road improvements, will reduce public utility costs and the operating costs of schools and other public services, and will contribute to local tax base and revenue.

On the other hand, unchecked growth that is dispersed all over a locality or region will result in greater expenditures of taxpayer money as well as increased transportation costs for households.

o Trying to get everyone to live in "cities" is social engineering.

This form of development is about providing more choices, not fewer. TND is not a replacement for other forms of land use, but, rather, it serves as a complement to a locality's land use patterns. Mixed use, TND design, and transportation efficient development provides a greater range of housing options for all ages and incomes, more transportation choices, the option of living closer to jobs and services and the ability to remain in a single neighborhood throughout the course of one's lifetime. Many people would like to live in these kinds of places, but developing in this way is prevented by the majority of existing zoning codes.

Concentrating development in more compact areas also allows communities to protect the way of life in surrounding areas by conserving land, preserving rural character and agricultural land, and protecting natural areas.



o Dense development will attract more people; why are you bringing growth to this area?

Population growth is inevitable and, generally, predictable. The question is not "if?" but "how much?" It is up to the community to determine how and where they want to grow. Not planning for growth will result in inefficient use of land and public resources. On the other hand, planning for compact development is about making strategic and well-informed decisions about how to accommodate expected future growth in a way that enables fiscally-responsible and strategic investments in public infrastructure and services, greater choice in housing and transportation, and lower transportation costs for households.

o This type of development will attract the "wrong people"?

Case studies of successful TNDs have shown that this argument is nonsense: This type of development will attract (1) professionals who want to live closer to jobs and services; (2) residents, including family members of existing residents, who would like to live in the neighborhood, but, cannot, due to a lack of suitable housing options; (3) elderly who want to live close to their children but who do not desire or cannot afford a rural lifestyle, and (4) people who

want to interact with their neighbors, walk to the grocery store, save on car and fuel costs, and who do not want to spend valuable hours in their cars each day.

In addition, the higher population density will attract the kinds of amenities and services that people like to have in their communities, but which currently cannot be supported by existing low-density development.

- o *We don't have emergency equipment to accommodate this kind of development.*

In fact, compact development and a connected grid of streets improve emergency response by enabling more potential routes for responding to and accessing emergencies, less traffic congestion, and shorter response times overall. The width of streets and the density of housing will not hinder emergency vehicles' ability to access residences and businesses.

- o *This kind of development will never happen here.*

Real estate markets and consumer choice will ultimately determine whether or not this type of development will occur, and demand for compact mixed use development is increasing. However, proactive planning for compact, higher-density development and creating the tools to encourage this type of development will enable the community to harness these market forces whenever the local development market exists. Doing nothing and keeping existing zoning regulations will ensure continuation of the status quo well into the future.

B. Strategies for Addressing Issues

A good general rule for all public engagement efforts is to be prepared - know the issues that are likely to be encountered before planning public meetings, whether this is a workshop, a focus group session, or other event. The most effective way to identify these issues is through thorough discussions with key stakeholders – both those who might be friendly to the project and, even more significantly, those who might oppose it. The purpose of these sessions is to identify stakeholder perceptions and misconceptions, the issues and concerns that might be raised, and the blogs or other communication streams that can be tapped to listen to the dialogue on the issues.

Once issues have been identified, public meetings can be planned. Proactively address any issues and concerns head on by:

- Inviting the groups who are likely to oppose the project to the session, as well as groups who will be “champions” of the project.
- Addressing the issues and objections likely to be raised through a discussion of the benefits of the project vis a vis these concerns.
- Avoiding the use of planning terms that are controversial (e.g., smart growth, sustainability, livability, climate change).
- Framing the project's benefits in ways that will resound with the community – many of these are described in the Benefits chapter of this handbook.
- For many, these might include the achievement of defined community goals such as: job creation, cost savings, economic growth, retention of rural lands, etc.



- Providing options that alleviate the cost burden to the community – discuss options that include public-private partnerships, a reduction in public sector investments (such as lower infrastructure costs), options for private sector investments, and so on.
- Anticipating questions that might be raised, and preparing your answers to them in advance. There are a number of useful presentations on the web that can help you prepare responses to difficult questions about density, growth, zoning regulations, traffic concerns, impacts on property values, and so on.

If you are using any written materials as part of your public engagement process, including a project website or Facebook page, make sure that that this includes a version of the typical answers and issues section included in this chapter – perhaps as an anticipated Frequently Asked Questions list – so that anticipated issues can be addressed before they become “viral” for your project.



1. Abandoned industrial uses.



2. Sidewalks and street trees added.



3. Commercial adaptive re-use.



4. New mixed use development.

Showing the public what future development could look like - through photosimulations like these - can be a powerful tool.

VI. Implementing Transportation Efficient Land Use

1. Regulatory Impediments to Transportation Efficient Land Use
2. The Zoning and Subdivision Amendment Process
3. Options for Implementation
 - a. By-Right TND
 - b. Targeted TND Zoning
 - c. TND District (Private Sector Initiated)
 - d. Adaptation of Existing Zoning
 - e. Form-based TND District
4. Designing TND Implementation Measures: Self Evaluation
5. Subdivision Ordinance Provisions
 - a. Connectivity
 - b. Road Design
 - c. Flexibility Provisions
6. TND Traffic Impact Studies
7. Environmental Regulations
 - a. Stormwater Management and Best Management Practices

VI. Implementation

Introduction

Zoning and subdivision regulations create the foundation for the ultimate implementation of projects that fulfill the principles of transportation efficient land use. The comprehensive plan provides guidance for future land use, but it does not directly regulate land uses. Zoning and subdivision measures should be designed to fulfill the comprehensive plan's goals by creating a regulatory framework for a detailed land development plan and program. This would establish the mix of uses, design guidelines, and conditions for a specific project at a specific location.



Zoning and subdivision ordinances must be structured to allow TND.

This chapter addresses implementation strategies to ensure that the comprehensive plan's vision and the techniques for traditional neighborhood development can be effectively combined and implemented by local government. The focus will be on the development of zoning and subdivision regulations that respond to the needs of transportation efficient land use.

This report has demonstrated that development that embodies transportation efficient land use principles, such as those common to traditional neighborhood developments. It represents a marked departure from conventional, single purpose

zoning practices in that it promotes (1) mixed-use development, (2) interconnected street systems, (3) compact building massing and density, and (4) friendly living and working environments built upon attractive neighborhoods. Traditional Neighborhood Development (TND) implementation measures must be drafted to thoroughly define and document the regulations and guidelines necessary to achieve these project objectives.

In drafting new and complementary implementation tools, the strategy should be to create regulations that promote opportunities for both:

- (1) creativity and flexibility for the developer and landowners in establishing TND land use plans, mix of uses, and densities that best serve the land use, and marketplace objectives for the project, and
- (2) necessary and sufficient regulatory controls for the locality to ensure the agreed mix of uses, neighborhood organization, lot and building types, density, development phasing, and community infrastructure.

1. Regulatory Impediments to Transportation Efficient Land Use

Zoning and subdivision codes directly influence the overall character and content of development in many Virginia communities, often resulting in inefficient transportation patterns, congestion and a lessening of transportation freedom. A combination of modern suburban zoning codes as well as economic and market conditions have resulted in houses, jobs and commercial areas that are separated from one another along congested arterial roadways. These inefficient land development patterns can increase public expenditures for roads, infrastructure and services. Ironically, local zoning regulations often preclude transportation efficient development patterns and traditionally designed communities, such as those found in many historic small towns in Virginia.

Local zoning regulations often preclude transportation efficient development patterns and traditionally designed communities, such as those found in many historic small towns in Virginia.

The first step in implementing compact and transportation efficient development is to assess a community's zoning and subdivision regulations, in general, and specific zoning districts, in particular. Common regulatory impediments to a mix of transportation efficient land uses and traditional community design include the following:

- Zoning that strictly separates residential and commercial uses
- Zoning districts drafted to attend to the demands of the post-war suburbs
- Insufficient number of zoning districts to address contemporary land use forms
- Zoning districts that are inflexible on mix and density of use
- Large minimum lot size requirements and excessive building setbacks
- Rigid standards for yard, building height, and setback geometry.
- Development density/intensity limits that favor building out, instead of building up
- Street standards that promote auto oriented, wide streets
- No requirement for sidewalks
- Excessive parking standards
- Lack of defined open space
- Inadequate guidelines for environmentally and topographically challenged lots
- No standards for building design/orientation toward the street
- Limited or no standards for block length, connectivity, or cul-de-sacs

Implementing transportation efficient land use through revised land use regulations depends on a community's needs, ambitions, and resources as well as public and development community support for alternative forms of development. While there may be widespread community support for comprehensive plan

goals aimed at promoting transportation efficient development, there may be less support for regulatory amendments that can increase the development potential of individual properties. An extensive community education and input process may be required to assess the level of support for various implementation options.

2. The Zoning and Subdivision Amendment Process

By law, zoning and subdivision ordinance amendments are subjected to public review and public hearings prior to approval by the governing body (Virginia Code § 15.2-2285, § 15.2-2251, § 15.2-2204). In most localities, modifications to zoning and subdivision regulations usually take the form of text amendments that do not change the zoning of a parcel but do, in fact, change some of the rules about how a property may be developed or subdivided. Zoning text amendments may also provide new development options, revise permitted uses in existing zoning districts or create entirely new zoning districts that better support the goals or policies of the comprehensive plan and the needs of the community. On the other hand, zoning map amendments address specific parcels to which text amendments may be applied.

Localities also have the option to initiate zoning map amendments that actually change zoning on individual parcels. A zoning map amendment may be targeted to a specific area for a specific purpose (Columbia Pike Form-based Code in Arlington County) or may affect an entire jurisdiction (Comprehensive Rezoning, Loudoun County, Virginia). This option is rarely exercised in Virginia and is usually limited to instances where a newly adopted or revised comprehensive plan proposes significant change in future development patterns.

In most cases, land development activity in Virginia is initiated by individual landowners or developers through subdivision and site plan applications or through zoning requests (rezoning). This makes it all the more important to ensure that the type of devel-



opment that is most desired by a locality is easy to achieve by private landowners and that regulations and policies work together to create incentives for preferred development forms.

The conditional zoning process relies on the use of proffers. Proffers are intended to help offset the costs and impacts of growth and mitigate site-specific development impacts, provided that the demand for which is necessitated by the development subject to the rezoning proposal. This is carried out through cash proffers and in-kind proffers as well as other conditions offered by a landowner with a zoning map amendment in response to the dynamics of the rezoning negotiation.

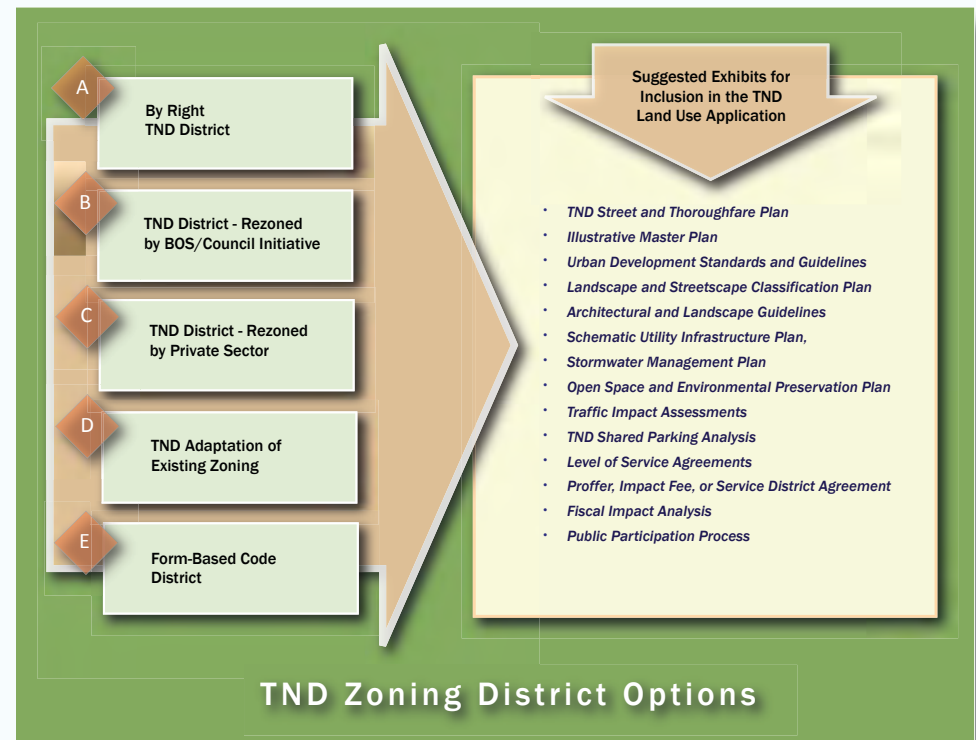
In rapidly growing jurisdictions, proffers obtained through conditional zoning may provide significant funds and in-kind contributions to offset capital facility and service demands on things like schools, utilities, firefighting, and many others associated with new residential development. Where cash proffers are employed, localities must first establish the capital cost threshold upon which proffers may be offered. Proffers may be used to ensure the quality, character, and phasing of a proposed development. In situations where communities have few design regulations, a concept plan proffered as part of a rezoning may be the only means of ensuring that certain traditional community design principles are achieved.

3. Options for Implementation

The essential governing document for a TND/mixed-use implementation system should be a zoning district that provides the platform on which the local government and the development community interface to create new projects. The review and approval process must be both seamless and transparent. Private and public sector project development strategies are often competing. While local comprehensive planning is conducted in a public venue, project master planning for private development often originates and incubates outside the public's view. The TND zoning district and its companion zoning amendment processes must bring these two together.

Over the brief history of the TND form of land use, many zoning district structures have been promoted and tested. Depending on the character of the particular locality, the varying approaches have had similarly varying results. In consideration of what could optimally satisfy a locality's needs, the following five TND implementation approaches should be considered:

- By-Right TND
- Targeted By-Right TND Zoning (Initiated by Local Government)
- TND District (Private Sector Initiated Rezoning Process)
- Adaptation of Existing Zoning Districts for TND
- Form-Based Code TND District





A. By-Right TND

The By-Right TND option is intended to offer an opportunity for applicants to pursue transportation efficient land use with few regulatory impediments. It can be achieved in two ways: (1) TND can be permitted as an additional use in certain existing zoning districts, or (2) a locality can rezone, on its own motion, a defined geographical area, such as a growth area defined in the comprehensive plan, to serve as an overlay (or option) district in which TND would be considered a by-right option. In the case of this overlay, TND would be a by-right option, but development based on the underlying zoning would also be possible. The appendix to this document contains the By-Right TND (option) district recently adopted by the City of Martinsville.



While a formal rezoning process would not be required for a TND project, the applicant would have to submit master plans, infrastructure and transportation plans, and design guidelines in conjunction with any project proposal. The TND requirements would be incorporated as a separate zoning ordinance chapter.

This approach provides the opportunity for the developer to seek approval (subdivision and site plan) for a TND project employing a process that requires a set of detailed TND design guidelines, feasibility studies, and other implementation documentation, but that does not require a rezoning action or public hearings. Upon approval of a project via the TND Option, the previous underlying zoning district is then replaced by TND zoning that governs the building of the project.



The By-Right TND Option works well in communities seeking new development as well as revitalization and redevelopment of core areas that have adequate public facilities. However, for other communities, there are negatives to this approach. Compared to a privately initiated rezoning application, the locality's ability to control the phasing of development is greatly limited. Conditional zoning and proffer agreements cannot be applied to this approach since the land has already been recognized for by-right TND use. Thus, lacking the ability to obtain proffers and in the absence of impact fees, the By-Right TND Option can greatly

compromise a locality's ability to effectively program and time the construction of essential capital facilities and infrastructure.

Another negative aspect of this technique emerges in instances where the applicant becomes discouraged with the enhanced administrative aspect of the TND process and subsequently elects to develop under the underlying by-right zoning district. In such cases, the locality typically settles for a lesser project losing the ability to achieve a higher quality plan that conforms to its vision for TNDs. Thus, the By-Right TND Option is not recommended in the absence of adequate public facilities and infrastructure or a pro-active approach to establishing infrastructure funding districts and transportation impact fee districts.

B. Targeted TND Zoning (Initiated by Local Government)

The targeted approach would permit TND zoning as a by-right use on certain designated properties. Similar to the option above, the result would yield a by-right TND zoning opportunity for the private sector. But, rather than applying zoning designation as an overlay encompassing the entire designated growth area, targeted tracts of land deemed most appropriate for TND projects would be proactively rezoned by local government. This action would remove the pre-existing zoning district designation. Thus, it would be the public sector's responsibility, guided by its comprehensive plan and adequacy of public infrastructure, to target the most desirable properties for this form of development.

As with the TND By-Right option, the landowner or developer would not be required to initiate a zoning map amendment. If properly managed, this results in a relatively straight forward process whereby the developer avoids the public hearing process but has to conform to a pre-defined set of administrative design standards, subdivision guidelines, and land use regulations that specifically fulfill the community's objectives for TNDs. These would be detailed in enhanced site plan and subdivision standards. In this case though, properties rezoned by the locality would not retain the right to develop under more conventional underlying zoning.

While avoiding a formal rezoning, the process still requires extensive up-front involvement by local government. Prior to selection of desired TND sites, specific land use plans that guide both the location and form of the TND should be included in the Comprehensive Plan. Design guidelines must be well thought out and detailed for the designated TND properties.

As with the By-Right Option, the process works well within highly developed urban areas where infill development and redevelopment are warranted, economically justified, and encouraged by both government and citizens alike. However, there is less ability for the governing body to negotiate post-zoning design details in absence of a highly refined and adopted jurisdictional master plan that establishes an architectural and urban design vision for the area in question. Also, local government would lose its ability to negotiate individual proffers and conditions.

This technique would not serve as the optimal foundation for any project within a jurisdiction that is lacking (a) adequate public facilities and (b) adequate administrative resources, and (c) a strong commitment to the local comprehensive planning process. However, in established urban areas, its limitations can be both anticipated and ameliorated. Both the by-right and targeted zoning options are excellent vehicles for local government to proactively employ in establishing the locations for compact, mixed-use projects.



Targeted TND zoning districts should focus on areas with anchors such as civic spaces, existing density, or transportation hubs.

C. TND District (Private Sector-Initiated Rezoning Process)

A TND district requiring a privately-initiated rezoning is likely the optimal approach for zoning TND development projects. In this scenario, a freestanding TND district would be incorporated into the zoning ordinance. TND projects would only be implemented via a landowner or developer-initiated rezoning process. Today, this is the most prevalent approach employed by growing communities to implement mixed-use projects. It works well for TNDs located on large, undeveloped (“greenfield”) tracts as well as smaller infill projects on properties where more public/private cooperation than could otherwise be achieved via by-right zoning measures is required.

As with the first two options, the TND district text would incorporate a set of private sector application requirements that include master plans, design guidelines, transportation and traffic studies, and development phasing plans. (See zoning district examples in the Appendix). Local government would react to individual zoning requests, and have ultimate approval of the mix, density, phasing, and conditions.

It presumes that the jurisdiction has adopted a comprehensive plan and future land use map that includes goals and objectives for future TND projects. Thus, the locality’s decision-making framework for evaluation of a particular rezoning should embrace and be consistent with its planning documents. Once approved by the Board or Council, the rezoning action would replace the prior, underlying zoning of the property.

As with the traditional rezoning process, private rezoning applications would be vetted by planning staff, the planning commission and the governing body, with final approval subject to public hearings. Public engagement meetings and community work sessions are encouraged before official public hearings are scheduled.

Unlike the by-right options, the developer-initiated approach allows for the locality to seek and accept proffers, condition, and supplemental improvements in consideration of the rezoning. Master planning decisions as well as negotiations related to zoning conditions and proffers provide the fulcrum to balance private and public sector objectives. However, as a result, the process typically consumes more time and effort by both the public and private sector than the by-right or TND option approach.

A fundamental limitation is that this strategy would only be applied on a case-by-case basis, thereby limiting the desired level of comprehensive coordination necessary to

tackle big picture issues within a larger region. The key advantage is that it allows public participation in the zoning process. This zoning technique, in combination with subdivision ordinance enhancements and other growth management tools, can be designed to implement the essential principles of Traditional Neighborhood Development.

D. Adaptation of Existing Zoning Districts for TNDs

Where privately-initiated zoning map amendments are required, a new TND district may be the optimal regulatory framework for a compact, mixed-use development. However, in many Virginia communities, elected officials have been hesitant to add new zoning districts to existing zoning ordinances, creating difficulties for staff planners to effectively address TND projects. This has led to efforts to implement TND through existing zoning district regulations. Typically, this is done in one of two ways: (1) Use of existing zoning districts, most frequently being amendments to Planned Residential Development (PRD) or Planned Unit Development (PUD) districts, or (2) Incorporation of TND/Mixed-Use projects employing a modified conditional (or special use) permit process.

Amended Districts: PUDs and PRDs

Planned Development districts - many of which have positive elements similar to those found in contemporary TND districts - were created during the 1970s as a response to cookie-cutter, single purpose development. While the original intent for Planned Development districts was noble, these districts were typically formulated to implement predominantly medium-density residential projects. They were not designed to tackle issues inherent to higher density, mixed use projects.

In rare cases the retail and employment components of these districts incorporate town planning principles, with peripheral shopping centers and office parks the typical outcome. PRD and PUD ordinances focused on negatives (what you can't do), not positives (what you should do), with firmly established minimum district sizes, minimum densities, minimum open space required, land use mix, and fixed lot sizes limiting project flexibility.

Encouraging quality of design should be more important than establishing rigid rules for land use types. Unlike the more prescriptive criteria found in traditional PUD and PRD districts in Virginia, there is no reason to introduce requirements for a pre-es-

tablished, fixed mix of uses. Zoning districts that have set thresholds for mix of uses have not been successful and have placed administrative burdens on governance in response to reasonable changes in the marketplace and evolving land use trends.

Rather, TND rezoning agreements should establish general parameters within which flexibility is permitted, changing demands are anticipated, and good design is rewarded. Good TND adjustments to planned development ordinances will acknowledge that there is a free market in play that ultimately decides the demand characteristics as well as the building type, quantity, and price of housing and commercial space to be introduced in a given area.

PRD/PUD regulations often stipulate the preservation of open space and sensitive environmental areas, while allowing density on the "high and dry" areas of a parcel. This is a good approach, but open space standards are typically expressed as a percentage of the whole, without regard for the location within the project, the actual lay of the land, and the open space demands of the community's residents.

In general, TND type design guidelines are rarely a part of the PRD/PUD zoning requirements. In the past, these districts rarely incorporated requirements for specific landscape design guidelines, internal transportation systems, civic improvements, and mix of uses. While it presents an option that could curry political favor, the adaptation of planned development districts is a substandard method that rarely achieves successful TND projects in comparison to a new TND district that more thoughtfully integrates transportation efficient land use principles.

However, one reasonable compromise example is found in the revisions to Fluvanna County's PUD district. In this case, there was little political interest in undertaking what was perceived as a major addition to its zoning ordinance. County planners, working with its consulting team, drafted incremental changes into the existing PUD district that more formally integrated its adopted comprehensive plan guidelines for mixed-use, minimum densities, and flexible design standards in its designated development area.

Conditional Use

TNDs employing a conditional (or special) use vehicle has applicability in existing, highly development urban areas and works best with small scale projects. Rather than requiring a formal rezoning action, TNDs would be allowed within selected conventional zoning districts via the issuance of a special use permit. The applicant can pursue a TND at any location within the underlying zoning district, while recognizing



that more exhaustive planning design standards are a requirement. However, unlike a formal rezoning process, the locality cannot make beneficial use of proffers and other conditions that could otherwise be realized via a formal, developer-initiated process. Elected public officials, with the advice of the planning commission, should be charged with making decisions on conditional uses.

While not recommended for large-scale projects, the conditional use approach is useful in urban areas where (a) infill and redevelopment is being encouraged, (b) the locality has developed a small area plan and urban design guidelines, (c) the project’s impacts can be readily defined and managed by the application of incremental special use conditions, and (d) the elected body is responsible for approval. (See discussion of small area plans in Chapter IV).



E. Form-Based TND District

The form-based code zoning technique emphasizes the look and feel of a project over the specific mix of uses and densities contained within. The form-based code presupposes a comprehensive plan and future land use map that incorporates well defined transects. If a proposed project--regardless of quality--does not fit within the development parameters of the designated transect, it cannot go forward.



While the form-based code approach has applicability within a range of planning areas, it is most effectively applied to mixed-use projects that would best fit into transects identified by the future land use map as Neighborhood Centers or Urban/Town Centers. It functions less effectively in rural and suburban fringe areas where underlying, conventional zoning is typically more politically expedient.

Form-based codes are a graphics-driven approach for establishing zoning standards and requirements. The TND project’s framework is established by a regulating plan that delineates and assigns a set of “mini”-zoning regulations to each sub-area within

a given project. A sub-area may be a rigidly defined set of blocks or it could be a more loosely organized neighborhood. The regulating plan defines the character, shape, and size of the sub-area while giving reasonable leeway to the configuration and mix of uses to be developed within.

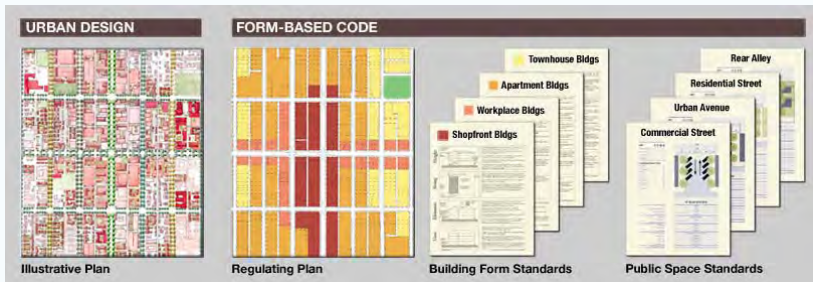
Unlike conventional ordinances that segregate land use types, a developer is given flexibility to build a range of housing types - detached, townhouses, condos - within an interior block as long as the code’s architectural and urban design standards are met. In this approach, fixed geometric standards give way to a design-driven approach to establishing building scale, siting, and location in proportional relationship to the vision for the particular neighborhood and its streets.

Form-based codes can be applied in one of two ways: (1) the locality can prepare and adopt its own small area plans and design guidelines for a specific area (containing multiple individual parcels), or (2) a project-specific code of development can be individually prepared by an applicant for a rezoning. In the latter case, it is necessary for the underlying TND zoning regulation to stipulate the expectations and content of an applicant’s code of development. In the latter case, the applicant would initiate a rezoning application. In the former, the jurisdiction could employ a hybrid of the by-right (or conditional) use approaches outlined in this chapter.

The work necessary to implement successful transect planning and form-based zoning calls for an extensive front-end effort by the local government. This approach requires a different perspective on the traditional view of zoning governance and marketplace realities: Local officials must embrace a new system that is very different from conventional zoning practices. Developers must engage architects and urban design specialists to establish plans and documents that communicate the desired form and character of a project well ahead of its construction. Local government must rely upon the expertise of these outside consultants, particularly in communities where TNDs and compact, mixed-use projects are uncommon.

Form-based codes are (a) popular, but lack a long-term record of land success and marketplace performance, (b) have not been widely embraced by the development community for application in non-intensely developed areas, (c) rely heavily on graphics and illustrations to convey the intent of the proposed development, and (d) are costly to prepare. With respect to (c) above, this may present interpretation difficulties for both developers and plan reviewers and creates potentially troublesome issues to resolve when there is a need to introduce project modifications. However, while complex, the form-based code approach is an extremely effective method to implement transportation efficient land use principles.

Form-based codes work well in areas that have a strong urban context and an equally strong urban planning ethos. Older historic areas, urban core areas, town and village centers, infill areas, and redevelopment areas are ideal candidates for the application of form-based zoning. While it works best in areas of established urban transects, elements of the form-based code are worthy of application to lower density planning areas, provided that a comprehensive update of the locale’s zoning ordinance fully integrates the requisite guidelines.



Form based codes focus on the shape and organization of development more than the uses of buildings, and are made up of regulating plans and associated form standards.

4. Designing TND Implementation Measures: Self Evaluation

The perfect TND zoning methodology has yet to be devised. No two jurisdictions are alike with respect to growth pressures and growth management personalities. The best form of TND governance is one that is tailored to the particular needs of the jurisdiction, very likely incorporating elements from any of the seven options. The new approach should recognize the strengths and weaknesses of the options outlined above within the context of “what is best for us”. While establishing incentives for developers to pursue TND projects, the TND district should be one that can best translate the jurisdiction’s transportation efficient land use policies into a manageable regulation that reflects the following:

- character of the locality,
- location of vulnerable development areas that would most benefit from the application of transportation efficient land use practices,
- strengths and weaknesses in the existing comprehensive planning policies and zoning measures,
- existing, demographic composition and projected housing and employment demands of the locality,
- capacity within prime development areas to accommodate a realistic proportion of the projected level of population and employment growth,
- recognition of and compatibility with the land use designations on the locale’s Future Land Use Map,
- physical development potential and environmental limitations of individual properties where TND projects may be appropriate,
- extent to which the locale is committed to comprehensive planning and capital improvements programming for the entire jurisdiction, and
- technical and administrative resources of the locality.

The TND implementation process should ultimately be designed to ensure that projects of only the highest standard are approved. Whether employing by-right or developer-initiated zoning approaches, TND ordinances should incorporate a mix of regulations, guidelines, and application requirements that formalize both the community's and developer's consensus vision for the project. It would be the responsibility of the locality to determine the extent to which any or all of the following documents and plans would be appropriate for inclusion in its local TND requirements and technical review process.



A variety of plans can be used for review - as always, visuals express more than words.

- TND Street and Thoroughfare Plan,
- Illustrative Master Plan,
- Urban Development Standards and Guidelines,
- Landscape and Streetscape Classification Plan,
- Architectural and Landscape Guidelines,
- Schematic Utility Infrastructure Plan,
- Stormwater Management Plan,
- Open Space and Environmental Preservation Plan,
- Traffic Impact Assessments,
- TND Shared Parking Analysis,
- Level of Service Agreements,
- Proffer, Impact Fee, or related Service District Agreement,
- Administrative Guidelines, and
- Public Participation Process.

5. Subdivision Ordinance Provisions

Unlike zoning ordinances, which regulate the use and intensity of development, subdivision ordinances include specific provisions for dividing lots and developing property. Subdivision ordinances can have a substantial effect on the design of a project, particularly where design guidelines are not very explicit. Sadly, when updating land use regulations, most communities have focused on the zoning ordinance and have given little attention to the subdivision ordinance. As a result, many localities continue to work out of “first generation” ordinances that do little to promote transportation efficient land use.

The subdivision ordinance must fit with the local comprehensive plan and zoning regulations to ensure that transportation efficient land use principles are incorporated and carried through to the subdivision of land and the layout of new communities and subdivisions. Like the comprehensive plan and zoning ordinance, subdivision regulations should first be reviewed for potential impediments to principles of transportation efficient development. Key design concepts that support transportation efficiency in subdivision regulations include: (a) connectivity and (b) road design, and (c) flexibility provisions.

A. Connectivity

Pedestrian and bicycle activity increases when connections between destinations are accessible and convenient. An interconnected street network provides a framework for mixed-use development through smaller block sizes with a greater diversity of building types and uses within close proximity. Increased street connectivity can disperse traffic flows, improve emergency access and help transform streets into comfortable environments for pedestrians. Interconnected transportation networks can also provide advantages such as enhanced vehicular access, reduced traffic congestion, and reduced emergency response times.

Provisions such as the following can be included or enhanced to promote street connectivity through the Subdivision Ordinance.

- Limit the use of cul-de-sacs, particularly in urban districts.
- Introduce connectivity ratio standards in certain districts (such as new mixed use or even existing planned development districts) so as to

reduce dead ends or cul-de-sacs, yet still provide a certain amount of flexibility to accommodate site-specific conditions. Standards could be more lenient in rural areas than in urban or suburban areas.

- Require that subdivision streets be extended to the edges of a tract, so that connections to future development on adjacent parcels can be made (except in cases where connections are impossible due to extreme topography).
- Require maximum block lengths in urban or compact high density areas. Maximum block perimeters of 800-1,000 feet ensure that development occurs with a pattern of smaller blocks that are more pedestrian friendly and connected.
- Allow alternative cul-de-sac designs and sizes such as tear-drop or island designs, as well as smaller than standard turning radii, in districts where dead-ends are permitted.



Subdivision regulations shape lot sizes and street access, and must be modified (in most communities) to allow TND.

B. Road Design

Roadways and sidewalks are seldom considered to be design features in new communities. However, transportation elements critically influence pedestrian and automobile travel. Complete road design considers all users of transportation facilities, not just drivers. Better street design can improve safety, walkability and community vitality. The width of roadways, driveways, sidewalks, and other physical features all contribute to how the pedestrian and auto will interact with the built environment.

Subdivision regulations are often overlooked as a means of implementing transportation efficient design recommendations and promoting economical use of public and private funds. In Virginia, most localities have road systems maintained by the Virginia Department of Transportation (VDOT) and therefore, are constrained by the need to use VDOT road standards. While VDOT road design standards have become increasingly flexible in recent years, even greater flexibility is available to those localities that maintain their own roads and develop their own road standards.

The following provisions can be incorporated into subdivision regulations to enhance transportation efficient and context sensitive roadway principles:

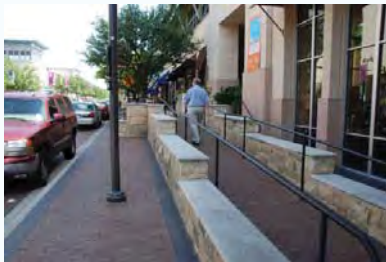
- Maximum block length standards should be established based on pedestrian behavior. As pedestrians typically will walk only $\frac{1}{4}$ of a mile for most trips, block lengths no longer than $\frac{1}{8}$ of a mile should be encouraged. This translates to a maximum block length standard in urban areas of approximately 600'.
- Sidewalks should be provided on all but the most rural or low density streets, and should be adequately sized and scaled in proportion to the function and character of the street. While five foot wide sidewalks could be adequate in lower density residential districts, twelve foot or wider sidewalks may be appropriate on streets in major commercial, office, and mixed-use districts that would allow for sidewalk cafes, cart vendors and other activities that make up a lively and pedestrian friendly streetscape.
- Permit private alleys. Alleys can improve transportation efficiency by reducing the number of curb cuts on roadways and fostering more pedestrian friendly streetscapes.

- Permit narrower travel lanes for low volume streets. Lane widths as narrow as 9-11 feet can be appropriate for low speed streets and result in less paved area and safer streets for pedestrians.
- Permit utilities to be located within the road right of way. Quite often, an urban and pedestrian friendly street design is precluded because of requirements that utilities (water, sewer, electric, etc.) be located in front yards. These requirements create excessively wide front setbacks and disengage the relationship between pedestrians and building fronts on a street. By allowing utilities to be located within the public right of way, the relationship between buildings and sidewalks can be much more closely linked.

C. Flexibility Provisions

In far too many Virginia communities, the requirements for lot and block design guidelines, right of way and easement specifications, and administrative processes have not been updated since the first generation of subdivision ordinances. This has left many communities inadequately prepared to accommodate traditional neighborhood development. Given the flexibility provided in TND forms of land use, even communities with updated subdivision regulations cannot fully address every situation.

Since no two TND projects are alike with respect to its lot, block, street and infrastructure design requirements, governmental review processes need the ability to consider waivers and modifications where specific subdivision ordinance regulations are rigid and limiting.



6. TND Traffic Impact Studies

Zoning and subdivision regulations establish the foundation for TND and other forms of development, but do not address project impacts unless local land use codes are supplemented. Over the past 25 years, traffic impact studies have been increasingly employed by localities to assess the capacity of proposed projects. Traffic impact analysis (TIA) is fundamental to any land development activity that impacts a jurisdiction's street and highway system.

While the use of TIAs is popular for application to specific, privately initiated projects, they have not found widespread use in the comprehensive planning process. In recent years, state planning initiatives, including VDOT Traffic Impact Regulations ("527") and Secondary Street Acceptance Regulations, have provided very beneficial tools to enhance local transportation planning efforts. Both comprehensive plan updates and individual land use applications should be considered in light of anticipated traffic on its local road network.

In conjunction with rezoning applications for TND projects, it is the responsibility of the locality and property owner to determine whether or not the project will require a traffic impact statement that is consistent with VDOT traffic impact regulations. Upon input from VDOT, if a formal "527" traffic impact analysis is required, the landowner/developer shall prepare and submit a Pre-Scope of Work Meeting Form on or before the date of formal submission of the zoning district amendment application. The Pre-Scope form shall be reviewed by and between the County, VDOT, and the landowner in accord with adopted regulations and procedures.

In rezoning cases where local planners believe that a TIA should be prepared but that the "527" regulatory thresholds have not been met, they shall determine whether or not an independent TIA must be submitted. In those instances where a TIA is needed, the landowner shall meet with local planners to determine the scope for a traffic analysis for the TND project. It is the responsibility of the locale to establish the elements to be addressed in the study. The traffic analysis shall be submitted with the zoning amendment and other land development applications. Minimum requirements may include the following:

- (1) Existing traffic counts (AM and PM peak hour) at key intersections to be identified by the local planners.
- (2) Trip generation estimates for the planned land uses within the TND.



- (3) Trip distribution and assignments to the existing road network of traffic projected for the development at full build-out.
- (4) Estimates of background traffic growth on impacted streets and highways.
- (5) Analysis of future conditions, to include Highway Capacity Manual (HCM) level-of-service analysis.
- (6) Signal warrants analysis.
- (7) Recommended transportation improvements to provide adequate levels of service for the traffic generated by the proposed project.

It is important to emphasize that TIAs don't necessarily resolve problems, but they often reveal them. Traffic analysis for projects proposed within designated development areas often yield negative results, particularly if these projects follow conventional, suburban development patterns. Conversely, TND projects that promote interconnectivity yield superior results.

However, in many instances, local road networks, when tested against proposed development impacts, have insufficient capacity and little room for expansion within existing rights of way. Further, individual projects, due to locational characteristics and economic feasibility, cannot carry the financial load of undertaking substantial system improvements. Where this phenomenon exists, compromises must be reached between developers, local government and VDOT in resolving apparent conflicts.

7. Environmental Regulations

As previously indicated, many local zoning ordinances take a limited approach to guiding active development activities on sensitive environmental land. The TND ordinances should be designed to ensure the preservation of natural areas and open space in conjunction with the master planning and zoning amendment process. As an integral part of any proposed TND project, residential and employment related uses should be complemented by ample spaces designated for outdoor activities, with a focus on the preservation of environmentally sensitive areas.

The TND regulations should establish clear expectations and guidelines for the creation of both public and private recreational areas. Depending on the specific "lay of the land" and community demands, these areas may include civic spaces, active parks, school sites, recreational facilities, and water features. The open space plan for a TND should yield a system of passive and active spaces that create coordinated, safe, and environmentally friendly relationships by and between residential uses, commercial uses, civic spaces, parks, and preserved natural areas.

Equally important are development agreements that ensure the sensitive environmental areas that should be preserved, actually will be preserved. This occurs only through a coordinated master planning effort that recognizes and quantifies the overall development potentials and limitations of a given tract. The TND design guidelines may include "net developable area" calculation standards and other approaches that reduce the allowable density on subprime land with vulnerable soils, poor geology, quality forest cover, streams, wildlife habitat, wetlands and steep slopes while promoting density enhancements on land with prime building potential.

The TND planning process must also be fine tuned to identify specific vulnerable environmental features. Unlike typical PUD and PRD-style ordinances that established fixed percentages for required open space, the TND regulations should establish criteria for the permanent preservation and maintenance of vulner-

able environmental areas. Consideration should be given to how flood-prone areas can still be important community features in the form of athletic fields, trails, or other passive recreation and open spaces.



A. Stormwater Management and BMPs

Stormwater management (SWM) and Best Management Practices (BMPs) present both benefits and challenges for compact, mixed-use development. Storm drainage solutions for compact TND projects require a different design approach than what has typically been applied to the suburban land use model. This would embrace a comprehensive strategy for the entire TND community, with fiscal benefits, land use efficiencies, economic productivity, and environmental enhancements resulting from shared participation by both the public and private sector.

A little historical background is essential to understanding the challenges and obstacles that may emerge in this pursuit: Local SWM/BMP ordinances that govern storm runoff quantity and quality have been widely adopted by localities throughout Virginia over the past generation. The early design standards were based on the assumption that there was ample undeveloped land available to satisfy requirements for runoff treatment. Because of rapid and dispersed growth, this is no longer the case in many localities.

For conventional residential subdivisions and planned unit developments, the most cost effective solutions were natural, but space consuming solutions, such as multi-purpose lakes, SWM ponds, combination SWM/erosion and sediment control basins, and BMP infiltration areas. Regional SWM basins for large developments were vogue in the 1970-80s prior to adoption of Department of Environmental Quality (DEQ) and Army Corps of Engineers regulations that either greatly restricted or eliminated the option for comprehensive SWM/BMP solutions. Nationally recognized projects such

as Reston and Fairview Park (Fairfax County) and Brandermill (Chesterfield County) provide excellent, environmentally attractive examples of this approach.

However, as non-local oversight tightened and suburban land prices increased within rapidly growing areas, developers sought other alternatives that would consume less land. Individual underground runoff storage systems for both high-density residential and commercial projects became popular alternatives.

While allowing projects to proceed without requiring substantial coordination between the public and private sectors, site-specific SWM structures have been proven inefficient when compared to larger-scale (regional) facilities that serve multiple projects. Studies reveal that individual storm retention/detention structures on compact urban projects create visual eyesores, mosquito havens, maintenance headaches, and insurance problems. For the treatment capacity they provide, they are not cost effective.

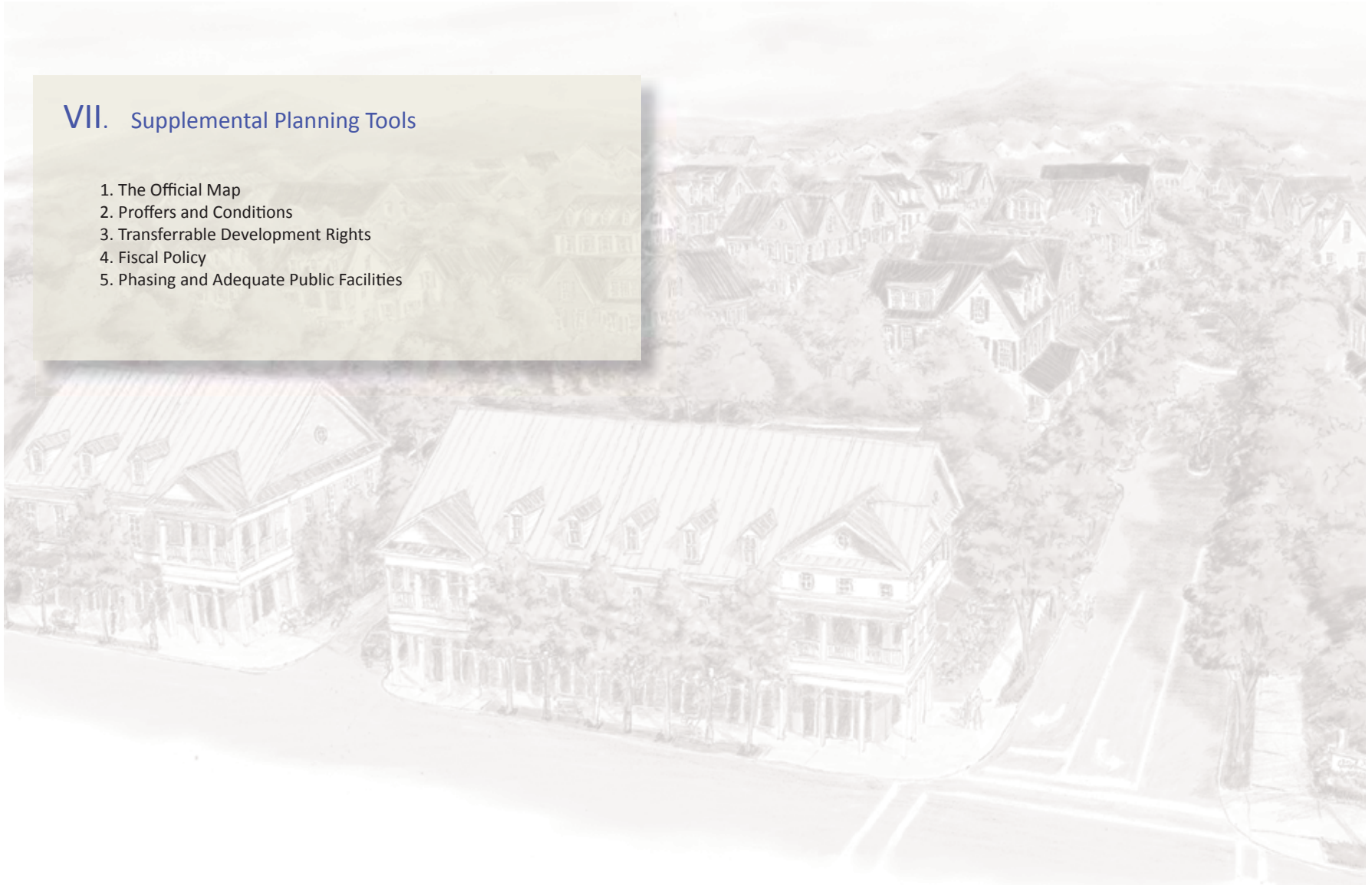
As related to urban design for higher density, pedestrian-oriented projects, the use of site-specific SWM/BMP facilities on a site-by-site basis is not recommended. The obvious reason is that little basins located within TND-scaled blocks are extremely disruptive to land use and transportation patterns. While site-by-site practices can survive in tandem with highway-oriented strip development, TND land use planning seeks continuity between land use, landscaping, pedestrian, and transportation elements that is virtually incompatible with the suburban model.

Large shopping malls and car dealerships can solve SWM/BMP needs by digging a large hole in the ground on residual property, but TNDs cannot achieve the same results when neighborhoods develop on a lot-by-lot, block-by-block basis. For TNDs to be successful, localities must take the lead in working with developers to coordinate and implement SWM/BMP improvements to serve the needs of the entire community.

The next generation of local comprehensive plans should recognize regional SWM/BMP approaches within development service districts. In addition, local zoning ordinances can be easily amended to include requirements for stormwater management master plans for projects in areas designated for TND forms of development and redevelopment. In Virginia, localities have ample statutory support to enact pro-rata share funding plans and/or service districts for comprehensive stormwater management and storm drainage improvements. However, the impact of restrictive DEQ and Army Corps of Engineers regulations that discourage the regional approach for urban watershed planning must be addressed at the state level.

VII. Supplemental Planning Tools

1. The Official Map
2. Proffers and Conditions
3. Transferrable Development Rights
4. Fiscal Policy
5. Phasing and Adequate Public Facilities



VII. Supplemental Planning Tools

Zoning and subdivision regulations aren't the only way for localities to facilitate compact, mixed use growth. This section addresses some other strategies and programs that can unite public and private sector objectives for an economically and community oriented approach to stimulating transportation efficient land use. They are:

- The Official Map
- Proffers and Conditions
- Transferrable Development Rights
- Fiscal Policies
- Phasing and Adequate Public Facilities

1. The Official Map

Over the next decade, Virginia transportation funding will be focused on major highway improvements and deferred maintenance. In the future, transportation network deficiencies will not be solved by historical approaches. In recognition of this, the localities should adopt both fiscal and physical transportation planning policies to ensure that road improvements are implemented to optimally:

- (1) maximize public benefits,
- (2) upgrade existing street system inadequacies,
- (3) provide for adequate long-term capacity,
- (4) minimize, if not eliminate, economic impacts on state and local fiscal structures,

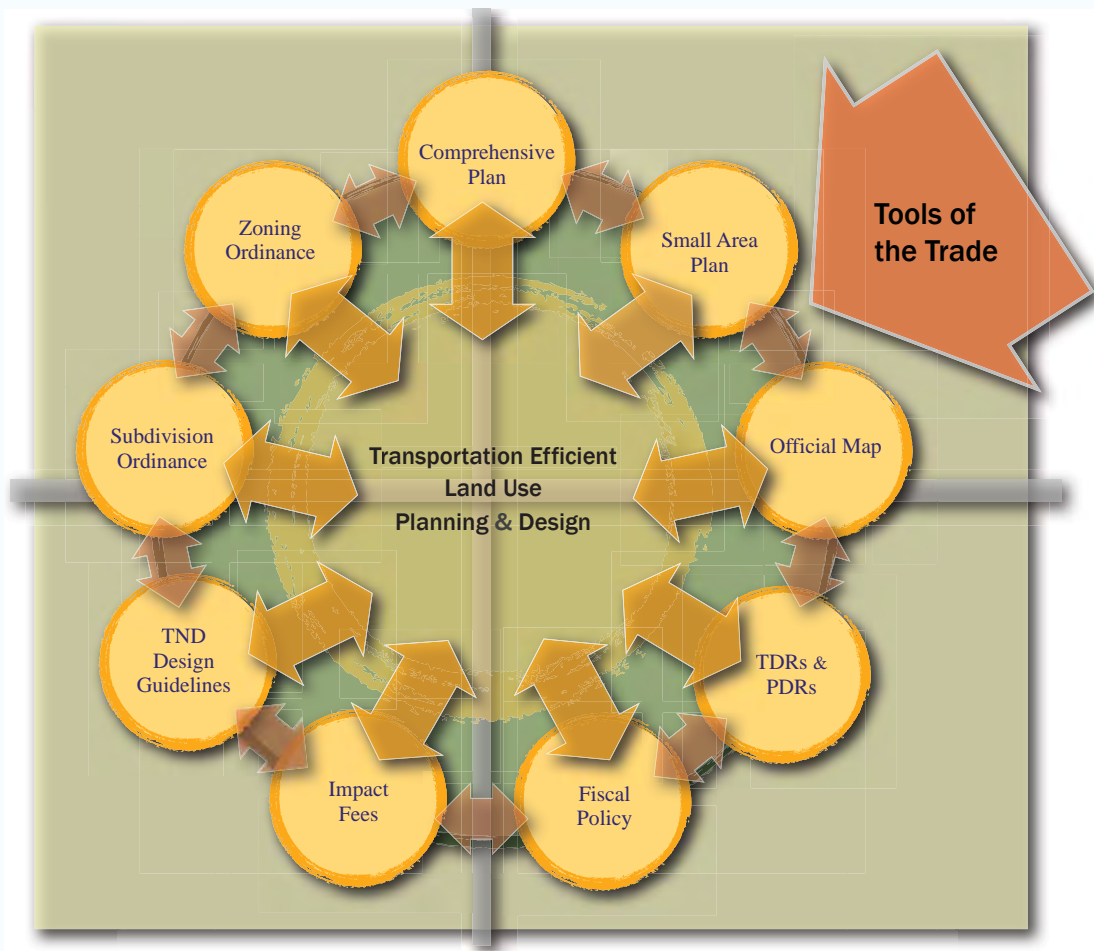
- (5) develop in conjunction with new development, and, most importantly,
- (6) locate where they can best serve the needs of the jurisdiction.

Virginia's statutes for local transportation planning – particularly the 5-Year Comprehensive Plan Update process, Virginia Department of Transportation (VDOT) Traffic Impact Analysis Regulations and Secondary Street Acceptance Requirements (SSAR), VDOT 6-Year Improvement Program, and Access Management Regulations and Standards – provide steps in the right direction. However, a valuable, but virtually neglected section of the Code of Virginia has been long overlooked by both local and state planners. As a companion to the comprehensive planning process, the one essential tool needed to successfully address both the existing and anticipated transportation demands is the Official Map (see §15.2-2233.)

In concert with a locality's ongoing comprehensive planning efforts, the Official Map should be employed to advance the locality's level of traffic and transportation planning to establish locations for its long-range street and highway network. It can be used for both major highways and local street networks. While past local planning efforts have typically focused on generalized transportation objectives, the transportation component of the comprehensive plan, in and of itself, cannot ensure the ultimate establishment of rights of way, nor can it provide the footing for the potential acquisition of rights of way for such alignments.

In locales that have not undertaken detailed comprehensive plans, meaningful governmental influence on the transportation elements of privately-initiated projects is limited to individual rezoning application reviews. It is usually too late to influence big picture transportation goals by the time a property owner applies for site plan or subdivision plat approvals. Unfortunately, most local comprehensive plans give too little attention to intermediate and long-range transportation alignments.





A variety of planning tools must all be used in coordination to achieve successful, transportation efficient communities.

In cases where alignments are depicted on a comprehensive plan, they don't account for the fact that future alignments will impact multiple parcels and property owners, some with sufficient by-right zoning and some with competing real estate interests. Through the use of the Official Map, jurisdictions have the opportunity to advance and coordinate its comprehensive plan process to define and secure desired transportation improvements.

If street and road alignments are absent from the comprehensive planning process, new streets that are incorporated into private land development will be dictated by project-specific objectives and will not necessarily be in the public interest. Ensuring adequate levels of connectivity between projects is fundamental to success. Individual developers will locate roads where they optimally benefit their own projects while public planners will focus on larger concerns that affect the community as a whole. From a comprehensive viewpoint, the VDOT 527 process and SSARs do not fully address this concern, given that they don't come into play until the individual developer has already defined a project's scope and the strategic approach to gaining approvals for it.

To ensure continuity in the planning and implementation process, the comprehensive plan's objectives for new and expanded transportation alignments should be explored and adopted well in advance of zoning, subdivision, and site plan applications. It is at the end of the local comprehensive plan update process where the real value of the Official Map legislation can be recognized. Without an Official Map that defines inter-parcel, interconnecting road and street systems, the governing body has no real legal mechanism to preserve the preferred alignments in conjunction with the processing of future subdivision plats and site plans. Simply having "desire lines" for these streets loosely drawn on a comprehensive plan is not enough to define, preserve, and secure required rights of way for essential improvements. One misplaced subdivision lot can effectively derail the best laid plans for an otherwise well conceived and integrated access system.



Under the Code of Virginia, the Official Map is the only formal mechanism by which the alignment for proposed roads and infrastructure can be established in advance by local government, allowing for the proposed rights-of-way to be reserved for future public acquisition or proffered dedication. This process benefits both the private and the public sectors, in that landowners can proceed with development plans with the full and precise knowledge of where transportation improvements are to be located.

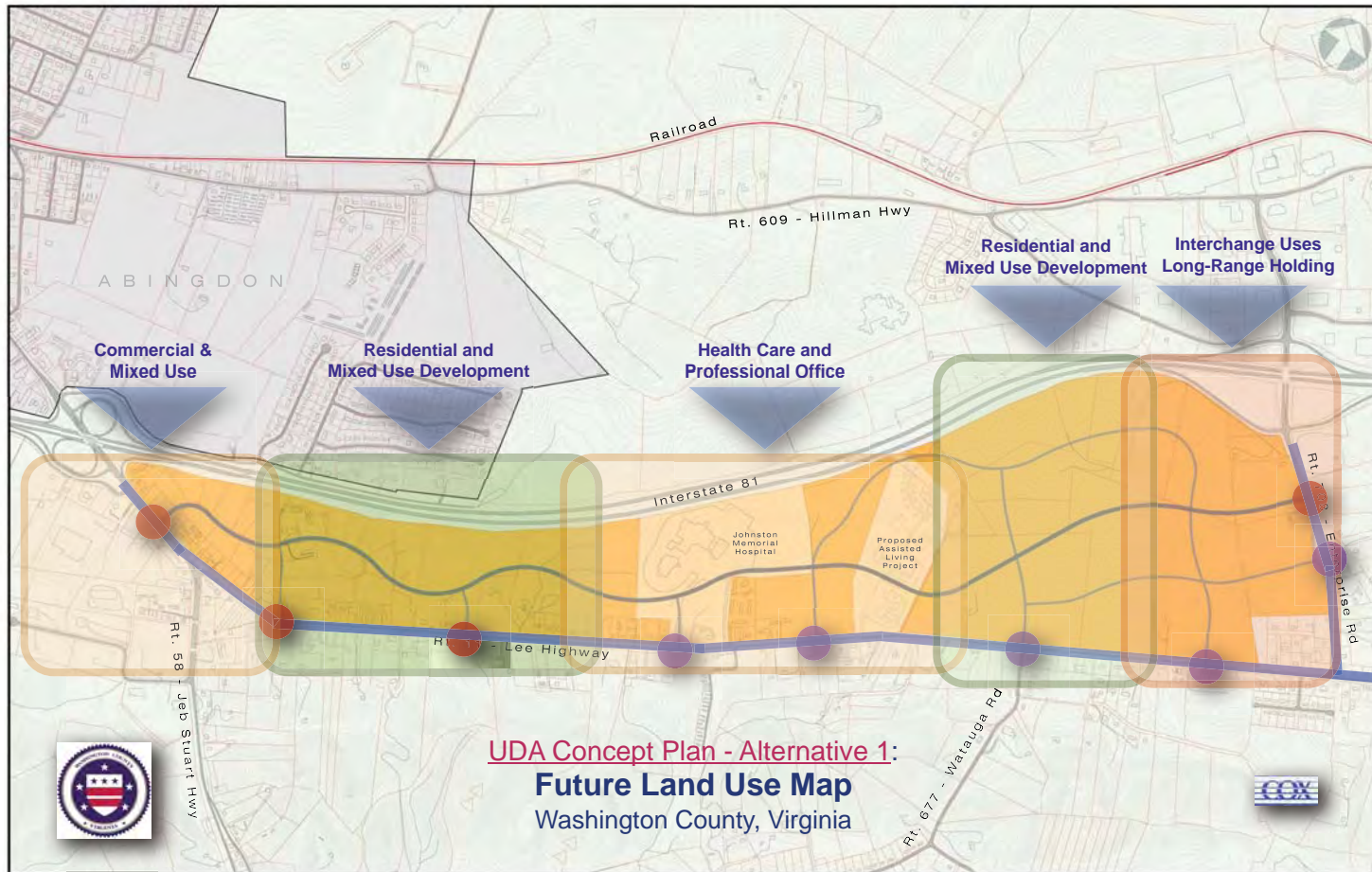
To advance an Official Map that (1) complements the locality’s comprehensive plan, (2) addresses the VDOT SSAR and 527-defined traffic planning, and (3) establishes desired future transportation rights of way, the locality would undertake a master planning and preliminary design study for the particular improvement. The locality’s key tasks would include the following:

1. Undertaking a small area plan including specific land use planning studies and development impact evaluations of existing and proposed future land uses. The small area plan would identify both deficiencies in the existing interior street network and opportunities for new and expanded transportation systems that complement the comprehensive plan’s vision for the designated development area.
2. Compilation of topographic mapping and property boundaries of the area impacted by the candidate alignments and right of way improvements as identified by the small area plan. (A locality’s Geographic Information System (GIS) or VDOT mapping sources may be sufficient.)
3. Preparation of schematic transportation plans and supporting traffic analysis to establish the most feasible alignment options and right of way requirements for identified improvements.

4. Coordination of the small area planning process with stakeholders and property owners in selecting the preferred option for alignments and system requirements for the street and road network.
5. Preparation of preliminary engineering plans and profiles to establish the vertical and horizontal alignment for the preferred option.
6. Preparation of metes and bounds for the rights of way for the preferred alignments. This represents the Official Map “product” for the rights of way to be reserved or acquired.
7. Review of the Official Map by the public interest groups, the planning commission and VDOT.
8. Adoption of the Official Map for the transportation system by the local governing body.

The Official Map process is neither new nor untested, but there are several reasons why it has not been commonly employed: (1) economics and (2) abundant land availability. In prior generations, the preparation of an Official Map was a costly and time consuming effort for local governments. This is one reason it has been employed sparingly in Virginia.

Today, many jurisdictions have expended tremendous resources to obtain GIS mapping that is capable of supporting Official Map infrastructure planning and design efforts. These represent a very efficient and cost effective tool for transportation planning. In most GIS systems, mapping is of sufficient detail to be readily and inexpensively deployed by engineers and planners to establish accurate alignments in response to anticipated future land uses as adopted by the locality.



Future Land Use Plan for Developing Corridor

Another reason that the Official Map has not been in vogue is that, historically, most exurban and suburban locales have not had to worry, for the most part, whether or not adequate land would be available for new streets or expansion of its existing road system: Land was ample, density was generally low, and existing highway corridors could be widened within existing rights of way to accommodate traffic generated by scattered, strip-styled growth. In effect, interconnecting suburban street systems were neither desired nor required in order to make traffic flow efficiently.

With only so many more lanes capable of being added to existing thoroughfares, many of these communities have now run out of right-of-way expansion space along existing commercial corridors as well as the finances to do so.

If thoughtfully employed, the Official Map could be the most effective growth management tool for a locality to meet its transportation demands in the 21st century. The Official Map should be a major priority to benefit the interests of both existing and future County citizens. The costs and benefits of such planning should be readily apparent to local government upon close scrutiny.

2. Proffers and Conditions

Privately-initiated rezoning applications provide an occasion for local government to negotiate conditions that would not otherwise be possible via a by-right approval process. Jurisdictions that have not incorporated state-enabled provisions to accept proffers, cash proffers, and conditional zoning measures into their ordinances are missing an effective growth management and fiscal planning tool that has been employed successfully by many Virginia localities.

The legislative intent for proffers and conditional zoning is to establish reasonable conditions to be voluntarily offered by the applicant during a rezoning process to reduce the impacts of the proposed rezoning in order to help ensure project approval. The local government cannot require a specific proffer, but it can seek a negotiated position, whereby a developer can offer to place conditions on the use of the property and to make certain improvements, either in-kind or in cash, to mitigate concerns over how the development could adversely affect adjacent properties and the community.

Zoning proffers may include a wide range of project conditions: restrictions on land use, provisions for on- and off-site infrastructure, dedication and construction of public improvements, phasing of development, and cash contributions to the locality towards expanding public infrastructure to serve the development. Once accepted by the governing body with a rezoning approval, the proffers become part of the zoning ordinance as it applies to that property, and become attached to the land unless altered by subsequent governmental action, in the same fashion as a deed restriction. Not all localities may accept cash proffers. (see §15.2-2296)



Proffers and conditions may be used to enhance public spaces and streetscape elements for the benefit of the larger community.

3. Transferrable Development Rights (TDRs)

Traditional Neighborhood Developments (TNDs) and mixed-use developments haven't frequently occurred in many rapidly growing Virginia communities, simply because they haven't had to. In those areas, the ease with which the rural countryside could be developed has far offset the impetus to emphasize transportation efficient land use practices and compact development. Without a renewed local focus on rural area protection, the former will continue to marginalize the latter.

In many exurban and suburban localities, there are an abundance of existing platted, by-right residential lots located outside of the designated development areas slated by the Comprehensive Plan for higher density uses. Virginia planning legislation has authorized a creative means to incentivize rural landowners to consider an economically beneficial land preservation and conservation alternative to property development. The ability for any jurisdiction in Virginia to adopt a transferrable development rights (TDR) program was first recognized in the Virginia statutes in 2006. TDR can be employed as a means to preserve open space, farmland, water resources and other sensitive environmental areas where active land development is to be discouraged.

In areas zoned for agriculture, conservation or preservation, individual properties have underlying development rights corresponding to the density provisions of the parent zoning district. In lieu of developing under the prevailing zoning district, the TDR allows rural property owners to "send" (i.e. sell) the rights to a landowner located in the locality's designated "receiving" area, where infrastructure is in place to accommodate the growth. The compensation for the exchanged development rights would be tied to a privately negotiated agreement with policy guidance and regulatory oversight from the locale. Thereafter, the rural landowner forfeits the ability to use the development right in perpetuity, thereby reducing the property's development rights by the number sold. However, agreements can be structured to encourage continued agricultural and forestal uses.

A TND project can serve as the ideal location for a "receiving" area within jurisdictions that have adopted policies and ordinances that (1) address the transfer of development rights from one property to another and (2) are located within the jurisdiction's designated development area. If the jurisdiction intends to embrace the TDR concept, zoning ordinances must be amended to (a) formally incorporate a TDR program, (b) designate the "receiving" and "sending" areas, and (c) provide guidance on the nominal "exchange" rate (in terms of densities and uses) that would achieve its objectives for both its rural and urban areas. By doing so, the locality has the option to recognize that the receiving property is entitled to additional density bonuses for having purchased TDRs.

4. Fiscal Policy

To catalyze TND forms of development, housing and economic development programs, as well as capital improvements for public infrastructure, should be targeted to designated development areas. This may require an overall reassessment of long-range planning policies. In revisiting policies, the locality should identify project categories in which state and federal grants and loans could be applied to support transportation efficient land use.

In practice, a locality's fiscal policy often transcends the comprehensive planning and zoning process. However, an understanding of the fiscal impacts of development is essential to programming intermediate- and long-range capital improvements programs and operating budgets. In order to achieve higher density and transportation efficient land use, assurances for adequate infrastructure must be in place for successful TND implementation. In addition to transportation service, the provision of water and sewer trunk lines and treatment facilities must be coordinated with proposed development activities. A range of other infrastructure and community facilities will also be demanded.



The question of “Who pays for new or upgraded infrastructure?” has politicized far too many governmental decisions related to the allocation of capital and operating policies. Achieving the proper balance in fiscal responsibility between existing and future residents is essential to the proper evaluation of any TND project. While there may be areas in which the applicant should be fully responsible for financing new public infrastructure, there will also be cases that warrant (and may be highly desirable for) a certain level of public financial commitment to upgrade existing infrastructure that will benefit the community as a whole. In order to rationally reach these decisions, a capital improvements program and a cash proffer policy (if available) should guide the decision process.

To determine the public revenue generated by, and expenditures attributable to, a specific development project, a locality may enact requirements to include a fiscal impact analysis with any rezoning application. Fiscal impact assessments (FIAs) are used to provide essential cost/benefit data helpful to proffer negotiations and budgetary analysis. The FIA would evaluate the overall economic burden or benefits to the community of any given development project. The results would yield estimates of all forms of local and state tax revenues, fees, and supplemental income. Governmental expenditures would focus on capital and operating cost consequences resulting from the new community.



Fiscal analysis can predict the costs of development, as well as the revenue that development will generate.

5. Phasing and Adequate Public Facilities

Areas designated for compact development may incorporate strategies for the phasing of land development. Within the context of what is achievable in a TND project, phasing agreements can be addressed and secured during the zoning amendment process via negotiated and proffered phasing agreements.

From a big picture perspective, the simplest negotiation approach is with an up or down vote: the governing body can use its broad police power authority to control when and where a proposed project is to be approved. If zoning applications are developer-initiated, the locality does not have to rezone a property simply because it is located within a designated area.

The approval of prime locations with available infrastructure should be given priority over locations where services are not yet available or programmed for the immediate future. TND zoning decisions should be subject to the availability of adequate public facilities and utilities as well as other factors that impact the timing and ability of the locality to serve the proposed project. If adequate public facilities are not available, zoning applications should not be approved unless commitments are made by the applicant to implement needed improvements.

Under Virginia’s enabling statutes for zoning, a locality may incorporate level of service standards as a means of determining the adequacy of facilities to serve properties subject to a rezoning application. This includes sewer and water mains and treatment plants, roads and streets, schools, libraries, parks, public transit, and other elements within the realm of public responsibility. The locality must understand its own infrastructure conditions and be able to quantify demand and capacity for individual facilities. The locality must first establish these standards and set them forth in either the comprehensive plan or a separate planning document.

It would be the governing body’s responsibility to determine if a proposed rezoning application fails to meet the infrastructure and facility standards. The governing body would then recommend either denial or approval with conditions tied to the provision of enhancements needed to attain the established service levels. The latter could be accomplished via the developer’s voluntarily offered cash proffers or in-kind proffers to construct needed improvements.

TND approvals should incorporate phasing agreements to ensure that specific project elements will be implemented on a timely basis. These could be conditions that

establish the scheduling, financial responsibility, and guidelines for implementation of various project components, including mix of uses, pace of land development, implementation of civic and recreation improvements, and timing of utility extensions. For a given project, the locality may seek the commitment for construction of certain levels of commercial development in advance of residential development. A proffer agreement could be structured to stipulate the timing and quantity of the development of one use relative to the other.

In communities where school and public service capacities are limited, the issuance of a maximum number of annual residential building permits could be stipulated in the applicant's proffer statement. In other instances, the jurisdiction may desire the scheduled timing for the dedication of land within a project for schools or emergency service facilities. Phasing agreements can be accomplished with a proffer agreement tied to a graphic phasing plan, both of which could be deemed a condition of the TND rezoning approval.



1. Existing road with rural section design.



2. Pedestrian and bicycle infrastructure added. (public improvements)



3. New TND residential uses. (private improvements)



4. New TND commercial uses. (private improvements)

