



**Virginia's Long-Range Multimodal
Transportation Plan
2007-2035**

**Transportation and Land Use: Challenges and
Opportunities**

**Prepared for:
Office of Intermodal Planning and Investment
Final Draft November 10, 2009**

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Transportation and Land Use: Challenges and Opportunities

Executive Summary

The interrelationship between land use and transportation policy is complex, involving decisions by individuals, investors, elected and appointed officials at various levels of government, and others. In Virginia local governments are primarily responsible for the approval of land use plans. Conversely, the state raises the vast majority of transportation revenues and makes decisions about major transportation investments including improvements that increase access to jobs and markets and that expand economic activity.

The disconnect between transportation and land use planning has had a significant impact on transportation costs in Virginia. From 1980 to 2000, the Commonwealth of Virginia experienced significant growth particularly in the urban areas of Northern Virginia, Fredericksburg, Richmond and Hampton Roads. During this time period, vehicle miles traveled increased 94% while the population increased 32% - a rate almost three times the population growth. There is an astounding disparity between the demand for transportation and the actual supply.

Increased congestion has negative impacts for all Virginians. It reduces quality of life as citizens sit in traffic instead of spending time in community activities and with their families. Employee productivity is reduced due to the lack of reliability in travel times making it difficult to plan daily activities. It increases the cost for Virginia businesses and consumers by increasing the cost to transport goods. The cost to move goods and the quality of life are two major factors businesses consider when deciding where to locate. These economic and social costs require that the Commonwealth find innovative solutions to its congestion problems.

Over the next 25 years, the urban and suburban areas of Virginia are expected to experience significant job and population growth. The Commonwealth is at a critical juncture with regard to its transportation infrastructure and land use patterns. The separation of authority that exists between state and local governments can be healthy if policies are put in place to overcome the disconnect between local governments' land use authority and the Commonwealth's responsibility for transportation.

Improving the coordination between transportation and land use is essential for the Commonwealth's long term economic competitiveness and the efficient use of taxpayer funds. Failure to do so will result in a system that cannot meet future demands.

Recently, the Virginia Department of Transportation completed an analysis of the impact of future growth patterns on demand for transportation capacity in the Fredericksburg region. This analysis showed that moderate changes in the projected development patterns can have a significant impact on future transportation capacity needs.

Transportation investments can be used as incentives to promote land use decisions that reduce the overall demand for the transportation system. Directing transportation investments to reward

local land use decisions that reduce the need for future transportation investments and capacity can provide for a more strategic and sustainable transportation system for the taxpayers of the Commonwealth.

There are several potential strategies that the Commonwealth should consider to improve the coordination between transportation and land use. These strategies can help manage future demand for transportation capacity and provide a more efficient transportation system.

- Develop regional transportation and land use performance measures and goals for urban regions in the Commonwealth and prioritize funding for transportation improvements to help meet established goals. Measures would include job-to-housing ratios, and job and housing access to transit and HOV facilities.
- Establish a competitive grant program to “leverage” compact development patterns from local governments. The program would create partnerships between local governments and the state to move transportation improvements forward in harmony with development. Studies have shown that compact development patterns help reduce vehicle miles traveled.
- Provide funding to regional organizations to complete detailed land use plans. The urban regions of the Commonwealth encompass multiple jurisdictions; and land use decisions in one jurisdiction influence the growth patterns in others. Similarly, transportation networks do not stop at jurisdictional boundaries and must be planned on a regional, state and national basis.
- Provide grants to assist local governments with implementation of transfer of development rights programs and designation of urban development areas. Grants like these would help put in place local plans to concentrate growth which would reduce per capita vehicle miles traveled and reduce congestion.
- Establish a competitive grant program to expand transit service that requires supportive local development commitments. Increased transit service can help accommodate both home-to-work and recreational trips. In addition, the increased proximity created by supportive development patterns will reduce the length of vehicle trips and make walking an attractive and comfortable travel option.

Over the next 25 years, the Commonwealth will face significant transportation pressures. This will include adequacy of revenues, identifying innovative solutions to accommodate future growth, maintaining an aging transportation system, higher energy prices and many other issues.

These programs described above seek to build upon Virginia’s current public-private partnership program that leverages private equity and risk sharing to help leverage local land use patterns. These programs will increase the public benefit provided by state transportation investments and help better align demand with supply. Failure to reduce future transportation demand will result in insatiable needs that existing and increased revenues will be unable to address – placing the Commonwealth’s future economic competitiveness and quality of life for its citizens at risk.

Definition of the issue

The interrelationship between land use and transportation policy is complex, involving decisions by individuals, investors, elected and appointed officials at various levels of government, and others. Land is a commodity that has value in relation to the ability of people and goods to access the land for a chosen economic activity – the buying, selling, making and transporting of goods and services, and the individual choices of people in the marketplace. Land becomes more valuable if it is close to where these activities are taking place or if it is accessible to areas of economic activity. Transportation improvements increase access to land – increasing land values and increasing the ability of the land to accommodate economic activities.

Responsibility for the approval of land use plans and land development is assigned primarily to Virginia’s local governments. Considering the legal framework set by the Code of Virginia, Acts of the Assembly and Virginia courts, the state has a limited role in the land use decision making process.

In contrast, it is the state that raises the vast majority of transportation revenues and makes decisions about major transportation investments, including improvements that increase access to jobs and markets and that expand economic activity.

The intensity, location and design of development have a significant influence on the demand for transportation capacity. For example, higher density in both residential and commercial development contributes to efficiency in the use of valuable land, as well as making it possible to serve the transport needs of both people and businesses in the most efficient and economical fashion – through a mix of roadways, public transportation, sidewalks and other facilities, and demand management programs.

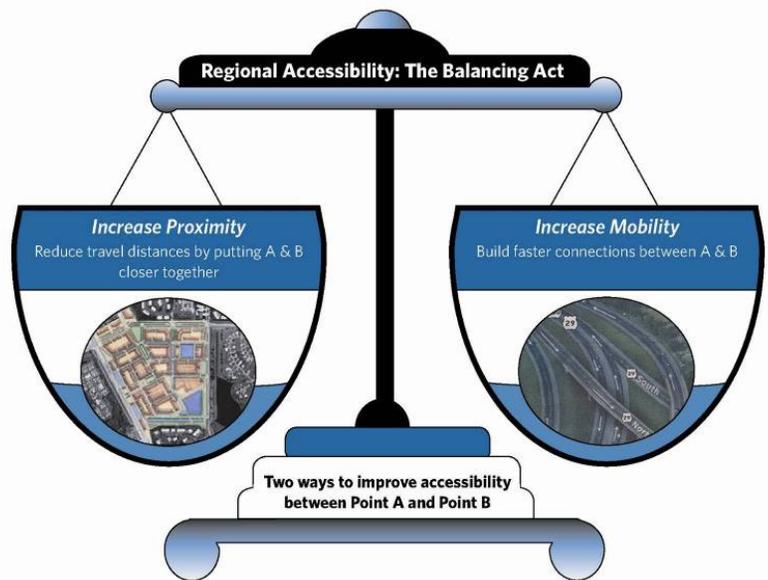
It makes sense for governments to work together to enact policies that encourage efficient patterns of land development and maximize investments in transportation infrastructure. Transportation investments help facilitate and affect the location of economic development, while at the same time, the amount and form of development influences the demand for transportation capacity. Poor balance between transportation and land use results in higher costs with fewer benefits.

It is essential for the Commonwealth’s long term economic competitiveness and the efficient use of taxpayer funds that the coordination between transportation and land use improve. The separation of authority that exists between state and local governments can be healthy. However, this requires that policies be put in place to overcome the disconnect between local governments’ land use authority and the Commonwealth’s responsibility for transportation to provide a more efficient transportation system planned in conjunction with local land uses.

Why is the coordination between transportation and land use important?

Transportation and land use are integrally related. The ability of residents to perform daily activities is dependent on the speed of travel and the distance between locations. The transportation system influences the speed of travel, while land use affects the distance between locations.

Since 1960, total vehicle miles traveled in the United States have increased over 300 percent, while total highway miles increased only 12 percent. There is an astounding disparity between the demand for transportation and the actual supply. And clearly, we cannot address this issue with supply-side solutions alone. While more transportation capacity is clearly needed, improving the coordination between transportation and land use is essential to reducing demand for transportation capacity.



As discussed in the preceding section, transportation investments help shape growth patterns and significantly impact economic development decisions. At the same time the amount and patterns of development influence the demand for the transportation system.

Well planned transportation investments can help promote and provide a framework to support and encourage smart land use decisions that have a number of benefits, including reducing per capita vehicle miles traveled, saving energy and helping preserve open space. Strategic investments in dense street networks, missing link and multimodal highway connections, and transit service can help provide incentives for growth to take place near existing infrastructure and development.

For example, the investment in the Dulles Corridor Metrorail Extension project has provided the opportunity for Fairfax County to move forward with the Tysons Land Use Task Force which has developed recommendations to re-develop the 1,700 acre suburban center into a more compact, mixed use urban area. If the plans are successful this will allow 80,000 new residents and 100,000 new jobs to locate in Tysons Corner where they will be served by heavy rail transit, fixed route bus service, high occupancy toll lanes on I-495 including potential bus rapid transit, general purpose lanes on I-495 and several primary highways. These improvements will connect Tysons Corner to a regional transit network and other compact, mixed use activity centers. Without the investment in the Dulles Rail project this growth would likely take place farther from existing development and infrastructure. This would create the need to provide new infrastructure to connect new development to existing development, and it would demand improvements to existing infrastructure to accommodate the increased demand.

Conversely, the lack of well planned transportation improvements often results in poor land use decisions and increases in per capita vehicle miles traveled resulting in increased congestion. A robust transportation network can serve as a means to focus and consolidate growth, and protect open space. For example, lack of transportation capacity and network connectivity often results in local land use decisions that spread out growth and population along two lane secondary

highways. Dispersed growth results in higher per capita vehicle miles traveled, which in turn requires a greater number of new lane miles or results in increased levels of congestion. As per capita vehicle miles travelled increases, the level of necessary transportation investments to provide citizens with adequate mobility also increases.

Growth that is spread out along two lane secondary highways may alleviate problems in the short term by reducing density in areas where sufficient transportation capacity does not exist, yet it results in increased congestion over larger areas and higher costs in the long-term. In addition, the lack of density reduces the range of potential transportation solutions such as high occupancy vehicle lanes, with or without tolls, and transit service.

Transportation investments can be used as incentives to promote land use decisions that reduce the overall demand for the transportation system. Directing transportation investments to reward local land use decisions that reduce the need for future transportation investments and capacity can provide for a more strategic and sustainable transportation system for the taxpayers of the Commonwealth. These issues will be discussed in more detail later in this policy paper.

Over the next 25 years, the urban and suburban areas of Virginia are expected to experience significant job and population growth. The Commonwealth is at a critical juncture with regard to its transportation infrastructure and land use patterns. Improving the coordination between transportation and land use will allow the Commonwealth to reduce the demands placed on the transportation system by growth.

Recent Accomplishments: Improved Coordination between Transportation and Land Use

As a candidate in 2005, Governor Kaine observed that a big part of Virginia’s transportation challenge was making better land use decisions. Since 2006, the Kaine Administration has worked in a bipartisan manner with the General Assembly to improve the coordination between transportation and land use. The new regulations, modifications to existing regulations and amendments to the Code of Virginia in the last three years represent the most significant changes to land use policy in Virginia in more than two decades.

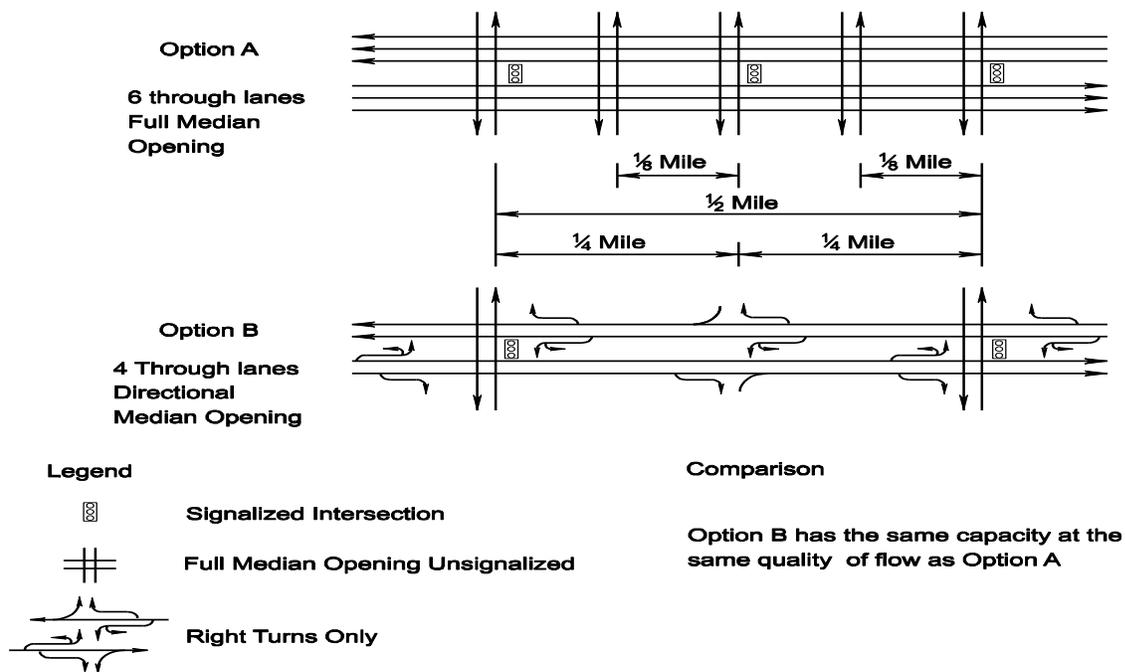
Traffic Impact Analysis Regulations. Often in the past, development proposals would be considered by local governments without reliable and accurate information on the traffic impacts of the proposed development. The developer would have one set of numbers, local staff would have another and citizens and local decision makers would be left to guess which numbers were “more accurate.” In other instances there was not any information on the traffic impacts. In 2006 the General Assembly unanimously adopted Senate Bill 699, introduced at the request of Governor Kaine, which directed VDOT to develop Traffic Impact Analysis regulations.

These regulations require that all developments with a substantial impact on the state highway network use VDOT’s statewide, uniform standards to analyze the



impacts of the development on the transportation network. The analysis will ensure that citizens and local decision makers are reasonably informed about potential transportation impacts as they consider development proposals.

Access Management Standards. Curb cuts and traffic signals have a significant impact on the capacity of highway corridors. Commercial growth over the last 50 years has concentrated along highway corridors and increased the number of entrances and traffic signals along state highways. The picture to the right shows the typical result of commercial growth along highways. Right turns into and out of business entrances, frequent left turns and vehicles slowing to react to these actions have a major impact on the level of service, safety and ultimately the capacity of these highways. For example, the Colorado Department of Transportation found that increasing traffic signal spacing and full access entrance spacing along a highway corridor would dramatically improve its level of service and capacity. In the example below, option B with four lanes can carry the same amount of traffic as option A with 6 lanes due to the increased spacing between traffic signals and median openings.



In 2007, the General Assembly unanimously approved Senate Bill 1312 and House Bill 2228 which were introduced at the request of Governor Kaine. These bills required VDOT to establish standards to manage access to state highways “through the control of and improvements to the location, number, spacing, and design of entrances, median openings, turn lanes, street intersections, traffic signals, and interchanges.” On July 1, 2008, phase I of the Access Management Regulations became effective. The regulations seek to preserve public investment in existing highways by maximizing their performance, and to reduce the need for new highways and road widening by improving the performance of existing state highways.

Urban Development Areas. House Bill 3202 was a bipartisan transportation compromise that passed in 2007. It included several provisions intended to improve the coordination between

transportation and land use. The bill required high growth localities to establish urban development areas (UDAs) to allow for the concentration of dense development. A UDA is an area that is appropriate for dense development due to proximity to transportation facilities and existing development. Within the UDA the local government must allow densities of at least 4 residential dwelling units per acre and a floor area ratio for commercial development of at least 0.4 per acre. It must also incorporate the principles of new urbanism including reduced street widths, reduced setbacks, and a mix of land uses.

Compact development that includes a mix of land uses and incorporates the principles of new urbanism can help reduce the burden placed by development on the transportation network for several reasons: this pattern of development encourages and promotes walking and cycling trips; higher densities can support efficient transit service; and, vehicle miles traveled are reduced due to shorter trips and increased use of other modes of transportation. A study conducted by the National Cooperative Highway Research Program shows that the minimum densities required in urban development areas can reduce vehicle miles traveled by eight percent compared to developments with densities of one residential unit per acre.

At its May 2009 meeting, the Commonwealth Transportation Board approved funding for an Urban Development Area Planning Grant program. This program provides consultant services to local governments to provide assistance in the designation of UDAs and revisions to local ordinances to incorporate the principles of new urbanism and traditional neighborhood design.

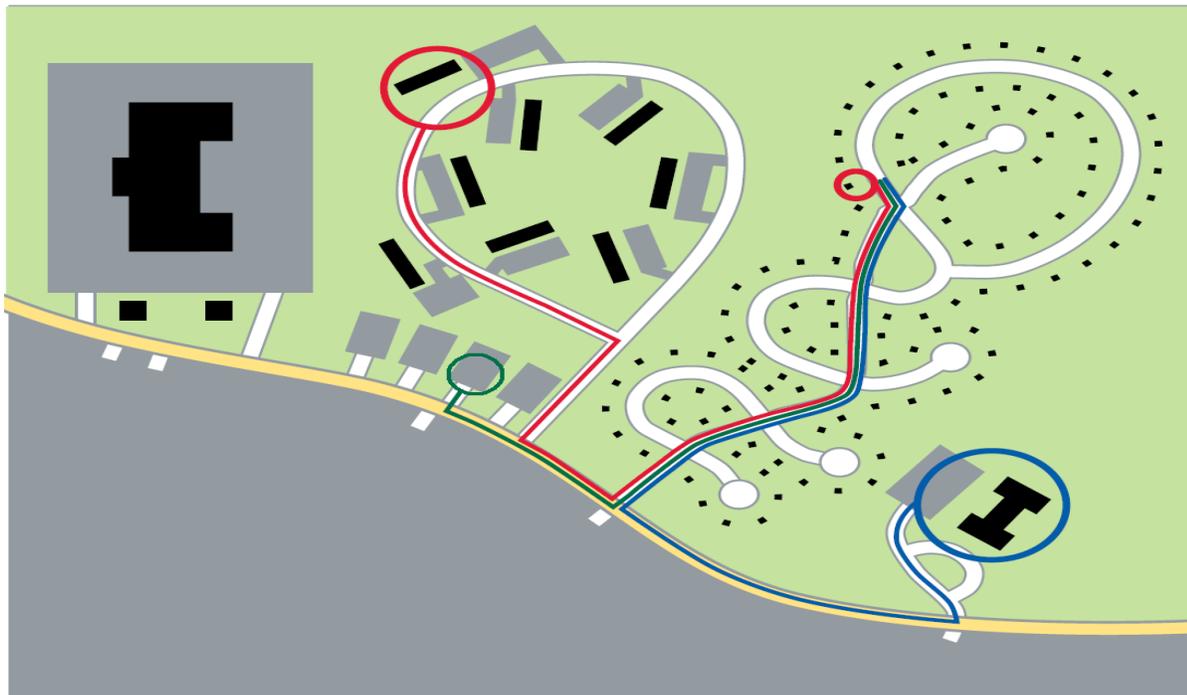
Road Impact Fees. House Bill 3202 also authorized the same high growth localities to implement road impact fees to help pay for the cost of new transportation infrastructure to offset the impacts from new development. Prior to the passage of House Bill 3202 most localities were limited to requesting voluntary contributions from developers for improvements to the transportation system at the zoning stage of the development process.

A properly implemented road impact fee program can help reward developments that are designed to minimize the impact on the road network – providing a market incentive for better planning and site design. Many factors, including location, site design, and access to alternative modes of transportation affect the number and length of trips generated by a development. Developments that use site design or other features to reduce their impacts on the road network can document and demonstrate the reduced impacts to the road network through the Traffic Impact Analysis regulations.

Road impact fee programs can also help address the major inequity that is inherent in the proffer system. Under the proffer system only development proposals that require a rezoning proposal can be “encouraged” to provide funding for transportation improvements while developments that do not require a rezoning proposal could proceed without having any responsibility to address off-site impacts of the development. This system created a market incentive for developers to not seek zoning modifications for more compact development. Road impact fee programs address this issue by requiring that all development pay their proportional share of costs for improvements to the transportation network.

Secondary Street Acceptance Requirements. Unlike most states, Virginia is responsible for the maintenance of most local subdivision streets. In the past, the state accepted streets for perpetual public maintenance without consideration of the overall public benefit they provided.

This policy often resulted in a network of one-way in and one-way out street networks that force all trips – both local and regional – to use the regional highway network placing an unsustainable burden on the regional network. In addition, public funds were used to plow snow and patch potholes on essentially private streets. As the *Richmond Times-Dispatch* editorial on March 27, 2009 noted, “Virginia’s policy of maintaining subdivision roads amounts to a direct financial subsidy. People living in grid-layout neighborhoods pay part of the freight for people who live in subdivisions -- yet they cannot use the subdivision roads to get from A to B.”



In the example above, any local trip to a neighbor’s house, the nearby store, or the school would require the driver to access the major highway to arrive at their destination. This design requires that all trips rely on these highways.

One-way in and one-way out developments contribute to congestion in several ways. A bottleneck forms at the subdivision entrance through which all residents and visitors must pass, long traffic signal wait times occur on the regional highway, and residents are forced to use the regional highway network for everyday activities such as going to school or buying a gallon of milk. This type of design also reduces emergency response times and increases costs for municipal services. The City of Charlotte, NC found that the per capital cost for fire service in areas with connected street networks ranged from \$159 to \$206 while the cost in areas with poor connectivity ranged from \$586 to \$740.

The Commonwealth Transportation Board adopted new Secondary Street Acceptance Requirements in February 2009. These requirements establish standards to ensure that streets accepted for perpetual public maintenance provide adequate public benefit. Streets in new developments must connect to adjacent developments to allow for local trips to use local streets and disperse traffic. In addition, new streets need to contain appropriate pedestrian accommodations and are encouraged to be designed with narrower widths to manage vehicle speeds on local streets. A connected network of streets will reduce the burden on the regional highway network and help reduce future operational costs and construction needs. Connected street networks also improve personal mobility for residents of all ages by ensuring a broader range of transportation options.

Regional Performance Measures. In 2009 the General Assembly unanimously adopted legislation – HB2019 and SB1398 – that included recommendations from the Governor’s Climate Change Commission. This legislation included several provisions related to transportation and land use.

The legislation revised the components of the Statewide Long Range Transportation Plan, VTrans. The revisions require the plan to explicitly consider regional accessibility and improvements to promote urban development areas as major components of the Plan. In addition, the Office of Intermodal Planning and Investment is now required to assume staff responsibility for the Plan to ensure proper integration of modal plans into a comprehensive multimodal plan.

The legislation also requires the Office of Intermodal Planning and Investment to work with regional organizations to develop regional transportation and land use performance measures. These measures will be used to analyze the impacts of land use and other factors on the transportation network and include measures such as job to housing ratios, and job and housing access to transit and HOV facilities.

When localities within a region have an imbalance of jobs to workforce it results in increased transportation costs. The imbalance causes peak hour volumes to be concentrated in one direction during morning peak period and the opposite direction in the afternoon peak period requiring increased capacity that would not be needed with balanced peak hour volumes. The increased congestion that results from unbalanced peak hour commutes imposes avoidable direct and indirect costs on each commuter.

The Office of Intermodal Planning and Investment is in the process of developing the regional transportation and land use performance measures and will consult with regional organizations as the measures are developed.

The legislation also provided the Office with authority to establish standards for the coordination of transportation investment and land use planning to promote commuter choice and transportation system efficiency. Potential policy considerations related to this new authority will be discussed later in this paper.

Lessons from the Past and Future Challenges

While significant progress has been made to improve the coordination between transportation and land use, the state must continue to look for methods to overcome the fiscal disconnect between state and local governments to provide a more efficient transportation network.

From 1980 to 2000, the Commonwealth of Virginia experienced significant growth, particularly in the urban areas of Northern Virginia, Fredericksburg, Richmond and Hampton Roads. During this time period vehicle miles traveled increased 94% while the population increased 32% - a rate almost three times population growth. This has had a tremendous impact on the quality of life for Virginia citizens. From 1982 to 2007, annual hours of delay for travelers quadrupled in the Washington DC metropolitan area from 16 to 62 hours, more than tripled in the Richmond metropolitan area from 6 to 20 hours and doubled in the Hampton Roads metropolitan area from 14 to 29 hours.

Dispersed land use patterns increase per capita vehicle miles traveled and in turn increase the amount of transportation investment necessary to provide adequate mobility. This is a result of increased distances between activities and the reduced number of potential transportation solutions. The overwhelming increases in demand on the transportation system since 1960 in which vehicle miles traveled have increased five times faster than population growth demonstrates the need to seek demand-side solutions since financing has not and will not be available to address our projected transportation needs with supply-side solutions alone.

One cause of dispersed development patterns is the lack of coordination between transportation and land use decision making. Interstate and primary highway funds are allocated by the Commonwealth Transportation Board at the state level. While local governments can plan for concentrated, compact development near existing development and infrastructure, their ability to implement the plan is to a great extent based on the availability of infrastructure funds. The allocation of interstate and primary funds can vary dramatically between six-year improvement programs as the availability of revenues fluctuates, the composition of the Board changes, and priorities shift.

Another major issue facing local governments is citizen resistance to planned transportation improvements and proposals for compact development. Citizen concerns regarding transportation improvements are often based on the perceived and sometimes real disconnect between the function of the roadway and the needs of the community. People do not want to live near or on wide, high speed highways and believe that these highways would decrease their quality of life. This is largely a result of the proposed design of major roadways. For many years highways were designed to allow drivers to travel at speeds of 45 miles per hour and greater. However there is the potential for major roadways to be designed for lower operating speeds using context sensitive solutions, helping to address citizen concerns about quality of life and improving personal mobility.

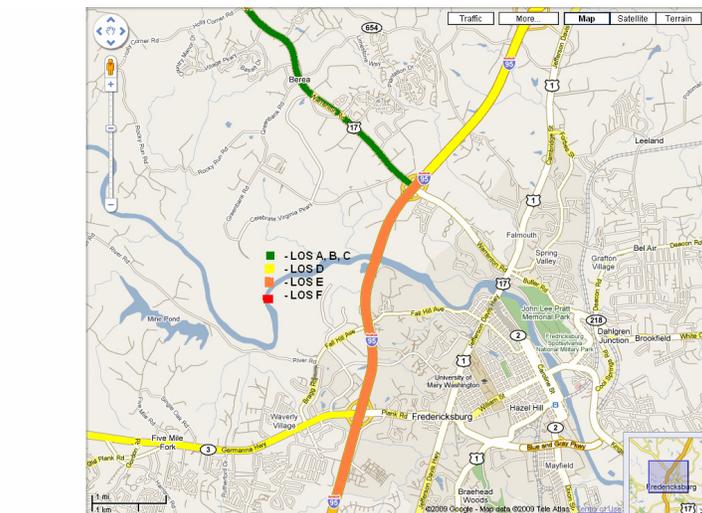
Residents have been opposed to proposals for compact development for a multitude of reasons. The perceived prospect of increased traffic is often a major cause of concern. But in many instances, studies showing the reduced traffic impacts of accommodating new growth in compact

patterns were not done. Studies and plans that show the traffic benefits of compact development and the transportation consequences of dispersed development would help citizens better understand the impacts of the different patterns of growth.

Local governments often reduce the density of development in plans in the absence of sufficient infrastructure or funding. While this can help address short term traffic and community concerns, in the long run, it will exacerbate congestion problems. In time, the projected growth will occur; if it is not developed in a reasonably compact pattern, it will likely result in increased per capita vehicle miles traveled. In recent years, as state transportation revenues available for highway construction have decreased, local governments have experienced equally dramatic reductions in secondary and urban highway formula funds. Since 2006, the funds available to local governments over the six year planning horizon have been reduced significantly. For example, in 2008 the six year program indicated that Fairfax County would receive \$18.5 million in secondary highway formula funds while just three years later the 2011 six year improvement program showed Fairfax County receiving \$0 secondary highway formula funds. This resulted in the same problem for local governments as shifting priorities and allocations for interstate and primary highway funds, and has had similar results.

During this time period there have also been limited state funds available to expand transit service which could have helped reduce the need for highway improvements. As localities close to the urban core and economic activity reduced the density of growth within their jurisdictions, growth spread to outer jurisdictions along two lane secondary roads. As this process repeated itself over time, congestion and the cost to address this congestion increased.

It is widely recognized that the Commonwealth needs additional funds to help address its existing and future transportation needs. However, the Commonwealth must also work to improve the coordination between transportation and land use. Failure to do so will result in transportation needs that cannot be addressed with existing or future revenues.



As part of the VTrans2035 process, the Virginia Department of Transportation conducted an analysis of the impacts of future growth patterns on the highway level of service in the Fredericksburg region using the regional traffic model developed by the Fredericksburg Area Metropolitan Planning Organization. The Fredericksburg region was selected because it has a constrained long range plan that considers the same time period as VTrans2035.

The current level of service (LOS) on major highways in the Fredericksburg region are shown on the graphic to the right. Currently Route 17 operates at LOS C; Route 3 and Interstate 95 north of Route 17 operate at LOS of D; and, Interstate 95 south of Route 17 operates at a LOS of E.

In the next 25 years the Fredericksburg region is expected to experience significant population and job growth – around 75%. The chart below shows the current and projected population, housing and employment for the region in 2009 and 2035.

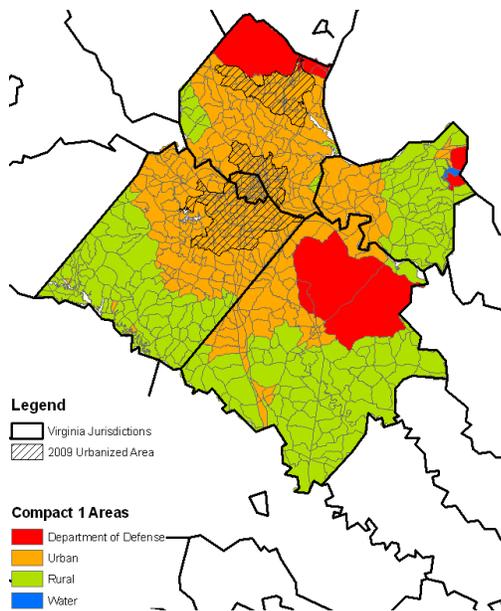
	2009	2035	Growth
Population	335,721	592,680	256,959
Households	121,103	211,744	90,641
Jobs	120,700	209,752	89,052

The region will continue to have a significant imbalance between jobs and workforce. In 2009 based on figures from the Bureau of Labor Statistics approximately 95,000 residents commute outside of the region for work. By 2035 this figure will increase to 170,000.

The analysis performed by VDOT focused on the patterns of future growth. The analysis did not modify projected growth patterns or shift projected growth from one locality to another. In its analysis VDOT considered projected growth patterns and three alternative growth pattern scenarios.

If growth takes place as in the projected dispersed patterns based on existing land use policies and future regional projections it will have significant negative consequences on the transportation network in the region. Overall, vehicle miles traveled would increase by 70%.

Alternative Scenario #1



The LOS on Route 17 in Stafford County would drop from C to F. The LOS on Route 3 in Spotsylvania County would drop from D to F. Interstate 95 north and south of Route 17 would operate at an LOS of F. It is important to note that this analysis assumes that all the current improvements contained within the regional constrained long range plan can be funded and built. Based on recent revenue reductions it is unlikely that these projects will be able to be constructed.

The three alternative growth pattern scenarios analyzed by VDOT considered the impact of future growth if the patterns were more concentrated and compact.

In alternative scenario #1 “buffers” were drawn around the urbanized areas in the region in 2009. In Stafford County the buffer was 3 miles, in Spotsylvania it was 5 miles and in King George and Caroline Counties it was 10 miles. Ninety percent of the growth that was projected to take place outside of these buffers was re-directed into the existing urbanized areas and within the buffer.

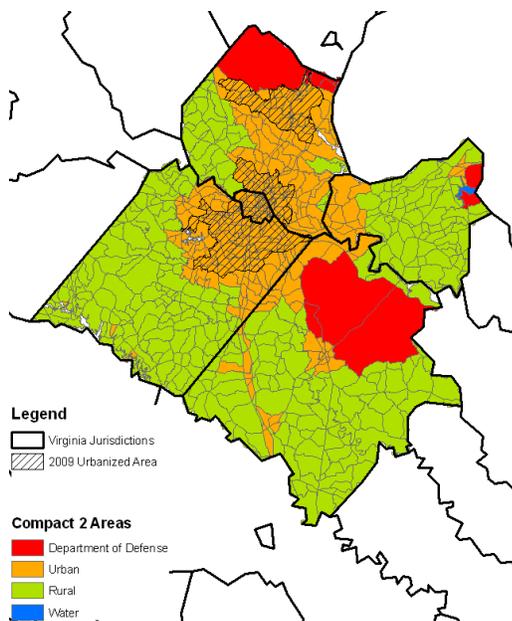
This alternative scenario shifted 16.2% of projected population growth (41,613 people) and 11.9% of projected employment growth (10,628 jobs) from outside of the buffer to inside the buffer. Based on a land use density formula that compares the number of people and jobs per

acre, in 2035 the urbanized area, or area within the buffer, will have a density equivalent to the overall density of Henrico County in 2008. The graphic provides a visual representation of the existing urbanized area and the 2035 urbanized area under the scenario.

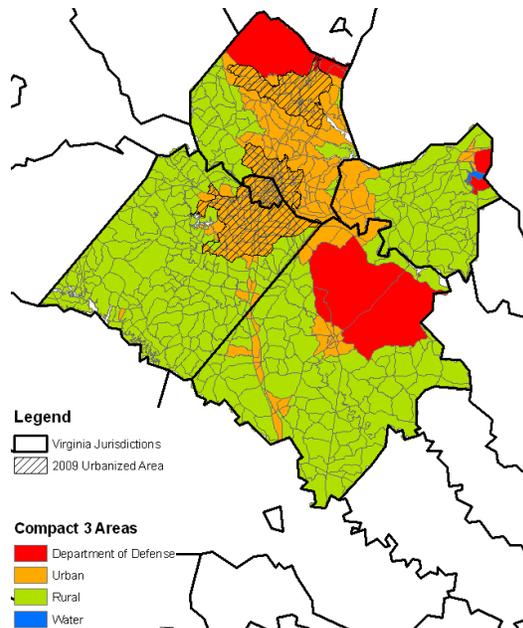
In alternative scenario #2 the size of the buffers was reduced in all four of the localities. In Stafford County the buffer was reduced to 2 miles, in Spotsylvania County to 3 miles, and in King George and Caroline Counties to 8 miles. Again, 90% of the growth that was projected to take place outside of these buffers was re-directed to areas within the buffer. This resulted in 25.8% of projected population growth (66,220) and 25.5% of projected employment growth (22,680) being shifted from areas outside the buffer to areas within the buffer. Based on the land use density formula the urbanized area in this alternative in 2035 would have a density of approximately one-third of the overall density of Fairfax County in 2008.

In alternative scenario #3 a different approach was taken. Areas with an existing land use density of at least 2.0 were identified; the same formula as described above was used. In this alternative scenario 95% of the growth projected to take place outside of these areas was re-directed to these areas. This resulted in 25.5% of projected population growth (65,518) people and 14.5% of projected employment growth (12,901) being shifted to the identified areas. Based on the land use density formula, the urbanized area in this alternative scenario in 2035 would have a density slightly higher than the overall density of Henrico County in 2008.

Alternative Scenario #2



Alternative Scenario #3



The table below compares the densities of the alternative scenarios in 2035 to the 2008 densities of various areas of the Commonwealth.

Area	Land Use Density
Urbanized Area in Alternative Scenario #1 (2035)	2.2
Urbanized Area in Alternative Scenario #2 (2035)	3.2
Urbanized Area in Alternative Scenario #3 (2035)	4.9
City of Fredericksburg (2008)	10.3
Arlington County (2008)	34.4
Rosslyn-Ballston Corridor, Arlington County (2008)	150.2
City of Richmond (2008)	13.6
Fan District, City of Richmond (2008)	47.2
Chesterfield County (2008)	2.2
Brandermill Subdivision, Chesterfield County (2008)	3.5
Henrico County (2008)	4.7
Fairfax County (2008)	9.0

Using the Fredericksburg Area Metropolitan Planning Organization’s traffic model VDOT analyzed the impacts of these alternative scenarios. The results are presented on the table below.

	Daily VMT*	Daily Level of Service		
		I-95	Route 17	Route 3
Today	11.6 M	D/E	C	D
Projected Land Uses	19.8 M	F	F	F
Alternative Scenario #1	- 5.2% from Projected scenario	F	E	F
Alternative Scenario #2	- 5.5% from Projected scenario	F	C	C
Alternative Scenario #3	- 7.2% from Projected scenario	F	C	C

* Fredericksburg Area Metropolitan Planning Organization traffic model does not include a transit component. A model that included a transit component would likely show larger reductions in vehicle miles traveled.

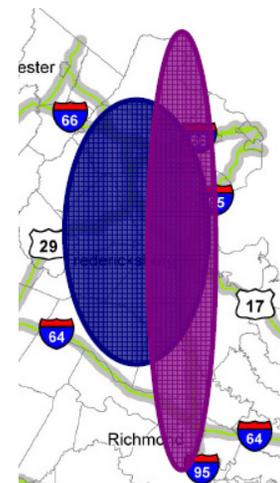
These alternative scenarios will not be realized without changes in state funding and policies, and local land use policies. The state will need to address how funds are allocated – and the role land use should play in their allocation.

Future Policy Directions and Considerations

There are several potential strategies that the Commonwealth can consider to improve the coordination between transportation and land use to help manage future costs and needs. Many of these strategies build upon the recent policy changes, particularly the authority for the Office of Intermodal Planning and Investment to establish standards for the coordination of transportation investments and land use planning – the two components of accessibility. Recent improvements represent a significant and meaningful change, however additional improvements to the coordination between transportation and land use are necessary to better balance demand for the transportation capacity with the supply that can be provided.

As this paper discussed earlier, the Office of Intermodal Planning and Investment is in the process of developing regional transportation and land use performance measures. These measures could be used to evaluate and prioritize capacity improvements in each region. Improvements would be evaluated based on whether or not the new development served or accommodated by the improvement would help meet the goal or goals established for the measures.

For example, a program of this nature could work as follows for a regional jobs-to-housing ratio measure: the regional jobs-to-housing ratio is 1.2 and locality X in this region has a ratio of 1.7; there are two capacity improvement projects under consideration in locality X. Project A would provide transportation improvements to support additional commercial development exacerbating the poor jobs-to-housing ratio and project B would provide transportation improvements to support residential growth as well as minor commercial development. In this instance the state would provide funding to help advance project B but not project A. The rationale for this decision is that helping to improve the jobs-to-housing ratio in urban regions will help reduce future demand on the transportation system. A program of this nature would require that local governments consider additional land use factors when seeking transportation funds.



This is one example of a potential program that would prioritize funds based on regional transportation and land use performance measures. The Commonwealth could also establish tiered funding levels for transit service operations based on the density around transit stations. Analysis of density around WMATA stations in Arlington County showed a moderately strong correlation between ridership and the density surrounding the transit stations. This would provide a financial incentive for local governments to plan for and encourage increased densities around transit stations.

The analysis of the projected land use patterns and alternative scenarios of the Fredericksburg region demonstrates the transportation benefits realized through modest concentration of new growth near existing development and infrastructure. The Commonwealth could create a competitive grant program to fully fund transportation improvements with local land use

commitments for density near existing development and infrastructure as the major consideration. This program would “leverage” local land uses that reduce the overall demand placed on the transportation system.

This program would allow well planned, compact development to move forward in harmony with necessary transportation improvements. As this paper discussed earlier, a major hurdle to compact development is the lack of funds for requisite transportation improvements. By tying the funding for improvements to local land use commitments, a competitive program could increase the public benefit from the transportation investments by reducing per capita vehicle miles traveled and allowing local governments to move forward with well planned development proposals.

In the future, as growth continues in already developed regions and energy prices increase, the demand and need for public transportation will increase. While there will be increased demand for transit service in the future, it is important to note that certain development patterns help improve the efficiency and effectiveness of transit service and the overall transportation network. As noted earlier, increased density around transit stations helps increase use of transit by citizens.

Paul Weyrich and Bill Lind in their article *Does Transit Work? A Conservative Reappraisal* (Free Congress Research and Education Foundation, May 1999) analyzed the types of trips that were transit competitive or trips for which transit can compete during the 1920s during the height of the street car era. They found that in the 1920s transit was competitive for work and recreational trips but not other trips such as shopping trips. Their article also shows that today more than 45% of work trips for citizens living within 1,500 feet of a transit station in the Washington area were by transit, a percentage that dramatically declines as that distance increases. This shows that transit, when available, remains competitive for certain types of trips.

Based on this information, the Commonwealth could establish a competitive grant program for the expansion of rapid transit – heavy rail, light rail, commuter rail and bus rapid transit – that requires supportive local land uses. This would allow for the concentration of growth near transit stations and would help increase the efficiency and effectiveness of state transit investments. In addition to improved transit service, the concentration of growth will shorten the length of trips for activities that are not transit competitive. A shopping trip that might normally require a long vehicle trip would be a shorter vehicle trip or a walking trip due to the increased proximity of activities.

In effect, a program that ties new transit service to compact, mixed use development can help reduce the impact of growth on the transportation network in two significant ways – by capturing a significant portion of home-to-work trips and reducing per capita vehicle miles traveled for shopping and similar trips.

While land use is a local prerogative, the actions of an individual locality have impacts on neighboring jurisdictions and the transportation network. A locality adjacent to major employment centers could push growth to jurisdictions further out by reducing allowable residential densities within their jurisdictions resulting in increased congestion and reduced economic competitiveness.

The Commonwealth can provide funding to regional organizations such as metropolitan planning organizations and planning district commissions to complete detailed land use plans. The urban regions of the Commonwealth encompass multiple jurisdictions. The land use decisions of a single local government can influence the growth patterns of other jurisdictions. Similarly, transportation networks do not stop at jurisdictional boundaries and must be planned on a regional, state and national basis. State funding for regional land use planning scenarios can help regions in Virginia as well as the Commonwealth understand how different growth patterns impact the transportation network and allow for the development of plans that focus on methods to accommodate future growth.

Past planning decisions are another major issue that local governments face. Decisions made up to 50 years ago were based on plans that can no longer be funded and implemented. These plans often allow dispersed development far from existing infrastructure. Local governments are limited in the tools they have available to address these past planning decisions.

Currently the two main tools available to local governments are urban development areas and transfer of development rights programs. The state should consider establishing an annual grant program to assist local governments with implementing these programs. Grants like these would help put in place local plans to concentrate growth to reduce per capita vehicle miles traveled and reduce congestion to help ensure the economic competitiveness of these areas.

Transfer of development rights programs allow local governments, through a market based program, to shift development rights to areas where concentrated growth can be better accommodated. This is one of the few tools localities have to directly address past planning decisions. As discussed above, establishing urban development areas is the other principal strategy available under existing law. An urban development area (UDA) is an area that is appropriate for dense development due to proximity to transportation facilities and existing development. State funds can help local governments put these programs in place and help incorporate them into their development approval process.

These programs would seek to build upon the current public-private partnership program that leverages private equity and risk sharing to help leverage land uses that reduce future demand for transportation. This type of program will increase the public benefit provided by state transportation investments and help better align demand with supply. Failure to reduce future transportation demand will result in insatiable needs that existing and increased revenues will be unable to address – placing the Commonwealth’s future economic competitiveness and quality of life for its citizens at risk.