



# Public Transportation and the Path Dependency of Highway Investments:

## Why the Silver Line Corridor in Northern Virginia will Take Decades to Mature

By Kevin DeGood

December 18, 2014

Major public transportation investments can be transformative—reshaping communities, spurring economic development, and improving mobility. The new Metro Silver Line in Northern Virginia, which is an extension of the existing Washington, D.C., subway system, represents a major investment that will reshape the region for decades to come. Yet, the evolution from initial operations to a completed system that fully delivers on promised benefits takes many years and is not guaranteed. Prior transportation investments and land-use decisions create a path dependency that often limits future change. Realizing the full potential of transit investments therefore requires a sustained political commitment to support development projects that increase ridership and offer an alternative to driving for all mobility needs.

When elected officials advocate for major transportation investments, they often promote a vision of a fully built-out rail system and communities that have grown and matured around each station. After all, accommodating future population growth and reducing roadway travel demand are important reasons for building these big projects. However, new rail lines don't exist in a vacuum. Instead, they must operate within the existing built environment that was designed with the exclusive goal of moving cars at high speeds. And the challenges don't stop with prior roadway investments.

Land use is arguably the single most important factor determining the ultimate success or underperformance of a rail line. Zoning and development standards control the functional use of land—meaning whether or not a parcel is designated for industrial, commercial, or residential development—as well as critical design features such as setback distances and how a building connects with the street. Collectively, roadway design, zoning, and development standards profoundly affect rail line ridership, accessibility, and the overall productivity of the asset.

### Path dependence

In general terms, path dependence is the idea that initial decisions and conditions will affect and constrain subsequent decisions or outcomes.<sup>1</sup>

Designing safe, accessible, and pleasant urban spaces for people is critical to transit success. In effect, the environment around a rail station matters as much as the line itself because transit riders are pedestrians at the beginning and end of every trip. For this reason, design elements that seemed of little consequence prior to the arrival of public transit can become major barriers to success. For instance, requiring large setbacks from the roadway to accommodate abundant surface parking forces pedestrians departing the transit stop to traverse a vast expanse of parked and moving cars in order to make a purchase. The added walking distance and the danger associated with crowded parking lots are often enough to deter potential riders.

In addition, the scale of development in communities that were designed exclusively around cars creates barriers that lower transit ridership. For example, transportation planners spent decades building communities with long city blocks—often referred to as superblocks—because this approach reduces the total number of intersections and other conflict points, allowing vehicles to travel at higher speeds. However, the lack of roadway connectivity presents a challenge to transit riders because it increases walking distance on both ends of a rider’s trip. A home or apartment complex may be located a short straight-line distance from transit, but the presence of superblocks forces people to walk substantially farther than would otherwise be required if the road network had additional cross streets and connectivity.

The issue of safe access and human scale also comes into play with roadway size. Placing a rail station next to a 10-lane arterial roadway forces people to cross an intersection that was never designed to accommodate pedestrians. In many cases, traffic light cycles are not long enough for pedestrians to cross safely, making access to transit nearly impossible for children, the elderly, or people with disabilities. In addition, while a standard 5-foot sidewalk with a 6-inch curb is appropriate for a quiet local neighborhood street, it would be inadequate for access to a rail station along a busy arterial road.

The challenge of maximizing a rail line is further complicated by the fact that the regional transit authority responsible for building the rail project does not control land-use regulations or approve development applications. Zoning and approval of new developments rests with the local government. This division of authority can lead to the approval of new projects that conform to auto-centric zoning and design standards and continue sole reliance on the automobile, while undermining the public’s substantial investment and the long-term success of the transit line.

Raising the funds to build a major new project is no small accomplishment; but construction is only the first step. Many different elements must come together to achieve success. Unfortunately, the existing built environment does not change rapidly, and prior land-use decisions and roadway investments create a path dependency that can be hard to break.

The new Metro Silver Line extension illustrates this situation. While it represents a commitment to making Northern Virginia an attractive place for businesses and residents alike, offering an efficient, affordable, and sustainable alternative to driving, the extension also represents the challenges and opportunities of major investments. After decades of planning and consensus building, the 11.7 mile first phase of the Silver Line opened in July 2014.<sup>2</sup> The 11.4 mile second phase from the Wiehle-Reston metro station to Dulles International Airport and eastern Loudoun County is slated to open in 2018.<sup>3</sup>

---

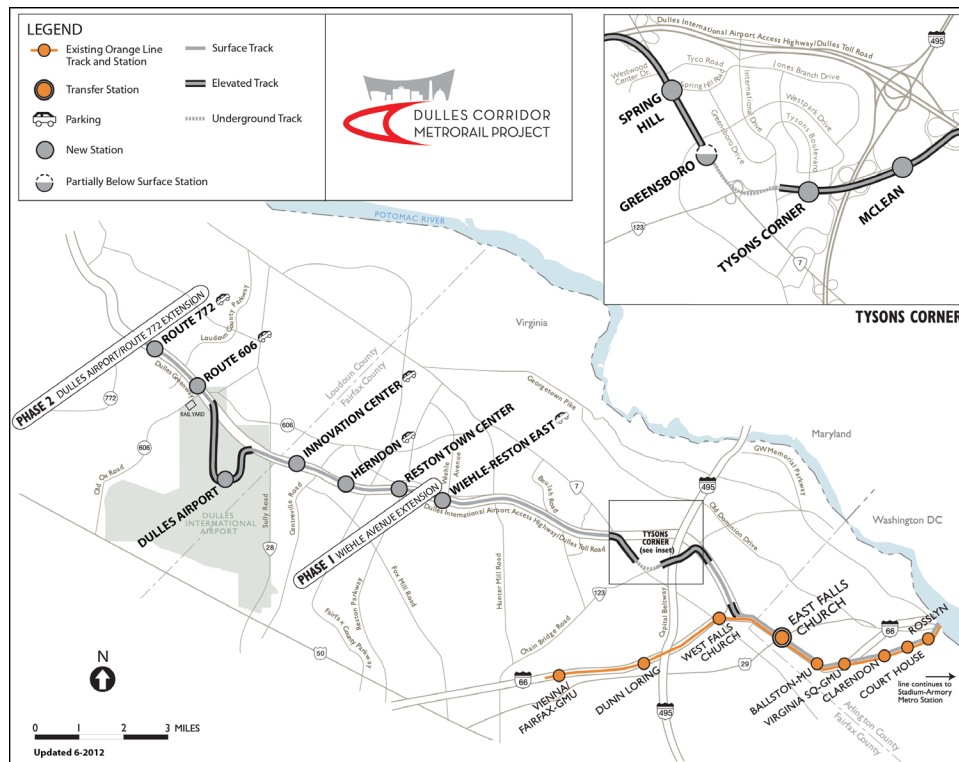
## Northern Virginia

The Washington, D.C., metropolitan region has grown tremendously over the past 20 years, and this trend is expected to continue for decades to come. Researchers at George Mason University estimate that the region's population will increase from 5.4 million in 2010 to 8.3 million in 2050.<sup>4</sup> A large share of this growth will take place in Northern Virginia, which is projected to grow by 1.5 million people—principally within Fairfax and Loudon Counties.

Tysons Corner, which is an unincorporated census designated place, is the economic heart of Fairfax County and Northern Virginia. While the area was historically a typical suburban bedroom community, it has transitioned into a more fully developed edge city. In fact, Tysons is the 12th largest business district in the United States,<sup>5</sup> featuring more than 28 million square feet of office space, 12 million square feet of residential property, and 9 million square feet of other developments.<sup>6</sup> The Tysons district is also home to various major corporations, including AT&T, Boeing, Ernst & Young, and IBM.<sup>7</sup> Over the next 40 years, Tysons is projected to add nearly 100,000 jobs and 67,000 residents in part due to the new Silver Line rail extension.<sup>8</sup>

Tysons Corner sits at the intersection of three major highways: Leesburg Pike (State Route 7), the Capital Beltway (I-495), and the Dulles Toll Road (State Route 167). These three facilities are heavily traveled, with Tysons and the eastern Dulles corridor suffering from some of the worst congestion in the region.<sup>9</sup>

## Metro Silver Line extension



Source: Metropolitan Washington Airport Authority.

As far back as the 1950s, local leaders discussed the possibility of building mass transit to Dulles International Airport. Ultimately, the Commonwealth of Virginia decided on building what was then called the Dulles Airport Access Road—now the Dulles Toll Road. However, the door-to-rail transit remained open; the state acquired a very large right of way that could accommodate both roadway expansion and an eventual rail line.<sup>10</sup>

In the 1990s, civic and business leaders began to worry that roadway congestion would eventually limit growth potential. In 1996, the Virginia Department of Rail and Public Transportation completed a major investment study to determine the best approach to managing travel demand within the Dulles corridor, which includes Tysons Corner and surrounding communities.<sup>11</sup>

The investment study determined that adding a new highway or multiple lanes to one of the existing facilities would be very challenging and ultimately not deliver sufficient mobility benefits to make such a project worthwhile. A subsequent environmental impact statement concluded that given the “limited amount of remaining right-of-way, the corridor will be unable to support further roadway capacity enhancements.” Moreover, the review stated that “Planned roadway enhancements are not expected to relieve the current state of congestion, which is already near or at gridlock conditions in many locations.”<sup>12</sup> By comparison, a new high-capacity rail line would substantially increase regional mobility without raising vehicle miles of travel or transportation emissions.

Transforming Tysons Corner and the surrounding communities to take full advantage of the Silver Line will not be easy. Tysons Corner currently has a poor balance of jobs to housing with 105,000 jobs and only 17,000 residents. This means that there are approximately 11.3 jobs for every 1 household. Fairfax County hopes to approve enough housing developments to bring this ratio closer to 4-to-1 in the future.<sup>13</sup> The area receives a huge influx of workers during business hours with a commensurate exit in the evening. Years of commercial development based on auto travel have resulted in an overabundance of parking, with the area containing more than 167,000 spaces.<sup>14</sup> In short, Tysons is the embodiment of auto-centric urban development, and this pattern will be very hard to change.

Prior to the completion of the first phase of the Silver Line, Fairfax County leaders began a long process of planning and community outreach to determine what land-use and development policy changes were needed to take full advantage of the new system. This process resulted in the adoption of a new comprehensive plan containing a subplan for Tysons, which calls for transforming the area into a truly walkable, livable, mixed-use community. In effect, local leaders are hoping Tysons leaves behind its history as a prototypical edge city business district to become “a true urban downtown for Fairfax County.”<sup>15</sup> Yet, the county’s current layout and zoning code reflects just how much work remains.

Article 1 of the code, which defines purpose and intent, states that the regulations are designed to “promote the creation and expansion of land uses that will be developed with adequate highway, utility, health, education and recreational facilities.”<sup>16</sup> First adopted in 1978, the code still does not formally contemplate the possibility that workers and residents would travel by any other means than automobile. Article 1 continues on to state a primary objective of avoiding “overcrowding of land” and “undue density.”<sup>17</sup>

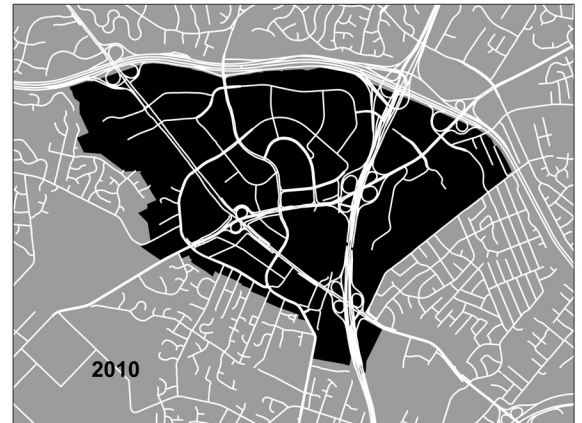
Fairfax County’s historic goals of limiting density and focusing on vehicle travel have produced a region defined by large arterial roads and superblocks. From a traffic engineering standpoint, the superblocks and arterial roadways complement the surrounding highways, allowing cars to flow onto, off of, and through the auto-oriented transportation network at high speeds. In Tysons, the superblock layout has often encouraged horizontal development because the lack of a completed street grid with cross streets allowed developers to more easily assemble large parcels of land.

### Metro Silver Line extension

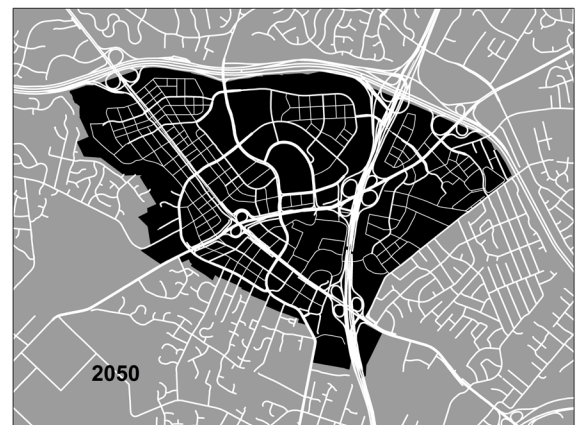


Source: Source: Treevis, available at <https://www.flickr.com/photos/treevis/617347105/sizes/l/in/photostream/>.

### Tysons Corner superblock roadway network



### Planned future roadway network with greater connectivity



Fairfax County has identified roadway connectivity as an important long-range goal. Time will tell if these plans can become a reality.

Source: Barbara Byron, “Transforming Tysons” (Fairfax, VA: Office of Community Revitalization for Fairfax County, 2014), available at [http://www.fairfaxcounty.gov/tysons/download/transformingtysonpresentation\\_091614.pdf](http://www.fairfaxcounty.gov/tysons/download/transformingtysonpresentation_091614.pdf).



This land-use legacy has important implications for the short- and long-term challenges and the success for the Silver Line. According to the Fairfax Comprehensive Plan, “The large block size inhibits transit use, pedestrian and bicycle movement by limiting short, direct connections between points within Tysons.”<sup>18</sup> The plan also notes that “Smaller block sizes will make Tysons more walkable by creating convenient and short walk distances between points in Tysons and will improve pedestrian and bicycle access to the four new Silver Line Metrorail Stations in Tysons.”<sup>19</sup>

The areas around the Greensboro and Spring Hill Silver Line stations on Leesburg Pike demonstrate this point. Both stations rise above the street on elevated platforms that sit in the median of Leesburg Pike, which is a major arterial roadway with three travel lanes in each direction. The Greensboro and Spring Hill stations are located 0.7 mile apart. Yet there is only one cross street, a little less than half way between the two stations. This is the definition of a superblock.

As the Greensboro station photo shows, the surrounding area offers few options for pedestrians. The stores to the right are separated from the sidewalk by very large parking lots that lack defined, safe walking areas, while the office buildings to the left were built to accommodate workers arriving in cars. In fact, riders exiting the Greensboro station to the west run straight into a retaining wall.

Pedestrian access is also a challenge at the Tysons Corner station located along Chain Bridge Road. In this case, the station sits parallel and north of the roadway rather than splitting traffic lanes. Once again, planners were forced to rely on elevated walkways because of the size of Chain Bridge Road and the volume of traffic entering and exiting the Tysons Corner mall. The elevated walkways, while allowing for safe station access, create a fundamentally different relationship between the transit line and the surrounding businesses. Separating riders from the ground level runs counter to the ultimate goal of transforming Tysons into an urban downtown.

Part of what makes city streets dynamic is the constant flow of people and the multi-purpose nature of public space. A city sidewalk is a meeting place, a place to talk; it ideally blends into a station entrance, creating a unique space that is greater than its narrow functional purpose. By comparison, the elevated walkways are directed space intended to serve the single purpose of lifting people over Chain Bridge Road so they may board the Silver Line. In many ways, the Tysons Corner stations shows that some prior transportation decisions simply cannot be fully overcome.

Greensboro station area during construction



Source: Virginia Department of Transportation, available at <https://www.flickr.com/photos/vadot/7068355635/sizes/k/>

Greensboro station east exit



Greensboro station west



Riders exit either into a retaining wall on one side or a vast parking lot and strip commercial development on the other.

Source: Photos by Kevin DeGood

The Dupont Circle station on the Metro Red Line in Washington, D.C., offers an example of transit integration within a street grid that combines maximum connectivity, a high degree of pedestrian access, and a dense development pattern. The most significant difference between the Dupont Circle station and the Silver Line stations is its location underground. Elevating the Silver Line helped to lower project costs, but it also reduced the extent to which the line could seamlessly integrate with and transform the surrounding development.

As the photo shows, the Dupont metro entrance, pictured in the bottom left corner, empties onto a small plaza that allows for activity beyond simple station access. The photo also captures the short urban blocks and minimal setback of buildings from the street. Moreover, buildings have been designed to maximize pedestrian access as opposed to vehicular access. The first stations on the Metro Red Line opened in the 1970s, and the District of Columbia has clearly had more time than Fairfax County to develop around its portion of the system. Yet, many of the characteristics that make the Dupont station so successful were decided decades before the line was built. The city's layout stretches back to planning decisions made by Pierre Charles L'Enfant.<sup>20</sup> As a result of the L'Enfant plan, Washington, D.C., has a different path dependency than Fairfax County.

Recently approved residential development applications show that Fairfax County is serious about increasing housing and pushing for greater density.<sup>21</sup> Yet, even the new projects show the path dependency created by past highway investments.

In June 2013, the Fairfax County Board of Supervisors approved a plan for a major multifamily housing complex and retail development known as The Commons of Tysons Corner. According to the master site plan, the 21 acres will eventually include more than 2,500 apartments spread across seven high-rises, along with amenities such as recreational fields.<sup>22</sup> In addition to this project, the county has recently approved four other major developments that will collectively add 6,500 housing units in Tysons.<sup>23</sup>

The new commons development will be located approximately one-third of a mile from the McLean metro station, which is the easternmost Silver Line stop.<sup>24</sup> As the rendering shows, Fairfax County intends the development to advance their goal of building a more traditional urban, walkable community. But the transition to a more urban form is undercut by the fact that the commons will also come with 3,100

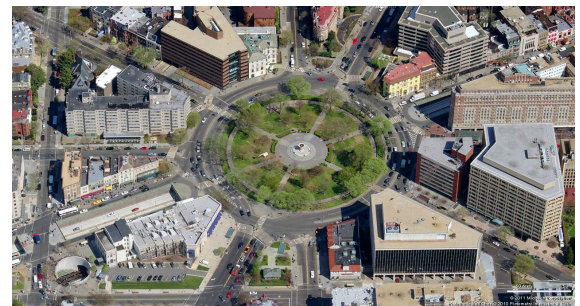
### Tysons Corner station area



The street design and station location require elevated access on the south side.

Source: Photo by Kevin DeGood

### Dupont Circle in Washington, D.C.



Source: BeyondDC, available at <https://www.flickr.com/photos/89392997@N00/5863048791/in/photolist-9W6E98>.

### Rendering of Tysons Commons



The proposed design offers a vision of a dense, mixed-use, and walkable place; time will tell if these plans can become a reality.

Source: Fairfax County, available at <https://www.flickr.com/photos/fairfaxcounty/8950791050/sizes/l>.



new underground parking spaces.<sup>25</sup> So while the residential units are close to the McLean stop, they also reinforce a heavy dependence on driving and add to the surfeit of parking in the area.

Additionally, residents of the new development must contend with a roadway network that makes accessing the metro a challenge. The McLean station sits parallel and to the north of Dolley Madison Boulevard with the commons located to the south. Pedestrians must either use an elevated walkway or try to cross at an intersection with 10 lanes of traffic. By comparison, pedestrians trying to access the Dupont Circle station, shown previously, only need to cross one or two lanes of traffic. Furthermore, rather than forcing pedestrians to change levels, the District of Columbia chose to lower Connecticut Avenue—grade separate the roadway—so that it passes underneath the surrounding streets around Dupont Circle. As a result, the four lanes of through traffic on Connecticut Avenue are able to continue under the Circle without impeding pedestrians, providing a safer and more accommodating station area.

---

### Silver line phase II in Loudon County

The second phase of the Silver Line is slated to open in 2018, extending the line an additional 11.4 miles with a connection to Dulles International Airport and two stations in eastern Loudon County. A majority of the second phase will run down the median of the Dulles Toll Road. In many ways, the second phase will operate more like a traditional commuter rail line as opposed to urban transit intended to provide mobility throughout the day and for multiple trips.

The Wiehle-Reston East stop, which is located within the toll road median, offers a look at the type of development that will surround many of the second-phase stations. As the photo shows, the Wiehle station is surrounded by traditional single-use zoning, large office park buildings, and expansive surface parking. These commercial spaces were developed well in advance of the Silver Line and are even less of a fit for transformation to a traditional urban form than Tysons.

### McLean station crossing distances



### McLean station area

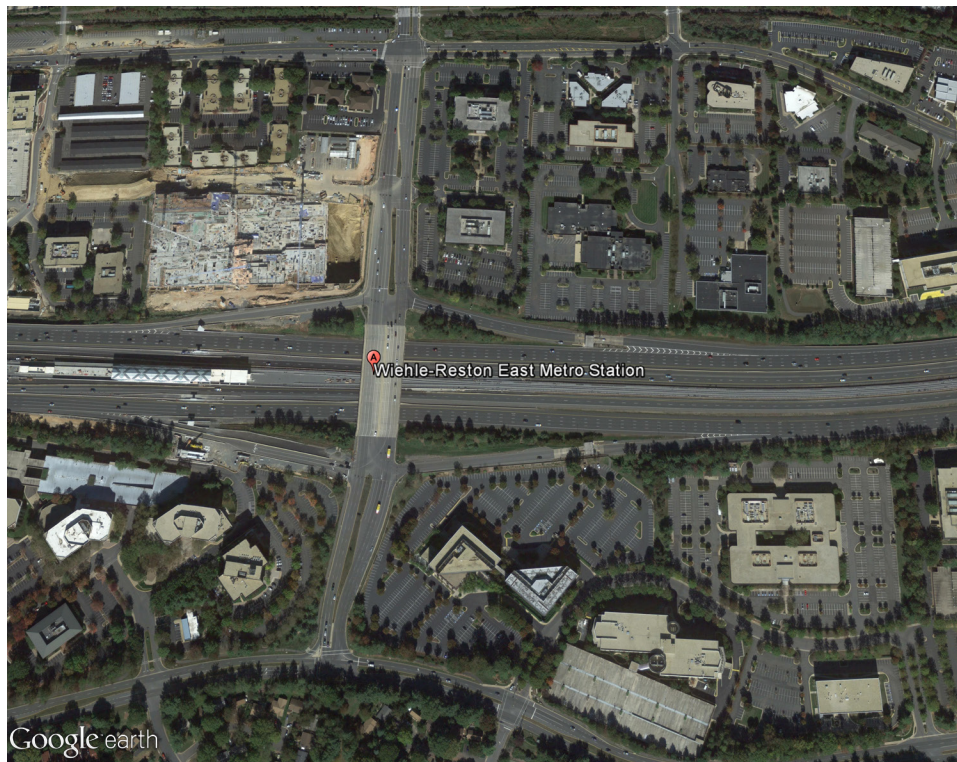


The existing roadway network requires pedestrians to either use an elevated walkway or cross 10 lanes of traffic.

Source: McLean station area photo by Kevin DeGood. McLean station crossing distances photo by Google Earth.



## Wiehle-Reston station area



Station area dominated by single-use zoning and office buildings surrounded by surface parking.

Source: Google Earth.

To its credit, Fairfax County is attempting to foster a different kind of development that will effectively leverage the Silver Line. The best example is the mixed-use Reston station project, which includes an underground bus transit hub and 3,500 commuter parking spaces. Above ground, Comstock Partners LC is building 550,000 square feet of office space, 120,000 square feet of retail, a 200-room hotel, and as many as 850 apartments and condominiums.<sup>26</sup> The developer boasts that their project will have “vibrant civic appeal,” representing “metropolitan living at its best.”<sup>27</sup>

While this is somewhat of a marketing stretch for a mega-development located atop a massive commuter parking lot, the Reston station project is fundamentally different from what has come before in the area. The point is not a critique of the Reston station design or the intentions of Fairfax County leaders, but rather an acknowledgement that the starting point for development around the Wiehle-Reston East station is fundamentally different than anything in Washington, D.C., or even Tysons Corner. Prior highway and land-use decisions effectively place a limit on the degree to which future development can lead to a fully urban place.

---

## Conclusion

The arrival of the Silver Line in Northern Virginia is unambiguously a good thing. Starting more than two decades ago, political, business, and civic leaders recognized the limitations of auto-only development. With the new line in place, Tysons and Northern Virginia are positioned to grow in a more sustainable way.

In order to realize the full benefits of the Silver Line, Fairfax and Loudon County officials must maintain their commitment to using the power of zoning and land-use policy to drive development change. Leveraging the Silver Line will require a sustained political commitment to break with past practices, focus public resources, and use the regulatory power of the Commonwealth of Virginia to carry out the vision for a new urban form. In the absence of such a commitment, the Silver Line will not deliver on its full potential. Building the first phase of the Silver Line was a major accomplishment, but it was only the start. Now the hard work of making it a success begins.

*Kevin DeGood is the Director of Infrastructure Policy at the Center for American Progress.*

---

## Endnotes

- 1 Wesleyan University, "Path Dependence," available at <http://govthesis.site.wesleyan.edu/research/methods-and-analysis/analyzing-qualitative-data/path-dependence/> (last accessed December 2014).
- 2 Washington Metropolitan Area Transit Authority, "Metro announces Silver Line opening date," Press release, June 23, 2014, available at [http://www.wmata.com/about\\_metro/news/PressReleaseDetail.cfm?ReleaseID=5731](http://www.wmata.com/about_metro/news/PressReleaseDetail.cfm?ReleaseID=5731)
- 3 Fairfax County, "Silver Line," available at <http://www.fairfaxcounty.gov/fcdot/silverline/> (last accessed December 2014),
- 4 Stephen S. Fuller and John McClain, "Forecast for Tysons Corner to 2050" (Fairfax, VA: George Mason University Center for Regional Analysis, 2008), available at [http://www.fairfaxcounty.gov/tysons/stats/download/george\\_mason\\_forecast\\_tysons.pdf](http://www.fairfaxcounty.gov/tysons/stats/download/george_mason_forecast_tysons.pdf).
- 5 Tysons Regional Chamber of Commerce, "Our Community," available at <http://www.tysonsregionchamber.org/our-community/> (last accessed December 2014).
- 6 Barbara Byron, "Transforming Tysons" (Fairfax, VA: Office of Community Revitalization for Fairfax County, 2014), available at [http://www.fairfaxcounty.gov/tysons/download/transformingtysonpresentation\\_091614.pdf](http://www.fairfaxcounty.gov/tysons/download/transformingtysonpresentation_091614.pdf).
- 7 Fairfax County Economic Development Authority, "Tysons Corner Business Area," available at <http://www.fairfaxcountyeconomicauthority.org/tysons-corner-business-area> (last accessed December 2014).
- 8 Wesleyan University, "Path Dependence."
- 9 Metropolitan Washington Airports Authority, "Final Environmental Impact Statement, Chapter 1: Purpose and Need for Proposed Action" (2004), available at [http://www.dullesmetro.com/pdfs/FEIS\\_I/FTA\\_FEIS\\_Chapter\\_1.pdf](http://www.dullesmetro.com/pdfs/FEIS_I/FTA_FEIS_Chapter_1.pdf).
- 10 Byron, "Transforming Tysons."
- 11 Metropolitan Washington Airports Authority, "Dulles Metrorail Project History," available at <http://www.dullesmetro.com/about/timeline.cfm.html> (last accessed December 2014).
- 12 Byron, "Transforming Tysons."
- 13 Fairfax County, "Fairfax County Board of Supervisors Approves Large Residential Development in Tysons," June 4, 2013, available at <http://www.fairfaxcounty.gov/news/2013/board-approves-largest-residential-project-tysons.htm>.
- 14 Byron, "Transforming Tysons."
- 15 Fairfax County, "Amendment to The Comprehensive Plan for Fairfax County, Virginia 2007 Edition" (2010), available at <http://www.fairfaxcounty.gov/dpz/comprehensiveplan/adoptedtext/2007-23.pdf>.
- 16 Fairfax County, "Article 1: The Constitution of the Ordinance" (1978), available at <http://www.fairfaxcounty.gov/dpz/zoningordinance/articles/art01.pdf>.
- 17 Ibid.
- 18 Fairfax County, "Tysons Comprehensive Plan—Transportation—Grid of Streets," available at <http://www.fairfaxcounty.gov/tysons/comprehensiveplan/transportation-grid-of-streets.htm> (last accessed December 2014).
- 19 Ibid.
- 20 Kenneth R. Fletcher, "A Brief History of Pierre L'Enfant and Washington, D.C." *Smithsonian Magazine*, April 30, 2008, available at <http://www.smithsonianmag.com/arts-culture/a-brief-history-of-pierre-lenfant-and-washington-dc-39487784/?no-ist>.
- 21 Fairfax County, "Fairfax County Board of Supervisors Approves Large Residential Development in Tysons."
- 22 Ibid.
- 23 Ibid.
- 24 Ibid.
- 25 WDG, "The Commons, Tysons Corner, VA," available at <http://www.wdgarch.com/portfolio/projects/the-commons> (last accessed December 2014).
- 26 Ibid.
- 27 Comstock, "Reston Station," available at <http://www.restonstation.com/residential.php> (last accessed December 2014).