

## 4. Access Management Issues

Access management is an approach aimed at reducing traffic congestion and accidents while appropriately balancing the need for maintaining access to local developments and streets. It involves the provision of certain techniques to reduce potential roadway conflicts that can cause roadway friction as well as potential safety problems. In addition, the application of proper access management techniques can enhance the character of a community and advance economic development goals.

Although there are numerous techniques that can be applied in access management, there are six basic principles of access management including:

- Maintaining a hierarchy of roads by function.
- Locating traffic signals to facilitate traffic movement.
- Limiting direct access on higher speed roads.
- Limiting the number of conflict points.
- Separating conflict points.
- Separating turning movements from through volumes.

### 4.1 Roadway System and Hierarchy

The establishment and maintenance of a roadway hierarchy is the first step in an access management plan. The roadway hierarchy ranges from high-level facilities such as freeways with a primary purpose of carrying high volumes of traffic quickly and efficiently to lower level roads that have a primary purpose of providing access to local roads.

By identifying the primary function of the local roads, appropriate treatments can be identified. For the project study area, the existing roadway hierarchy includes the following roads, listed in order of importance for the flow of traffic:

- US 29 Madison Heights Bypass – This soon to be opened freeway link will provide a new crossing of the James River and provide a freeway link for high speed, long distance travel. The proposed interchange at the relocated US 460 allows for a possible future extension of US 29 to the south, although that extension is not part of this study.
- US 460 Bypass – Between the interchanges at Campbell Avenue and the Madison Heights Bypass, this intrastate arterial currently allows access to various businesses and residences located adjacent to US 460. A signalized intersection is now being constructed for the intersection of Concord Turnpike to provide local access. This two-mile section of roadway connects two freeways (approximately 8 miles of US 460 Bypass to the west and approximately 8 miles of the future Madison Heights Bypass to the north). With increasing traffic volumes, it is probable that at some date in the future a limited access freeway section with an interchange will be required to maintain capacity, increase safety, maintain driver expectancy, and to maintain/upgrade the road hierarchy.
- Pleasant Valley Boulevard (Old US 460) – This section of roadway will be downgraded to a local collector following the existing US 460 alignment, and has been downgraded to reflect that it will primarily serve local traffic when US 460 is relocated. It has a four-

lane section east of Concord Turnpike that will be reduced to a two-lane roadway. The estimated ADT is approximately 24,000 vpd in 2002, but is projected to drop to 3,000 vpd with the relocation of US 460 to the south.

- Concord Turnpike – This local road will be upgraded to a minor arterial in importance with its proposed connection between US 460 Business and the realigned US 460. It also serves medium distance trips to the north.
- Tyreeanna Road - This road is currently a local collector providing access to the Tyreeanna neighborhood to the north. It has an unsignalized access with US 460 on the west and provides access to Concord Turnpike to the east. The intersection of Tyreeanna Road / Holcomb Path Road with US 460 is currently marked with substandard geometry, limited storage for through and left-turning vehicles from the minor street and substantially grade differences between the eastbound and westbound lanes.
- Holcomb Path Road – This road is currently a local collector providing access to the residences to the south of US 460. To the north, it connects with Tyreeanna Road at an intersection with US 460 (see above). To the south it connects with Wolf Pit Road which can provide access to Campbell Avenue and eventually US 460.
- Other local roads – Several existing two-lane roads exist within the study area and would remain as part of the future roadway network. These roads include:
  - Rockwell Road
  - Poston Street
  - Megginson Lane
  - Statham Road
  - Kavanaugh Road
  - Nickerson Road

## 4.2 US 460 Mainline

With the completion of the Madison Heights Bypass, the one-mile section of US 460 between Campbell Avenue and the Madison Heights Bypass will link two freeways – approximately 8 miles of US 460 to the west and 8 miles of Madison Heights Bypass to the north.

As indicated by the capacity analysis of the two major intersections on this section, the need for improvements on this section increases substantially with implementation of planned development. To determine access management measures that may improve conditions in the short term, it is necessary to understand when overall improvements, including widening, may be required on US 460. To determine this, roadway capacity on US 460 should be examined. As indicated in the capacity analysis, unacceptable LOS E conditions could occur as early as 2022 at the Concord Turnpike signal. This signal is a good indicator of congestion since it is the focus point for all delay on the corridor.

A more common threshold for the City and VDOT to estimate the need for roadway capacity enhancement would be to utilize Annual Daily Traffic (ADT) for this section of US 460. For example, the Florida Department of Transportation (FDOT) has developed tables estimating level of service thresholds for typical roadways factoring in characteristics such as signal spacing, number of lanes, and the presence of medians. Note that these are not standards

and can not be used for detailed capacity analysis. They can serve as valuable guidelines for general planning applications, although VDOT is commonly more conservative in estimating maximum capacity than the FDOT tables. Utilizing these tables, a four-lane arterial with interrupted flow is projected to reach LOS E with approximately 32,800 vehicles per day (vpd), while a four-lane arterial with uninterrupted flow reaches LOS E with 57,000 vpd.

Since LOS E flow is not considered acceptable, it is reasonable to plan for US 460 to be widened before traffic volumes reach the given thresholds. Since US 460 is projected to exceed 66,000 vpd in 2025 with the planned development, it is reasonable to assume that US 460 will require widening to six lanes prior to 2025. If a signal remains in place at the Concord Turnpike intersection (resulting in interrupted flow on US 460), it is estimated that widening may be required as early as 2008. With uninterrupted flow, widening is estimated to not be needed until 2021.

Note that the use of different thresholds type can yield very different conclusions. The reason for this is that level of service reflects the willingness of drivers to accept certain types of delay. Using a signalized LOS for a threshold indicates widening is not needed until 2022 because it reflects that drivers are willing to accept delays at a signal. The roadway LOS threshold indicates widening may be needed as early as 2008 since drivers traveling longer distance trips may be less tolerant of delays caused by a signal. This willingness to accept different types of delay is critical on US 460 since it serves as link between two freeway sections – the US 460 Bypass of Lynchburg and the Madison Heights Bypass.

It is probable that the true threshold is somewhere in the middle – possibly drivers are willing to accept interrupted flow at a signal, at least for the short term, if LOS C operations can be maintained.

### **4.3 Local Roadway Access Points**

As indicated in the analysis of the US 460 mainline, the current traffic volumes do not warrant the immediate elimination of access on US 460. In the long term it would be advantageous for capacity, safety, and route continuity to convert this section of roadway to a limited access facility with elimination of most at-grade access points.

It is difficult to pinpoint the timeframe and level of development that would trigger the need for closures of direct access to US 460 and reconnection of access to frontage roads providing secondary access to US 460. As an absolute rule, no new access points should be allowed to connect directly to US 460 unless they are part of a deal to close other access points, and it is recognized that the new access points will be closed in the near future.

In addition, the City and State could adopt a capacity threshold at which time access points will be removed from US 460. Although no formal policy now exists, it could be recognized that when the roadway reaches LOS E, this threshold has been exceeded. As indicated in the capacity analysis, this condition could occur as early as 2022 at the Concord Turnpike signal. This signal is a good indicator of congestion since it is the focus point for all delay on the corridor.

US 460 between the Campbell Avenue interchange and the soon new Madison Heights Bypass interchange will be opened with several access points and crossovers both at local roads and at private driveways. This includes the provision of a traffic signal at the extension

of Concord Turnpike and an unsignalized intersection at Tyreeanna Road/ Holcomb Path Road.

Widening to six lanes will be required by 2025 if the proposed development occurs. The provision of a grade separation at Concord Turnpike will eventually be required. If provided in the shorter term, it is possible that it could delay the need for widening US 460 for more than 10 years. Access control would be important to ensure efficient operations on a six-lane facility and maintain capacity on a four lane facility.

Once the LOS thresholds have been reached, action could be taken to eliminate access and provide alternate access to roadways such as Campbell Avenue, Brown Haven Lane, or Florida Avenue. In some cases, businesses or residences may be removed. Any implementation of a policy such as this will require extensive study and work with the City, local residences and businesses, as well as VDOT. Given the difficulties involved, it may be ideally combined as part of the right-of-way purchase for a six-lane widening of US 460.

#### **4.3.1 Public Roads**

##### *US 460 & Concord Turnpike Extension*

At the soon to be opened three-legged intersection of US 460 and Concord Turnpike, a traffic signal is being installed. As indicated in the existing conditions analysis, this signal is projected to operate acceptably at opening but will exceed capacity with build out of the planned development. When development occurs, it will be necessary to consider possible improvements/access management techniques such as:

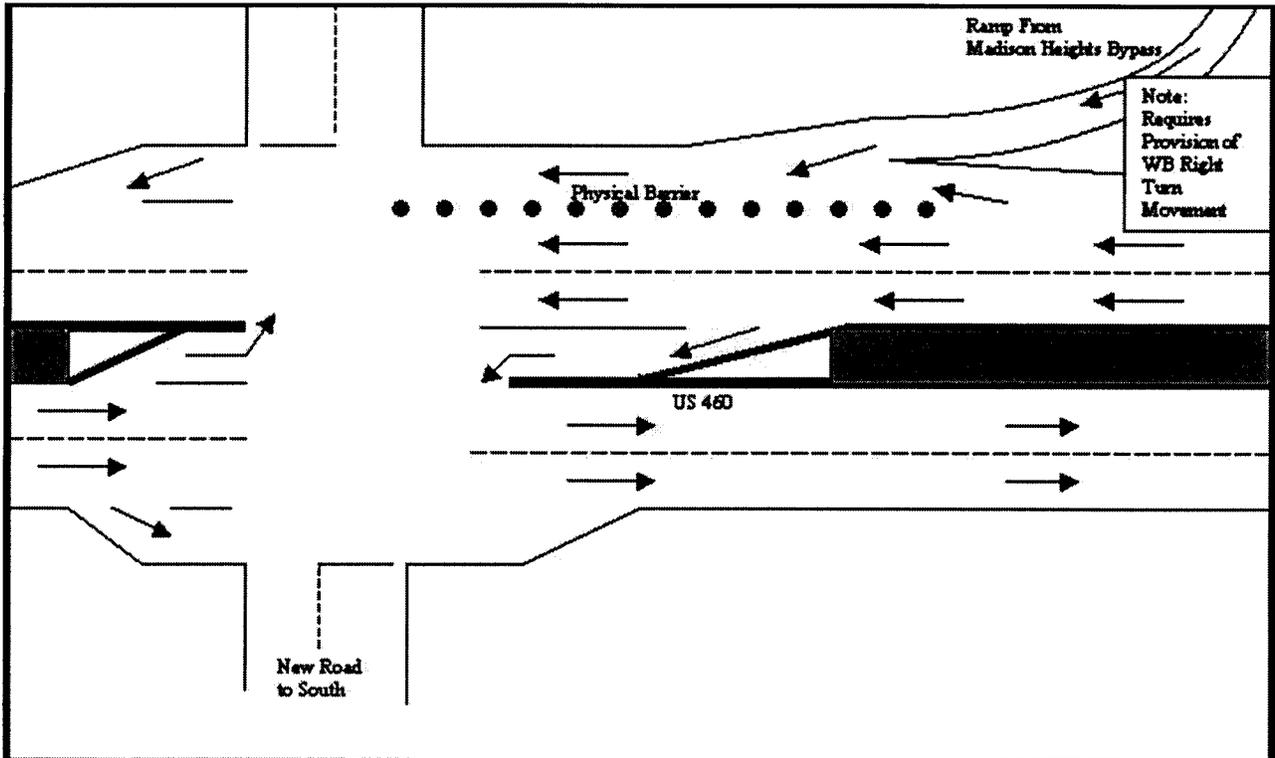
- Providing dual left turns for traffic exiting Concord Turnpike and turning left onto US 460 WB. Although this solution provides a temporary increase in capacity, unacceptable operations could still be expected unless US 460 is widened to six lanes.
- Ultimate improvements may require the provision of a grade separation and ramp access to the local area. The reasons for this include reducing delays on US 460, particularly related to the traffic signal. In addition, the existing signal location is approximately 1000 feet from the Madison Height Bypass merge onto US 460 westbound.

Note that it is possible that, although VDOT currently does not have plans for this improvement, that future improvements may include a fourth leg to the south of US 460. The addition of the fourth leg, would provide potential benefits to the Tyreeanna Road / Holcomb Path Road intersection by providing a second access to the Village Center located south of US 460. The addition of a left turn lane for US 460 EB traffic into the fourth leg would potentially introduce safety problems caused by traffic exiting the Madison Heights Bypass to US 460 westbound cutting across from the far right into the left turn lane in a distance of approximately 1000 feet. The high speeds on US 460 combined with through and turning traffic volumes could result in either sideswipe accidents in the weave area or rear end accidents at the intersection. In addition, traffic operations degrade with the addition of a conflicting movement.

To address the potential safety problems caused by weaving traffic trying to turn left onto the fourth leg, an option may be to install a physical barrier that extends between the Madison Heights Bypass exit ramp and the Concord Turnpike intersection. This would physically

prevent traffic from crossing the westbound through-traffic and would limit the potentially dangerous weaving movements. For this to be successful, directional signage should direct traffic to the Village Center. In addition this design would need to safely allow westbound traffic on US 460 to turn right onto Concord Turnpike.

**Figure 3 Fourth Leg at Concord Turnpike With WB Weave Restrictions**



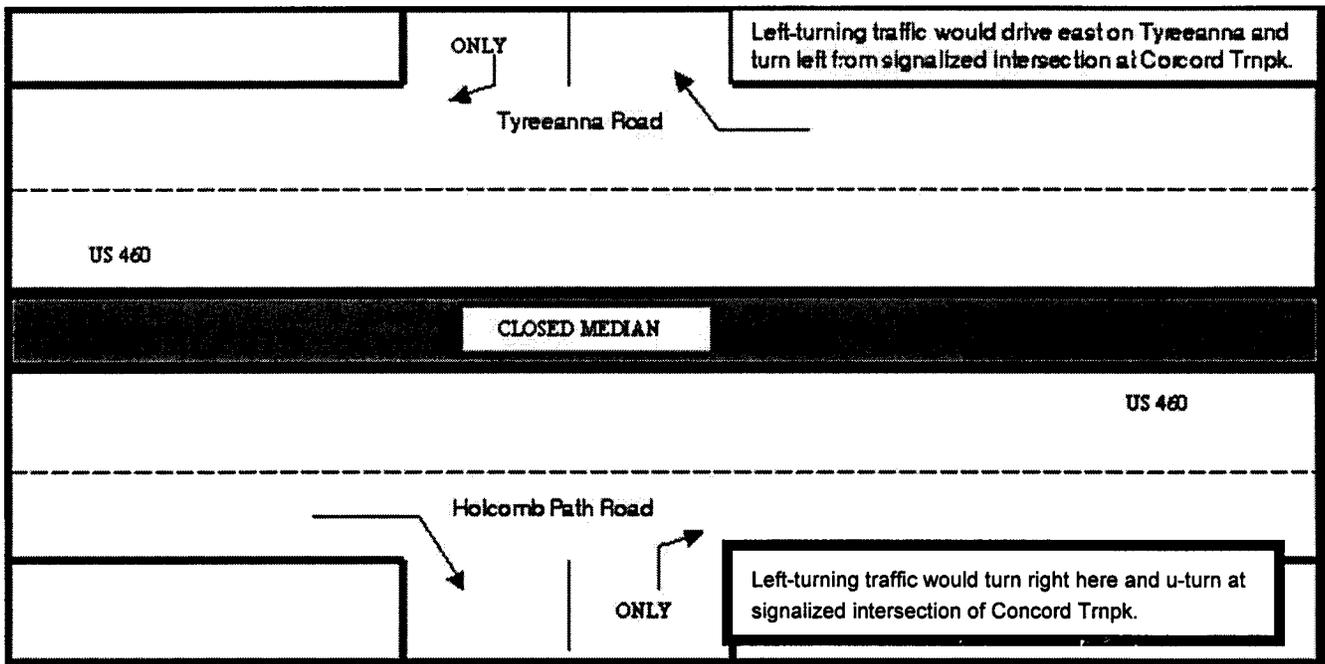
*US 460 & Holcomb Path Road / Tyreeanna Road*

As indicated in the signal warrant and capacity analysis sections, this intersection is projected to have significant capacity restrictions and congestion in both the short term and long term. Since a signal is not warranted, however, other methods of access control should be considered for implementation to reduce possible conflicts and improve safety. These should be completed for the Madison Heights Bypass.

This analysis indicates that even with the provision of a signal or other short term improvements, significant roadway modifications would be required to ensure that adequate design accommodates all movements safely and efficiently. Any improvements would ideally be a temporary solution until the ultimate solution, a grade-separated interchange, is in place.

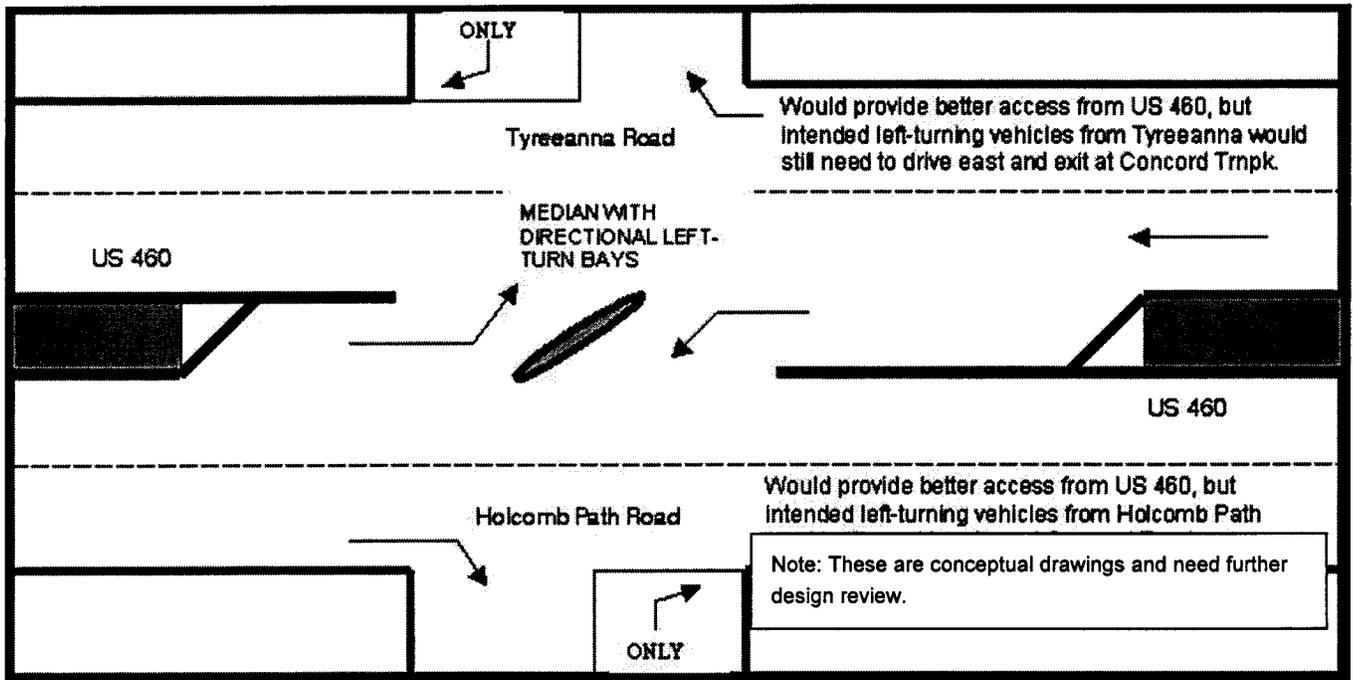
The first and simplest approach would be to provide full closure of the median opening, enabling right-in/right-out operations only. The primary impacts to local users exiting at Holcomb Path Road would be a U-turn at Concord Turnpike on US 460. Drivers exiting Tyreeanna Road would have to re-route their trip adding trips on Tyreeanna Road and Concord Turnpike. In addition, turn restrictions can impact the willingness of businesses to locate near an intersection. Note that a right in/right out access can serve the land area north of US 460 since that traffic can utilize Tyreeanna Road to Concord Turnpike. South of US 460, however, traffic is forced to utilize the Holcomb Path intersection and make a u-turn at the signalized intersection of Concord Turnpike.

**Figure 4 Median Closure at Tyreeanna Road / Holcomb Path Intersection**



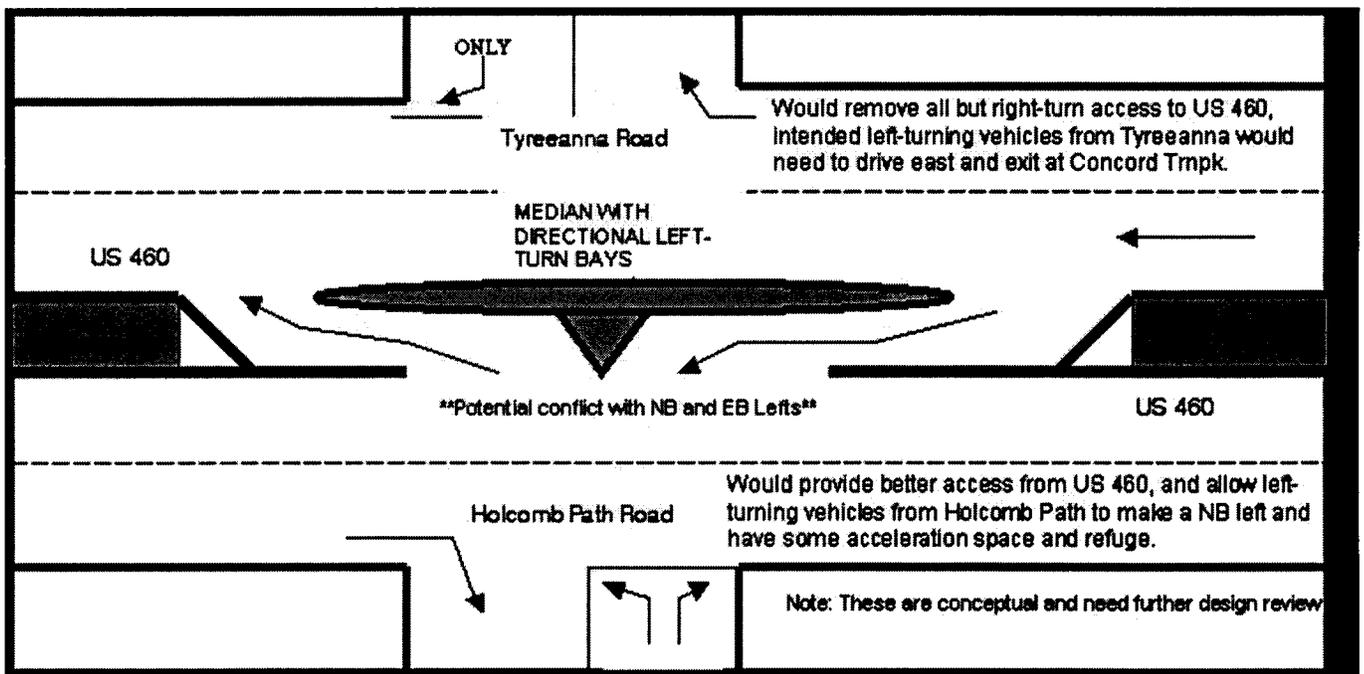
A second approach would be to provide a directional median opening allowing exclusive left-turns onto Holcomb Path Road and Tyreeanna Road from US 460. This method would reduce potential conflicts while still maintaining access into the local area. Traffic exiting the side streets would be forced to turn right and use the signalized intersection at Concord Turnpike to make a U-turn. If necessary, the treatment would have similar impacts as the right in/right out solution although it would affect half as many vehicles and would be less objectionable to businesses than full closure of the median.

**Figure 5 Directional Median Opening at Tyreeanna Road / Holcomb Path Intersection**



A third approach would be to allow full access to the south (i.e., the Town Center), but restrict access to/from the north (Southbound movement) to only right in-right out. A simple method to do this would be to close the Tyreeanna access point to the north, forcing that traffic to exclusively use Concord Turnpike to access US 460. A more complicated method allowing Tyreeanna to remain open would be to construct a channelized median that allows for a SB left turn for WB traffic entering the site and a channelized refuge and acceleration lane for NB left turning traffic exiting the site. Both treatments would reduce potential conflict points when compared to a full median opening. This does create a conflict between NB left-turning traffic exiting the site from Holcomb Path Road and WB left-turning traffic from US 460 and into the site. It is likely, however, for both safety and capacity reasons, that both scenarios would ultimately require a traffic signal, although the traffic signal could be more efficiently timed than a conventional four-leg intersection.

**Figure 6 Closure of Tyreeanna Road Opening / Directional Left In and Out of Holcomb Path Road**



In addition to these access management techniques for restricting turns, some short-term safety improvements can be implemented to address field conditions at the intersections. Note that these are based on field observation only and would require more detailed survey and design as well as a formal accident analysis.

In general, this intersection currently has a steep slope south of US 460 (Holcomb Path Road). There is limited room for northbound left, thru and right-turning vehicles further exacerbated by the limited sight distance. The north side of US 460 (Tyreeanna Road) is marked by a sharp 90-degree turn just north of the intersection with US 460. This nonstandard geometry limits storage, impacts access, affects sight lines and increases accident potential. On US 460, there is a narrow crossover with no turn bays in the median, making it difficult to make left-turns and through movements across US 460. Improvements to

the existing cross-over should be considered in the short term and medium term. Potential safety improvements to address these issues include:

- Add or lengthen turn bays.
- Increase throat length on the north side of US 460 (Tyreeanna Road) to reduce accident potential, eliminate the sharp right turn onto Tyreeanna Road from the approach lane from US 460 and drastic left turn from Tyreeanna Road to the approach onto US 460, and improve sight distances at the intersection.

#### **4.4 Access Management for New Development**

As an area develops, it is often a concern to get the most value from each parcel of land. Direct access to a critical roadway adds “value” to a parcel. However, poor access management can cause an inefficient and congested major roadway, more accidents and excessive queuing that can block critical access points. Property is more “valuable” if driveway locations are well planned and designed on a roadway.

With improving or maintaining roadway efficiency as a goal, the City can adopt the following policies to ensure “valuable” development along the US 460 Corridor. The following techniques can be used to ensure efficient access management:

- **Minimize/Eliminate Signals** – With the goal of the US 460 Corridor eventually acting as a continuous limited access facility, the number of direct connections onto US 460 should be minimized and concentrated onto the two primary intersections at Concord Turnpike (currently signalized) and at Holcomb Path Road / Tyreeanna Road. As the area evolves, consideration can be given to modifying the access to this area by adding an interchange for this area.
- **Provide Design Consistent with Roadway Hierarchy** – This section of roadway has served as the last section of rural highway connected to a freeway beginning at Campbell Avenue and following a route to the west. With the opening of the Madison Heights Bypass, this section will link two sections of freeway – the US 460 Bypass and the Madison Heights Bypass. This change in hierarchy warrants strong consideration of a consistent limited access facility through Lynchburg.
- **Provide Limited Access to Improve Capacity** – A limited access facility can carry significantly more traffic than a similar facility with traffic signals and other access points. In the study area, US 460 is forecast to carry approximately 64,000 vpd. Using a standardized planning level methodology (the Florida DOT’s ARTALL software), it is estimated that a high level rural arterial can carry up to 32,100 vpd at LOS D with four lanes and 48,300 vpd with six lanes. The provision of a limited access uninterrupted highway increases freeway capacity to 51,000 vpd with four lanes (i.e., more than the six-lane roadway with signals) and 76,500 vpd with six lanes (i.e., more than the projected 2025 volumes).
- **Driveway Spacing/Shared Access Roads** – As discussed previously, limiting the amount of driveway connections onto US 460 will minimize the friction on through-flow traffic thus preserving the carrying capacity of the roadway. The access points are then consolidated onto back frontage/collector roads and distributed onto US 460 on an improved intersection/interchange to give priority consideration to the major street through movement.
- **Internal Site Design** – Consolidation of driveway access points requires a planned approach to future development. The land use plans discussed in Section 2.1 include a conceptual internal roadway site design. Though the specific location of roadways is beyond such a conceptual layout, general design concepts are critical to integrate into any future site. Specific issues to consider include:
  - Access in the employment area west of the railroad tracks and north of the US 460 (existing Truck Body Area) should be provided via a collector road that runs parallel to

- US 460 and intersects Florida Avenue at location to provide adequate spacing from Campbell Avenue, possibly as an extension of Brown Haven Lane. (See Appendix A)
- Access in the employment area west of the railroad tracks and south of US 460 (existing Falwell Airport) should be provided via an internal circulation road that runs adjacent to US 460 and connects to Route 501 (Campbell Avenue). Appropriate spacing of 1,000 feet should be provided from the US 460/Route 501 (Campbell Avenue) interchange. A 1,200 foot spacing is preferable if this is feasible. (See Appendix A.).
  - Local circulator roads should be provided that tie into the primary loop road concept based on Holcomb Path Road / Tyreeanna Road and Concord Turnpike. As the area develops, buildings should be reoriented from US 460 to an internal emphasis. New building designs would orient their fronts to the local roads and back to US 460. Once again, a key to this concept is to provide appropriate access from development both north and south of US 460 on Holcomb Path Road / Tyreeanna Road and Concord Turnpike. These intersections should provide sufficient capacity for inbound and outbound movements, provide signalization (if and when warranted) and eventually provide grade separation and interchange access ramps. This access progression will eventually lead to the complete access control of US 460.
  - A key component missing from the circulatory road system is the lack of a second access point to the south. To the north both Tyreeanna Road and Old Concord Turnpike provide alternate access points to US 460 (as well as Pleasant Valley Boulevard).
  - In the short-term, the local roadway network will be missing a critical component. There is currently no plan to bridge across US 460 or provide ramps at the intersection of Holcomb Path Road / Tyreeanna Road. This crossover point is not currently in a condition to allow crossing movements from the minor streets, although existing crossing movements are estimated to be limited. If the full median opening is deemed unsafe in the short-term (especially after the Madison Heights Bypass is completed), it should be closed to minor street crossing or left-turning movements and vehicles attempting to make a southbound thru or left-turn movement will be forced to backtrack east on Tyreeanna Road, turn right on Concord Turnpike and use the signalized intersection at Concord Turnpike to access US 460. Alternatively, this traffic could use Tyreeanna Road to access Concord Turnpike to US 460. On the south side, there is no reasonable alternative route forcing vehicles attempting to make a northbound thru or left-turn will need to make a U-turn at Concord Turnpike.
  - Starting now, no new access to US 460 should be permitted. New access should be encouraged to develop frontage road systems and develop access locations on secondary roads (Campbell Avenue, Florida Avenue). These new frontage roads should also be designed to provide access to adjacent existing development. As development pressure builds after 2014, serious improvements to the loop road system should be considered. Plans to develop such a circulation system will attract potential developers and make the adjacent property more valuable.
  - Development Approvals and Conditions – Many areas have adopted development regulations to require access control regulations for new developments on major thoroughfares. These regulations require frontage (reverse frontage roads, consolidation of driveways and internal collector roads that reduce access points/connections on major thoroughfares. The City of Lynchburg has already taken a step toward this type of development guidelines by integrating a specific plan for the Pleasant Valley/Tyreeanna

neighborhood into the Comprehensive Plan. No development should be approved that is not consistent with the future land use and transportation plans.

The City of Lynchburg may also want to consider requiring a detailed traffic impact analysis for large developments. In some areas, a traffic impact analysis is required for all developments generating more than 100 trips in the peak hour or more than 1,000 daily trips.

- **Setbacks** – Long-range transportation planning activities have already indicated the potential need for the six-laning of US 460 through the study area. As the transition of land uses from the existing to planned advance, an emphasis should be made by the City of Lynchburg and VDOT to preserve that right-of-way necessary for future roadway expansion (discussed further in Section 5).

Similarly, two locations at Holcomb Path Road / Tyreeanna Road and US 460, and Concord Turnpike and US 460 have been identified as areas for potential improvement. A conceptual footprint of bridges, ramps and collector/distribution roads should be identified and preserved. As part of this analysis, four alternatives were developed. The next section, Section 4.5, identifies these interchange and ramp configurations as well as the preferred solution. The City, VDOT and its consultants should review these concepts to identify the most preferable alternatives.

## 5. Right of Way Preservation for Future Corridors

As the roadways in the study area are expanded to facilitate higher future traffic volumes, the City would want to ensure that future development provides appropriate setbacks of these structures from the roadway. Substantial redevelopment has been planned for the study area and has been summarized in this report. Corridor preservation will help ensure that viable locations for roadway expansion will not be developed and will be available as the eventual expansion of lanes is needed. FHWA's Memorandum on Highway Corridor Preservation and Early Right-of-Way Acquisition (FHWA July 1988) discussed two methods that the City of Lynchburg can consider to preserve Right-of-Way (ROW) for future expansions of US 460 in the study area.

The FHWA ROW Preservation Memo notes that the two approaches that meet existing regulatory requirements that FHWA, State Highway agencies and local governments can use to protect prospective highway corridors from development include utilization of preliminary studies / planning tools and acquisition. The first approach is to finalize the conceptual location early, conducting environmental and preliminary location studies. This approach ensures that the highway location is selected by the state and local transportation agency and approved by FHWA. This will identify an approved highway location and allow this location to be identified on future land use maps and ROW Preservation Plans before major development occurs. This forethought also ensures that future development will be consistent with the proposed highway.

The other approach discussed in FHWA's memo suggests protective buying on a site-specific basis when development "threatens to foreclose highway location options. This method offers an opportunity for preserving the highway corridor through advanced acquisition and reducing project costs. As development occurs in the vicinity of the project, land values tend to soar. By advancing acquisition, ROW cost savings well over 50 percent can often be realized."

As the modification to the alignment of US 460 is completed in late 2003 until the closure of the landfill in 2014, development pressure in this southeastern area of the City may gradually increase. Planning for the preferred long-term transportation concept and the related interchange construction and access road construction should continue into more detail and design. Although the need is not immediate (the closure of the landfill in 2014 is identified as the start of the majority of development), the City should develop a preliminary design location for identifying acquisition of key parcels when they become available. This will require budgets to allow these purchases. By purchasing parcels when they become available, it is also possible to avoid difficult right of way acquisitions at a later date.

In the meantime, the City should consider creating a ROW Preservation area adjacent to the existing roadway. The Lynchburg Area Long-Range Transportation Plan Year 2025 (Adopted January 18, 2001), shows US 460 west of the railroad tracks as a financially-constrained rural six-lane section to the realigned segment of US 460 (just west of the intersection with Concord Turnpike). This proposed cross-section does not accommodate the potential for auxiliary lanes associated (turn lanes/bays) with the construction of an interchange. Consequently, an eight-lane section should be preserved between the railroad and Madison Heights Bypass. West of the railroad bridge, a six-lane corridor should be preserved.

To accommodate two additional lanes in each direction would require a minimum of 24 feet. If the roadway were to be upgraded, however, an improved shoulder would be desirable probably warranting an additional 10 feet to each side. It is also possible that some median widening may be warranted in the future by converting a portion of the left lane to a paved shoulder along the median. Using these estimates, it would be reasonable to protect a minimum of 40 feet to 50 feet outside the existing ROW limits. This zone would accommodate future expansion and would allow for expanded shoulders if deemed necessary. Note that this assumes a similar clear zone area as currently exists on the roadway.

Outside the roadway right of way limits, the City would probably want to include landscaped buffering for the roadway to improve the appearance of the corridor and buffer any buildings. At the same time, however, the backs of any buildings should be oriented toward US 460. Driveways and the majority of parking lots would then access off local roads serving the front of the buildings. As a result, the width of the buffer strip can be less than may typically be required if buffering parking lots and other people-oriented facilities.