

600.00. TRANSPORTATION SYSTEMS

600.01. Definitions

Alleyway: A privately maintained travelway primarily designed to provide a secondary access to the side or rear of properties whose primary frontage is on another street. Alleyways may be allowed on single family, multifamily, townhouse/single family attached residential, and on commercial uses in town center developments/small area plans, as designated by the Comprehensive Plan.

Bridge: A structure carrying a road, path, or railroad across a waterway, depression, or other obstacle with minimal disturbance to the features below. The structure generally consists of a deck or superstructure supported on two or more abutments or piers.

California Bearing Ratio (CBR): A measure of the strength of the subgrade of a road or other paved area, and of the materials used in its construction. The ratio is measured using a standardized penetration test first developed by the California Division of Highways for highway engineering.

~~Care Facilities: Hospitals, adult and/or child day care centers, nursing convalescent homes and their buildings and associated parking.~~

Channelization: The design of a street intersection which separates conflicting traffic movements into definite paths of travel through the application of pavement markings, raised medians, bollards, or other appropriate means to facilitate the movement of pedestrians, cyclists, mass transit, and vehicles.

Commercial/Retail: Buildings with uses that are primarily retail, or retail-related, including shopping centers, motor vehicles fuel sales, etc.

Institutional Uses: Churches, cemeteries, rescue squads, fire departments, police departments, libraries, schools (public and private), and their associated buildings and parking areas.

~~Industrial: Buildings with uses related to manufacturing, storage and distribution services, maintenance and repair of vehicles or machinery, data centers, etc.~~

~~Multimodal: A transportation system element that provides opportunities for modal transfers and use of multiple transportation modes such as walking, riding a bicycle, taking transit, or driving a car.~~

Office: Buildings with primarily administrative activities, including financial institutions

Pipestem Driveway: A relatively long, narrow driveway that services up to five pipestem lots (see below) which is typically maintained or owned jointly by the property owners of the lot(s).

Pipestem Lot: Lot(s) in a cluster development for which the minimum frontage for the zoning district in which it is located is not required to be met, and which are connected to the public ROW via a pipestem driveway (see above).

Proof Rolling: A physical compaction test performed with a rear tandem axle dump truck with a gross weight of fifty thousand (50,000) pounds or twenty five (25) tons. The loaded dump truck will roll over the soil subgrade where the proposed concrete curb or asphalt concrete is to be placed. As the proof roll truck at two to five miles per hour rolls over areas being tested and does not yield or pump, it is considered passing and suitable for curbing and asphalt placement.

Small Area Plan: A plan of development for multiple contiguous properties that guides land use, zoning, transportation, urban design, open space, and capital improvements at a high level of detail within an urban development area or for a transit-oriented development that is at least one-half (0.5) square mile in size unless otherwise approved by VDOT due to proximity to existing moderate to high density developments. A small area plan shall include the following: (i) densities of at least four residential units per acre and at least a floor area ratio of 0.4 or some proportional combination thereof; (ii) mixed-use neighborhoods, including mixed housing types and integration of residential, office, and retail development; (iii) reduction of front and side yard building setbacks; and (iv) pedestrian-friendly road design and connectivity of road and pedestrian networks.

Street, Private: Where permitted, a privately maintained roadway street designed to provide access to a private property or within a private development.

Street, Public: A roadway which has been or is intended to be dedicated for public use, and which has been accepted or is intended to be accepted into the State system.

String Line: A nylon line usually strung tightly between supports to indicate both direction and elevation, used in checking grades or deviations in slopes or rises.

Traffic Impact Study (TIS): A study which provides information on the impacts of vehicle and multimodal trips generated from the proposed land uses on traffic safety operation within a designated area and provides recommended solutions to mitigate the impacts.

~~Traffic Study: A study conducted to assess the impact of traffic generated by a new use or change in use on existing or future road network, and to obtain the required information in evaluating any potential road network improvements.~~

Transit-Oriented Development (TOD): ~~A pattern of development that brings compact, mixed-use development within walking distance of transit. TOD features vibrant streetscapes, pedestrian-oriented built forms, and land use characteristics that make it convenient and safe to walk, cycle, and use public transport.~~

Travelways: A direction path primarily used for vehicular movement that is designed to provide access to parking bays and/or adjacent parking spaces and to and from privately maintained properties, commercial, industrial single family attached and multifamily developments, whether or not in an easement or built to design standards. They are considered as private streets and are not intended for acceptance into publicly maintained roadway systems.

Use Group: The classification of a building or structure based on the purpose for which it is used, as listed in the Virginia Uniform Statewide Building Code.

Vaswani Method: The Vaswani Method was developed for use on all new asphalt pavement designs as well as overlay of asphalt pavements. This method is used for low-volume secondary and subdivision roads as detailed in the [Pavement Design Guide for Subdivision and Secondary Roads in Virginia](#).

600.02. Acronyms and Abbreviations

AASHTO – American Association of State Highway and Transportation Officials

ASTM – American Society for Testing Materials

BRT – Bus Rapid Transit

DRPT – Virginia Department of Rail and Public Transit

FHWA – Federal Highway Administration

ITE – Institute of Transportation Engineers
LOS – Level of Service
MUTCD – Manual on Uniform Traffic Control Devices
NACTO – National Association of City Transportation Officials
PROWAG – Public Right-of-Way Accessibility Guidelines
ROW – Right of Way
SRTP – Safe Routes to Parks
SRTS – Safe Routes to School
TDM – Travel Demand Model
TIS– Traffic Impact Study
TOD – Transit-oriented Development
UCS – Urban Center Streets
VDOT – Virginia Department of Transportation
VMT – Vehicle Miles Traveled
VPD – Vehicles Per Day
VPH – Vehicles Per Hour
VUSBC – Virginia Uniform Statewide Building Code

600.03. Purpose

- A. This manual provides guidance for the planning and construction of context-sensitive streets that provide a wide range of mobility options for all users of the street network. The document is intended to provide a detailed overview of all transportation-related regulations and guidelines within Prince William County (PWC) and has been updated to address specific goals detailed within the [Mobility](#), [Land Use](#), and [Housing](#) chapters of the [Prince William County 2040 Comprehensive Plan](#). The PWC 2040 Comprehensive Plan acknowledges that “it is not possible to address congestion through road investments alone” in order to achieve the Strategic Plan Mobility Goal of “an accessible, comprehensive, multimodal network of transportation infrastructure that supports local and regional mobility.” The Mobility Plan recommends an examination of the criteria used to evaluate the design of streets in order to address the needs of people walking, biking, using transit, making deliveries, and driving while maximizing safety, connectivity, and network capacity.
- B. **(601.01.A)** The provisions of this section shall apply to all street design and construction in the County. These standards are intended to provide consistency across development with flexibility for specific conditions and contextual design. ~~The standard waiver process may be utilized to provide special accommodations due to topography, sight distance, constructability, environmental, or other site restrictions with the approval of the Director of Transportation. Where no specific roadway construction, design standard, or specification is set forth in this manual, the provisions of the Virginia Department of Transportation (VDOT) Road and Bridge Standards, Secondary Street Acceptance Requirements, Minimum Standards for Entrances to State Highways, Road Design Manual, A Policy on Geometric Design of Highway and Streets, the Manual on Uniform Traffic Control Devices 11th Edition, and the Virginia Supplement to the Manual on Uniform Traffic Control Devices shall be used.~~

- C. (601.01.B) PWC and the surrounding Northern Virginia area ~~has been~~ is designated as an urban area by VDOT subdivision standards and all streets shall be designed as specified in this manual or by VDOT standards, whichever is more stringent. VDOT requirements may be permitted by the Director of Transportation on a case-by-case review when site limitations do not allow for meeting the PWC standard. Any development within VDOT ROW requires VDOT coordination and approval.
- D. Streets are the most prominent form of public space within the built environment and as such should be designed and constructed to the highest standard of safety for all road users possible while and maximizing equitable multimodal options for users of all ages and abilities. The existing character of rural areas can be improved through standards and practices that maintain unpaved streets, improve stormwater management, and preserve the natural topography, vegetation, and landscape across PWC.
- E. Safety for all road users shall be foundational in the design of all streets, including consideration for pedestrians, cyclists, and transit users. The highest-level multimodal accommodations shall be provided as described in *Section 602.00. PLANNING AND DESIGN*. ~~All urban streets shall provide a minimum five (5) foot sidewalk along one side of the street and ten (10) foot shared-use path along the other side of the street, or five (5) foot sidewalks along both sides of the street with bicycle infrastructure such as bike lanes or buffered bike lanes. Mid-block crossings shall be installed where there is a significant pedestrian desire line. Frequent applications include mid-block bus stops, transit/rail stations, schools, parks, plazas, and building entrances.~~
- F. While there are obvious constraints associated with redesign and reconstruction of existing streets, such as limited right of way, it is critical to leverage the existing street and transit network to support future growth within the County and limit additional lane miles and urban sprawl. New street construction may more easily accommodate multimodal transportation options but comes with increased liabilities, including future maintenance costs and additional public investments in expanded services and amenities. These costs are best managed when new streets are constructed to enhance connectivity between neighborhoods, transit, employment centers, and commercial districts.
- G. Traditional street design can be thought of as an “inside to outside” process, in which the priority is placed on maximizing travel lanes for vehicles within the road cross section then, allocating the remaining space along the edge for pedestrians, bikes, and transit. This method evaluates the capacity and functionality of the street by prioritizing a high vehicular Level of Service, in which vehicle delay is limited at the expense of other road users. AThe modern approach to design employed throughout this manual can be thought of as an “outside to inside” process in which streets are constructed in a contextual manner with regard to the overall transportation network and surrounding land use, and certain corridors prioritize walkability and transit access over high vehicle speeds or vehicular volume. The existing character of an area and planned land use shall be considered during design, as detailed in *601.02. Context Classification*.

H. The street network is to provide continuous connectivity for all users. Interconnected streets reduce overall VMT and improve emergency response times by dispersing trips across parallel corridors and limiting bottlenecks associated with funneling vehicles through hierarchical networks. Permanent cul-de-sac streets should be avoided as they inherently reduce connectivity to the broader street network, increase vehicle miles traveled, and require additional pavement surface for emergency vehicle access and turnarounds. In cases where permanent cul-de-sac streets are approved, sidewalks, on-street bicycle facilities, shared use paths, or trails should be provided for direct pedestrian and cyclist connectivity to the surrounding street network.

601.00. ROADWAY CLASSIFICATION

601.00.01. General

- A. Functional classification is a hierarchical system that defines the role a street is intended to serve within the overall street network. Classifications are primarily based on a street's balance between moving traffic and providing property access, without consideration for surrounding land use or neighborhood context.
- B. This [policy manual](#) incorporates a comprehensive framework for geometric design based upon:
1. A functional classification system that characterizes roadways by their position in the transportation network and the type of service they provide to motor vehicles, as described in *Section 601.01. Functional Classification*.
 2. A context classification system that characterizes roadways by their surrounding environment and how the roadway fits into the community, as described in *Section 601.02. Context Classification*.
- C. Together, the functional and context classification of a roadway are used to provide general information and guidance for the character of a roadway at any given location. Classification schemes in and of themselves are rarely adequate as a design tool for the diversity of situations to be encountered on city streets, and each street must be designed on a case-by-case basis with facilities that balance safety, neighborhood context, multimodal accommodations, and capacity.
- D. [Functional classifications and associated details represent typical applications and are subject to direction by the County based on the specific roadway, context, and the \[Prince William County Comprehensive Plan\]\(#\).](#)

601.01. Functional Classification

601.01.01. Interstates

- A. [The design and maintenance of interstates is a VDOT function.](#) For interstate design refer to [VDOT Road Design Manual Appendix A1](#), Standard GS-INT. For associated interchange ramps please refer to [VDOT Road Design Manual Appendix A1](#) Standard GS-R.

601.01.02. Arterials

- A. [\(601.02.D\)](#) Arterial streets are intended to convey major movement of traffic within or throughout the County. They connect the principal traffic generators within the County and provide direct access to individual abutting parcels in extremely rare instances.

- B. (601.02.2) Parkways: Serve intra- and intercounty traffic and provide important connections to the surrounding region. Parkways prioritize the travel of major traffic movements by limiting land access to designated intersections rather than curb cuts, travelways, and entrances. Parkways are designed as a scenic linear park containing a wide vegetated median with landscaped plantings that define and enhance the aesthetics of the roadway. In rural areas, parkways may contain woodland conservation areas along each side. Parkways typically contain 4-6 travel lanes, turn lanes, shoulders, and drainage ditches. Parkways may contain guardrail and curb and gutter. Pedestrians and cyclists are accommodated via a shared use path along at least one side of the road and sidewalks or shared use path along both the other sides of the road, with wide buffers to provide separation from high-speed traffic. Refer to Detail 650.13 for specific design criteria.
- C. (601.02.D.3) Urban Principal Arterials: Serve as primary routes for intra- and intercounty traffic, carrying a high proportion of total urban travel even though they compose a small portion of the overall road network. Urban principal arterials differ from rural principal arterials mainly through their need to balance mobility against the need to provide direct access. Urban principal arterials typically contain four to six (4-6) travel lanes, turn lanes, median, curb/gutter, landscaped buffers, and sidewalks or shared use paths. Urban principal arterials often serve high volumes of pedestrians, bicyclists, and important intercity and regional transit service. Bicycle and transit accommodations shall be incorporated as detailed in the Countywide Trails Map, Transit Connectivity Map, and Future Transit Alternatives Map. Bicycle facilities along urban principal arterials should prioritize grade-separated/curb-separated bicycle facilities and shared use paths due to high vehicle traffic volumes and travel speeds. Urban major-principal arterials can create barriers for multimodal users and should include appropriate traffic calming elements at intersections and mid-block crossings. Pedestrian bridges and mid-block crossings may be warranted when intersections are spaced further than six hundred (600) feet apart and at locations with high volumes of pedestrians, cyclists, or transit users. Urban principal arterial streets require a flexible design approach in which vehicle lanes remain a high priority, though not at the expense of multimodal traffic safety or community context. Slower design speeds and reduced vehicle LOS may be necessary to accommodate all road users along urban principal arterials. This is comparable to VDOT GS-5 Urban Principal Arterial System. Refer to Detail 650.12 for specific design criteria.
- D. (601.02.D.3) Rural Principal Arterials: Serve as primary routes outside of urban areas and frequently pass through built-up areas and small towns or villages. Rural principal arterials facilitate intercounty, statewide, and interstate travel. Rural principal arterials differ from urban principal arterials mainly through higher vehicle speeds and reduced conflict points. Rural principal arterials typically contain two to four (2-4) travel lanes and may include a median, center swale, curb/gutter, or drainage ditches. Rural principal arterials should include sidewalks and typically accommodate bicyclists through shared use paths and buffered/separated bike lanes but may also utilize bike lanes and paved shoulders where appropriate. This is comparable to VDOT GS-1 Rural Principal Arterial System. Refer to Detail 650.13 for specific design criteria.

- E. (601.02.D.1) **Urban Minor Arterials:** Primarily provide increased land access, multimodal accommodation, and conformance to neighborhood context as compared to urban **major principal** arterials. Urban minor arterials typically contain four to six (4-6) travel lanes, medians, curb/gutter, landscaped buffers, and sidewalks or shared use paths. Urban minor arterial streets typically do not penetrate identifiable neighborhoods. When urban minor arterials do penetrate neighborhoods, these streets should be designed such that they do not create safety hazards or barriers for pedestrians and cyclists. Urban minor arterials are often used as the spine for regional bicycle networks due to reduced vehicle traffic volumes and slower vehicle travel speeds as compared to urban major arterials. Bicycle and transit accommodations shall be incorporated as detailed in the [Countywide Trails Map](#), [Transit Connectivity Map](#), and [Future Transit Alternatives Map](#). Separated bicycle facilities such as buffered bicycle lanes or physically separated bicycle lanes should be prioritized over standard bicycle lanes and shared lanes, with appropriate transitions through auxiliary/turn lanes at intersections. Urban minor arterials can create barriers for multimodal road users and should include appropriate traffic calming elements at intersections and crossings. Mid-block crossings may be warranted when intersections are spaced further than six hundred (600) feet apart and at locations with high volumes of pedestrians, cyclists, or transit users. This is comparable to VDOT GS-6 Urban Minor Arterial Street System. [Refer to Detail 650.11 for specific design criteria.](#)
- F. (601.02.D.1) **Rural Minor Arterials:** Typically contain two (2) lanes, shoulders, wide landscaped buffers, and drainage ditches that can accommodate an additional travel lane or future curb and gutter. Rural minor arterials may include a median. Rural minor arterials should include sidewalks on both sides of the street or a shared use path along just one side of the street. Bicyclists may also be accommodated through buffered bicycle lanes, standard bicycle lanes, or wide paved shoulders. Rural minor arterials differ from urban minor arterials mainly through increased mobility and higher design speeds, factors which impact the facility type when including dedicated pedestrian and/or bicycle accommodations. This is comparable to VDOT GS-2 Rural Minor Arterial System. [Refer to Detail 650.10 for specific design criteria.](#)

601.01.03. Collectors

- A. **(601.02.B) and (601.02.C) Urban Collectors:** Serve community traffic and provide direct land access within residential, commercial, and industrial areas. Urban collectors typically contain two to four (2-4) lanes, medians, curb/gutter, landscaped buffers, sidewalks/shared use paths, and may contain on-street parking. Urban collectors with two (2) lanes may consider a two-way left turn lane (TWLTL) instead of a median in areas with a high density of existing driveways. TWLTLs should include intermittent landscaped islands or concrete medians to prevent the lane from being used as a through lane or passing lane. TWLTLs shall not be used on 4 lane collector streets. Urban collector streets may have narrower lanes than arterial streets but should still accommodate transit vehicles along existing and potential transit corridors as shown in the [Transit Connectivity Map](#) and [Future Transit Alternatives Map](#). Urban collectors often function as the spine and/or spurs for regional and local bicycle networks due to their connectivity to both local and arterial streets, reduced vehicle traffic volumes, and slower vehicle travel speeds as compared to arterial streets. Dedicated bicycle facilities such as physically separated bicycle lanes, buffered bicycle lanes, or standard bicycle lanes shall be included with appropriate transitions through auxiliary/turn lanes at intersections. Urban collectors should include traffic calming elements at intersections and crossings. Mid-block crossings may be warranted when intersections are spaced more than six hundred (600) feet apart and at locations with high volumes of pedestrians, cyclists, or transit users. This is comparable to VDOT GS-7 Urban Collector Street System. [Refer to Detail 650.09 for specific design criteria.](#)
- B. **(601.02.B) and (601.02.C) Rural Collectors:** Primarily serve intra-county travel by linking local traffic generators through increased land access. Rural collector streets differ from urban collector streets in that they do not typically include medians or on-street parking. Rural collector streets may include intermittent two-way left turn lanes (TWLTL) in areas with a high density of driveways. Rural collector streets should include sidewalks on both sides of the street or a shared use path along just one side of the street. Bicycles may be accommodated through shared use paths, bicycle lanes, or paved shoulders. Mid-block crossings may be warranted when intersections are spaced more than six hundred (600) feet apart. This is comparable to VDOT GS-3 Rural Collector Road System. [Refer to Detail 650.10 for specific design criteria.](#)

601.01.04. Local Streets

- A. **(601.02.A) Urban Local:** Provide the highest level of land access within the transportation network and support lower levels of vehicle traffic than collector streets. Urban local streets typically serve frequent bicycle and pedestrian movements and may also serve transit in higher-density areas. Urban local streets typically include landscaped buffers, curb/gutter, sidewalks, and on-street parking. Bicycles may be accommodated via dedicated bike lanes or shared lane markings. On-street parking, if provided, may be along one or both sides of the street. Urban local streets shall be designed to a maximum of twenty five (25) mph and include appropriate traffic calming elements such that they do not impede emergency access and delivery vehicle operations. This is comparable to VDOT GS-8 Urban Local Road System. [Refer to Details 650.04 – 650.08 for specific design criteria.](#)

- B. **(601.02.A) Rural Local**: Provide direct land access to abutting parcels, serve bicycle and pedestrian movements, and in rare cases provide local transit service. Rural local streets typically include paved shoulders, drainage ditches, sidewalks, and on-street parking. Bicyclists may be accommodated via dedicated bicycle lanes, shared lanes, and paved shoulders. On-street parking, if provided, may be along one or both sides of the street. Rural local streets shall be designed to a maximum of twenty five (25) mph and include appropriate traffic calming elements such that they do not impede emergency access and delivery vehicle operations. This is comparable to VDOT GS-4 Rural Local Street System. [Refer to Details 650.02 and 650.03 for specific design criteria.](#)
- C. **Low Volume Unpaved Streets (LVUS)**: Primarily serve local, familiar traffic at volumes below two hundred fifty (250) VPD, including both local and rural street types: access roads, agricultural roads, rural and scenic roads, and residential roads. LVUS may be paved or gravel, may not serve through traffic, and may frequently be used by trucks, service vehicles, or oversized farm equipment. The geometric design of very low-volume local roads presents a unique challenge because the traffic volumes and reduced frequency of crashes make designs normally applied on higher volumes less cost effective. Very low-volume roads should avoid widening of lanes and shoulders, changes in horizontal and vertical alignment, and roadside improvements except in situations where such improvements are likely to provide substantial safety benefits. These guidelines are less likely to negatively impact the environment, roadway and roadside aesthetics, existing development, historic and archaeological sites, and endangered species.

601.01.05. Urban Center Streets

- A. **(601.02.E) Urban Center Streets (UCS)** are designed to accommodate multimodal travel for all road users in areas of high-density development or targeted growth, as identified in a Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center as shown on the [Comprehensive Plan Long Range Land Use Map](#) and [Comprehensive Plan Future Transit Alternatives Map](#). Urban Center Streets are typically designed to prioritize pedestrian, cyclist, transit, and delivery/curbside vehicles over the through movement of private vehicles (with the exception of the Through Boulevard) and often contain wider sidewalks, dedicated bicycle facilities, on-street parking areas, transit stops, and traffic calming elements. Urban Center Streets do not have a comparable VDOT Geometric Standard [and will not be maintained by VDOT.](#)
- B. **(601.02.E.1) Through Boulevards**: UCS that prioritizes high vehicle throughput and accommodate high capacity transit through dedicated transit lanes, pull-out transit stops with shelters, and/or signal prioritization. On-street vehicle parking is prohibited. Physically separated, buffered bicycle facilities, and shared use paths are used to increase cyclist comfort and overall road safety. Pedestrian and bicycle facilities are typically lined with shade trees to increase comfort and aesthetics, reduce the urban heat island effect associated with wide roadways, and promote slower vehicle speeds. Through Boulevards typically contain four (4) lanes, an average ROW of one hundred one (101) feet, and a maximum design speed of forty five (45) mph. A design speed between twenty five (25) mph and thirty five (35) mph is often more appropriate, particularly in areas with major destinations, high multimodal activity, and near residential developments, schools, parks, and transitions to lower street classifications. Through Boulevards include a landscaped or tree-lined median with regularly spaced crossings and pedestrian refuges. [Refer to Detail 650.14 for specific design criteria.](#)

- C. **(601.02.E.2) Boulevards:** UCS with the highest density of destinations and street activity. Transit and multimodal travel are prioritized, oftentimes through exchanging a general purpose travel lane or on-street parking with dedicated transit lanes and/or shared bicycle/transit lanes. On-street parking is permitted and provided between general travel lanes and bicycle lanes such that parked vehicles serve as a physical barrier to separate moving vehicles from cyclists and to reduce instances of vehicle occupants opening a door into the path of a bicyclist along the driver's side of parked vehicles. On-street cyclists are common and accommodated via buffered bike lanes, dedicated bike lanes, or shared lanes. This further increases the utility of transit and reduces conflict points along the sidewalk where pedestrians often gather, such as building entrances and transit stops. Pedestrian and bicycle facilities are typically lined with shade trees to increase comfort and aesthetics, reduce the urban heat island effect associated with wide roadways, and promote slower vehicle speeds. Boulevards typically contain two lanes (but may include additional transit lanes), an average ROW of seventy seven (77) feet, and a maximum design speed of thirty (30) mph. Design speeds between twenty (20) mph and twenty five (25) mph may be more appropriate in areas with major destinations, high multimodal activity, and near residential development, schools, parks, and transitions to lower street classifications. Boulevards may include a landscaped or tree-lined median with regularly spaced mid-block crossings and pedestrian refuges. Mid-block crossings may be warranted when intersections are spaced more than six hundred (600) feet apart. [Refer to Detail 650.15 for specific design criteria.](#)
- D. **(601.02.E.3) Avenues:** UCS that serves as an intermediary facility, connecting higher-level Through Boulevards and Boulevards (as well as collector and arterial streets) with lower-level streets. Avenues typically include traffic calming measures that prioritize multimodal travel, reduce vehicle speeds, and discourage high speed cut-through traffic. On-street parking is permitted and provided between general travel lanes and bicycle lanes such that parked vehicles serve as a physical barrier to separate moving vehicles from cyclists and to reduce instances of vehicle occupants opening a door into the path of a bicyclist along the driver's side of parked vehicles. Bicycles are accommodated through shared lanes, dedicated bike lanes, buffered bike lanes, physically separated bicycle lanes, or shared use paths. Pedestrians are accommodated through wide sidewalks or shared use paths. Pedestrian and bicycle facilities are continuously lined with shade trees to increase comfort and aesthetics, reduce the urban heat island effect associated with wide roadways, and promote slower vehicle speeds. Transit is typically in-line with vehicle traffic and transit stops may be in-line or pull-out. Pull-out transit stops can be accommodated through reductions in on-street parking or through shared use of buffered bike lanes. Avenues typically contain two lanes, an average ROW of seventy one (71) feet, and a maximum design speed of twenty five (25) mph. Design speeds between fifteen (15) mph and twenty (20) mph may be more appropriate near residential developments, schools, and parks. Avenues often include a landscaped or tree-lined median with regularly spaced mid-block crossings and pedestrian refuges. Mid-block crossings may be warranted when intersections are spaced more than six hundred (600) feet apart. [Refer to Detail 650.16 for specific design criteria.](#)

- E. (601.02.E.4) **Urban Small Streets:** The lowest-level facility within the UCS system that are intended primarily to serve residential areas with low traffic volumes. Transit operates in-line with traffic and pull-out transit stops are not frequently used. Streets utilize traffic calming measures that accommodate on-street and shared bicycle travel, reduce vehicle speeds, and discourage high speed cut-through traffic. Bicycles are typically accommodated through shared lanes and shared lanes due to low traffic volumes and slow vehicle speeds. Pedestrians are accommodated through sidewalks along both sides of the street. A shared use path may be incorporated along one side of the street to accommodate pedestrians and cyclists. Sidewalks and shared use paths are continuously lined with shade trees to increase comfort and aesthetics, reduce the urban heat island effect associated with wide roadways, and promote slower vehicle speeds. Streets typically contain two lanes, an average ROW of sixty five 65 feet, and a maximum design speed of twenty five (25) mph. Design speeds between fifteen (15) mph and twenty (20) mph may be more appropriate near residential developments, schools, and parks. [Refer to Detail 650.16 for specific design criteria.](#)
- F. (601.02.E.5) **Private Side Streets:** UCS within residential areas that include on-street parking. Private Side Streets typically contain two lanes, an average ROW of fifty one (51) feet, a maximum design speed of twenty (20) mph, and may contain continuous planted buffers or intermittent landscaped median islands. Private Side Streets will not be maintained by VDOT. [Refer to Detail 650.17 for specific design criteria.](#)
- G. (601.02.E.6) **Private Alleys:** UCS that are intended to serve the rear of properties by providing access to parking and service areas as well as to provide an easement for utilities. Private Alleys typically contain two lanes, an average ROW of twenty (20) feet, and a maximum design speed of ten (10) mph. Private Alleys will not be maintained by VDOT. [Refer to Detail 650.18 for specific design criteria.](#)

601.02. Context Classification

601.02.01. General

- A. The character of development often varies along a given roadway corridor so a project may include more than one context classification. The portion of the project in each context class shall be designed in a manner appropriate to that class, with appropriate transition as needed. Community context, in accordance with the [Prince William County 2040 Comprehensive Plan](#), should both inform and reinforce speed and accessibility expectations for pedestrians, cyclists, and drivers.

601.02.02. Rural Context Classifications

- A. The Rural Context applies to roads in rural areas that are not within a developed community. These include areas with ~~the lowest~~ development density; relatively few houses or structures; widely dispersed or no residential, commercial, and industrial land uses; and usually large building setbacks. [The rural context includes land uses classified as Rural Communities within the Prince William County Long-Range Land Use Map.](#) The rural context may include undeveloped land, farms, outdoor recreation areas, or low densities of other types of development. Most roads in rural areas fit the rural context and should be designed in a manner similar to past design criteria for rural facilities and with basic accommodations for pedestrians and cyclists.

B. The Rural Town Context applies to roads in rural areas located within developed communities. Rural towns generally have low development densities with diverse land uses (including mixed use development), on-street parking, sidewalks, and small building setbacks. Rural towns include land uses classified as Rural Communities and may include areas classified as Transition Areas. Rural towns may include residential neighborhoods, schools, industrial facilities, and commercial main street business districts, each of which present differing design challenges and differing levels of pedestrian and bicycle activity. The rural town context recognizes that rural highways change character when entering a small town or other rural community. Speed expectations of through travelers change when they enter a rural town, and street design should first meet the needs of the residents of the community and the needs of through travelers. The rural town context differs from the rural context primarily through slower design speeds and the need to provide parking, serve increased pedestrian and cyclist flows, and blend in with the community.

601.02.03. Urban Context Classifications

- A. The Suburban Context applies to roads and streets, typically within the outlying portions of urban areas, with low to medium development density generally between one and four units per acre. The Suburban Context features a mix of land uses including single family residences, some multi-family residential structures, and nonresidential development including mixed town centers, commercial corridors, big box commercial stores, and light industrial development. Building setbacks are varied and parking is mostly provided off-street. The Suburban Context generally has lower development densities and drivers have higher speed expectations than the Urban and Urban Core Contexts. Pedestrians and cyclist volumes are higher than in the Rural Context Classifications but may not be as high as those found in other Urban Context Classifications.
- B. The Urban Context includes medium- and high-density development, mixed land uses, and prominent destinations. On-street parking is more common than in the suburban context and building setbacks are mixed. The Urban Context includes multi-story and low- to medium-rise structures for residential, commercial, and educational uses. The Urban Context includes light industrial and sometimes heavy industrial land use. The Urban Context includes prominent destinations with specialized structures for entertainment including athletic venues, social events, and conference centers. In small- and medium-sized communities the central business district may be more of an Urban Context than an Urban Core Context. Driver speed expectations are generally lower and pedestrian and cyclist volumes may be significantly higher than in suburban areas. The density of transit routes is generally greater in the Urban Context than the Suburban Context, including in-street rail transit or bus rapid transit (BRT) in larger communities and transit terminals in small- and medium-sized communities.

- C. The Urban Core Context includes areas of the highest density and mixed land uses within and among predominantly high-rise structures with small building setbacks. The Urban Core Context is found predominantly in central business districts and adjoining major metropolitan areas. On-street parking is often more limited and time restricted than in the Urban Context. Substantial parking is in multi-level structures attached to or integrated with other structures and the streetscape. Wide sidewalks and dedicated bicycle facilities are present continuously, with pedestrian plazas and multilevel bridges connecting commercial and parking structures or crossing major roads. Transit corridors, including bus and rail transit, are typically common and major transit terminals may be present. The area is accessible to commercial delivery vehicles, curbside pickup, and automobiles. Some government services are available, while other commercial uses predominate, including financial and legal services. Residences are often apartments or condominiums. Driver speed expectations are low and pedestrian and cyclist volumes are highest within the Urban Core Context.
- D. Town Centers, Activity Centers, and Small Area Plan Contexts are areas that are planned with specific density and multimodal facilities to address PWC's Strategic Plan Goals. These areas are defined by mixed use town centers, increased private sector investment, and improved transportation infrastructure. These areas typically utilize the Urban County Street Functional Classifications.

602.00. PLANNING AND DESIGN

602.01. General

- A. (601.03) When a development abuts one side of a state-maintained street(s), the developer shall be responsible for right of way dedication, grading, surfacing, and drainage along such street(s) as may be deemed necessary by the Director of Transportation or VDOT and, to the extent commensurate with the additional traffic generated, to provide safe access to the development. The new street section shall contain all roadway elements including travelways, buffers, pedestrian facilities, bike facilities, and transit facilities. The development should also provide the dedication of sufficient right of way and the construction of a half section improvement of the street(s) for its entire frontage, including all roadway elements, to conform to the design standard for that street(s) as shown in the [Prince William County 2040 Comprehensive Plan Roadway Plan Map](#), County approved functional plans, six year secondary road plans as approved by the Board of County Supervisors, centerline studies, engineering plans, and the appropriate standards of this manual. The area dedicated for future roadway improvements may be used, provided it is not for the purpose of satisfying minimum requirements of the DCSM or Zoning Ordinance (i.e., parking storage, etc.). The placement of utilities within the dedicated area will be allowed when they are consistent with the ultimate roadway construction. If the dedicated area is used for any other purpose other than roadway construction, the developer shall escrow funds for the removal of any improvements not consistent with the planned roadway construction.

- B. The standard waiver process may be utilized to provide special accommodations due to topography, sight distance, constructability, environmental, or other site restrictions with the approval of the Director of Transportation (this is separate from the VDOT waiver process). Where no specific roadway construction, design standard, or specification is set forth in this manual, the provisions of the Virginia Department of Transportation (VDOT) Road and Bridge Standards, Secondary Street Acceptance Requirements, Minimum Standards for Entrances to State Highways, Road Design Manual, A Policy on Geometric Design of Highway and Streets, the Manual on Uniform Traffic Control Devices 11th Edition, and the Virginia Supplement to the Manual on Uniform Traffic Control Devices shall be used.
- C. All urban streets shall provide a minimum five (5) foot sidewalk along one side of the street and ten (10) foot shared use path along the other side of the street, or five (5) foot sidewalks along both sides of the street with bicycle infrastructure such as bike lanes or buffered bike lanes. Mid-block crossings shall be installed where there is a significant pedestrian desire line. Frequent applications include mid-block bus stops, transit/rail stations, schools, parks, plazas, and building entrances.

602.02. Design Speed

- A. (602.04.A) Design speeds are used to determine the geometric design of streets ~~to and accommodate safe operation of vehicles to address sight distance requirements for all streets, travelways, access points, and commercial entrances~~ regarding community context, surrounding land use, and multimodal considerations for multimodal users. Design speeds determine the maximum safe speed for a vehicle to travel when conditions permit design features to govern and should be selected to attain an appropriate balance of safety, multimodal mobility, and efficiency within the constraints of environmental quality, economics, aesthetics, and social or political impacts.

(602.04.B) ~~The minimum design speed for new streets shall be based on the projected average daily trips (ADT) as shown in Table 6-2.~~
- B. Design speed shall be based on the functional classification of a street and in accordance with [MUTCD Chapter 2B.21](#). New construction, retrofit, and reconstruction projects should incorporate appropriate traffic calming and geometric design elements to ensure safe vehicle speeds in compliance with the design speed. Retrofit and reconstruction projects shall consider the factors within [MUTCD Chapter 2B.21](#) in determining design speed. Previous speed studies should be examined to assess if the 85th-percentile has consistently increased and retrofit/reconstruction projects should incorporate appropriate traffic calming and geometric design elements to ensure safe vehicle speeds.
- C. Roads with posted speeds of forty-five (45) mph or less shall utilize a design speed that is equal to the posted speed. Roads with posted speeds of fifty (50) mph or greater shall utilize a design speed that is at least five (5) mph higher than the posted speed.
- D. Low-volume roadways with fewer than two thousand (2,000) ADT shall be designed with a minimum design speed of twenty ~~five (205)~~ mph. Lower design speeds (and street widths) may be utilized provided they are designed in accordance with the AASHTO's *A Policy on Geometric Design of Highways and Streets* or *Guidelines for Geometric Design of Low-Volume Roads*. Design should be coordinated with VDOT if this alternative criteria is being used.
- E. An engineering speed study sealed and signed by a licensed professional engineer, using VDOT's standard speed study report, must be provided by the developer and approved by VDOT for any roads posted at other than the statutory speed limit and planned for acceptance into the state system.

602.03. Level of Service (LOS)

- A. Level of Service (LOS) is a benchmark used to describe the operation of roadways, based on traffic density, and intersections, based on delay (refer to Transportation Research Board's *Highway Capacity Manual* for additional information). VDOT, FHWA, and the County use LOS as a benchmark for the success of regional and local transportation roadway networks. The fundamental reason that state and local governments plan new or widen existing roads is to improve LOS during the peak hours, which creates roads that are typically underutilized the rest of the day. LOS does not account for the impacts of people walking, biking, and/or riding transit, focusing solely on impacts to drivers and undermining value-aligned goals including safety, access, sustainability, and resilience.
- B. While congestion is a considerable problem, the County recognizes that it is not possible to address congestion through road investments alone. New developments should address traffic impacts to maintain LOS E or better for roadways and intersections currently operating at or above LOS E, and not deteriorate roadways and intersections currently operating below LOS E as detailed in [Prince William County Mobility Plan Appendix A](#).
- C. It is expected that the LOS will be "E" within the limits of Small Area Plans, Activity Centers, and Redevelopment Corridors (as shown on the [Prince William County Long-Range Land Use Map](#)); MultiModal Hub and Transit District or Center (as shown on the [Prince William County 2040 Comprehensive Plan Transit Connectivity Map](#)); and streets classified as Principal Arterial or Minor Arterial (as shown on the [Prince William County 2040 Comprehensive Plan Roadway Plan Map](#)).

602.04. Street Grade and Layout

- A. (602.09.A) The minimum grade for streets with curb and gutter shall be five tenths of a percent (0.5%). The minimum grade for streets without curb and gutter shall be one percent (1%). The maximum street grade shall be as specified in the standards for each typical section.
- B. (602.09.C) Design of reverse and compound centerline curves on roadways functionally classified as collector and above shall conform to minimum standard requirements of AASHTO's *A Policy on Geometric Design of Highways and Streets*.
- C. (602.09.E) Loop or through roads shall have a standard typical cross section ~~throughout their entire length~~ that is consistent with the Context Classification along a particular road segment including appropriate transitions at intersections and between changes in lane widths, on-street bicycle facilities, and sidewalks or shared use paths.
- D. Where lanes of unequal width are used, locating the wider lane on the outside (right) provides more space for larger vehicles that usually occupy that lane, can better accommodate in-lane transit stops, provides more space for bicycles in shared lanes, and allows drivers to keep their vehicles at a greater distance from the right edge. The widths needed for all lanes and intersection design controls should be evaluated collectively with consideration of all user modes and the adjacent land use. A wider right lane may be attained by providing a narrower left turn lane.
- E. (602.09.F) Lengths of horizontal centerline curves shall be in accordance with VDOT standards. The minimum allowed arc length shall not be less than one hundred (100) feet.

- F. (602.09.G) Sharp centerline curves such as ninety (90) degree bends shall should be avoided in the design of roadways. If unavoidable due to natural terrain, vegetation, or density of mature trees, the centerline radius shall be increased to the extent possible to achieve a roadway cross section that can accommodate two-way traffic of emergency vehicles with consideration of parallel parking along it. If emergency vehicle movements cannot be adequately achieved, on-street parking shall be restricted and replaced with appropriate mountable/navigable traffic calming elements such as curb extensions, truck aprons, striping, etc.
- G. (602.09.H) The design of intersections on horizontal curves should generally be avoided along roadways classified as Category VI (4,000 VPD ~~– 7,000 VPD per Detail 650.04~~). If used, these intersections shall be designed in accordance with Section 602.12.06. *Sight Distance*.

602.05. Privately Maintained Travelways and Parking Lots

- A. (602.14.A) Privately maintained travelways, where permitted, with traffic counts up to one thousand (1,000) VPD shall be designed and constructed in accordance with Detail 650.06 of this manual.
- B. (602.14.B) Main travelways carrying greater than ~~six hundred (600)~~ one thousand (1,000) VPD shall not have direct access from parking spaces, except travelways serving parking bays in office, commercial, and industrial developments.
- C. (602.14.C) Entrances and travelways into commercial and industrial development may carry greater than one thousand (1,000) VPD, provided that these entrances and travelways are designed with appropriate pavement width, pavement categories, channelization, and controlled access based on the projected traffic counts and movements.
- D. (602.14.D) Travelways and parking areas permitted in industrial, institutional, office, commercial, multifamily, and single family attached developments shall be designed and constructed in accordance with Detail 650.06 of this manual.
- E. (602.14.E) In planned mixed residential districts such as PMR, RPC, and PMD, residential mobile homes (RMH), and single family attached developments where the standard private travel (TS-1) is allowed, the required eight (8) feet wide separation on both sides of the travelway shall be provided throughout the street layout, including along corner lots. The separation width will be measured eight (8) feet from the face of the curb to the property line. All other elements of the travelway such as sidewalk and utility or grass strip shall also be provided.
- F. (602.14.F) Industrial, institutional, office, commercial, multifamily, and single family attached developments which are not located in Urban, Suburban, and Transition areas, as designated by the [Long-Range Land Use Map](#), are required to have curb and/or gutter along all travelways and paved parking areas. Additionally, this requirement applies to developments that access state roadways that have and/or are planned to have curb and gutter. ~~Curb and gutter will not be required if the area drains to a low impact development (LID) that applies integrated management practices (IMP). Curb cuts are also acceptable that drain to a LID.~~ Curb and gutter shall be designed in accordance with Section 602.13.01. *Curb and Gutter*.
- G. (602.14.G) Residential development in Rural Communities as designated by the [Long-Range Land Use Map](#) may have privately maintained streets designed and constructed in accordance with Detail 650.02 of this manual and VDOT requirements.

- H. (602.14.H) ~~A cul-de-sac or appropriate turnaround shall be provided at the end of all privately maintained travelways. Otherwise,~~ Privately maintained travelways should interconnect within the development to provide for adequate emergency vehicular access, reduce VMT, and increase street network connectivity. A cul-de-sac or appropriate turnaround in accordance with *Section 602.09. Driveways and Entrances*, *Section 602.10. Cul-de-sac Streets*, and Detail 650.31 shall be provided when natural terrain, vegetation, or density of mature trees prevents interconnecting travelways.
- I. (602.14.I) Short parking courts, bays, or cul-de-sacs shall be designed in accordance with *Section 602.09. Driveways and Entrances*, *Section 602.10. Cul-de-sac Streets*, and Detail 650.31.
- J. (602.14.J) On gated communities, access control gates and queuing areas when provided on privately maintained travelways shall be designed, installed, and located to accommodate the design vehicle and so as to be acceptable to the Fire Marshal's Office. Access control gates and all appurtenances, facilities, and equipment shall not be allowed on public ROW. An adequate vehicle queuing area ~~must~~shall be provided to prevent spill over or blockage of public roadways. ~~When provided, a separate pedestrian gate exclusive of the vehicle movement area may also be provided.~~ All road users including drivers, pedestrians, and cyclists shall be provided the same level of access to the community. Sidewalks, shared use paths, or pedestrian walkways within a gated community shall connect to similar existing or planned pedestrian and bicycle facilities along the adjacent external public roadway via a separate pedestrian-accessible gate, exclusive of the vehicle movement area. Pedestrian-accessible gates shall provide a minimum five (5) foot clear width.

602.06. Pavement Design

- A. (602.10.A) California Bearing Ratio (CBR) tests are required for streets within single family detached, single family attached, and condominium developments. CBR tests are not required for private streets within multi-family, commercial, office, industrial, or institutional developments. Subbase and/or base thickness is based on a subgrade CBR value of ten (10).
- B. (602.10.B) Final pavement design shall be determined after a CBR test is run to determine the true support values of the various soils in the subgrade. A representative from the Department of Transportation shall be present to verify the locations and minimum numbers of CBR tests required at the time samples are acquired from the subgrade. With the prior approval of the Director of Transportation, instead of a representative being present at the time of sample taking, a licensed engineer may certify that the samples tested were acquired from the same locations as indicated on the test results.
- C. CBR tests shall be spaced a maximum of five hundred (500) feet, at each intersection, and at each change of material within a proposed roadway. For streets between two hundred (200) feet and five hundred (500) feet, at least two (2) soil samples are required. For streets less than two hundred (200) feet in length, one (1) soil sample is required.
- D. (602.10.C) CBR test results shall be submitted in a form provided in the PWC Pre-Construction Manual and certified by a licensed engineer.
- E. (602.10.D) CBR values less than ten (10) shall require redesign by the Vaswani Method.
- F. (602.10.E) All pavement designs for streets with traffic volume exceeding one thousand (1,000) VPD shall provide 21B, Type I aggregate as subbase or base material. This will necessitate the use of UD-4 underdrains in the design.

602.07. Alternative Pavement Design

(602.11) When using alternative equivalent pavement design as a result of the CBR tested references in *Section 602.06. Pavement Design* of this manual, the following minimum and maximum thickness of layers shall apply:

- A. (602.11.A) Six (6) inches shall be the minimum thickness of the aggregate layer used as the base in a one- or two-layer system.
- B. (602.11.B) Four (4) inches shall be the minimum thickness of the aggregate layer used as the subbase.
- C. (602.11.C) The minimum thickness of the bituminous concrete base layer for BM-25.0A shall be three (3) inches.
- D. (602.11.D) One and one-half (1.5) inches shall be the minimum thickness of the bituminous concrete surface lift (SM9.5A or SM-9.5D) used on top of the bituminous concrete base layer (BM-25.0A) or binder (IM-19.0A).
- E. (602.11.E) Two (2) inches shall be the minimum thickness of the bituminous or concrete surface layer (SM-9.5A or SM-9.5D) used on top of aggregate material (treated or untreated).
- F. (602.11.F) Six (6) inches shall be the minimum thickness of the stabilized soil layer (cement, lime, etc.).
- G. (602.11.G) Two (2) inches shall be the maximum thickness of the bituminous concrete surface (SM-9.5A or SM-9.5D) for one lift.
- H. (602.11.H) For staged construction, two and one-half (2.5) inches shall be the maximum thickness of the bituminous concrete surface (SM-9.5A or SM-9.5D). The thickness of each lift shall be of one and one quarter (1.25) inches.
- I. (602.11.I) If staged construction is performed, a four (4) foot radius area, measured from the center of the manhole cover around protruding utility manholes, shall be paved with leveling asphalt concrete surface mix (SM-9.5A) to provide a relatively smooth riding surface. In addition, the asphalt concrete paved peripheries shall be painted with twelve (12) inch wide white paint acceptable to County inspectors. The maximum exposure limit for staged construction shall be two (2) years, unless it is extended by the Director of Transportation.
- J. (602.11.J) One-half (0.5) integrals shall be utilized for aggregate materials (i.e., eight (8) inches or eight and one-half (8.5) inches, but not eight and one quarter (8.25) inches.
- K. (602.11.K) Eight (8) inches shall be the maximum thickness of the aggregate base or subbase material. If eight (8) inches is exceeded, a bituminous material (BM-25.0A) shall be substituted.
- L. (602.11.L) When bituminous concrete base is equal to or exceeds three (3) inches, the underlying material shall be considered subbase.
- M. (602.11.M) As long as the total bituminous concrete thickness does not exceed four (4) inches, the first eight (8) inches of the underlying material may use the thickness equivalency value for the base. The remaining depth shall use the subbase value.
- N. (602.11.N) Six (6) inches shall be the maximum thickness of the aggregate layer used over soil cement or cement treatment aggregate.
- O. (602.11.O) Six (6) inches shall be the minimum thickness of cement treated aggregate placed directly on untreated subgrade.

602.08. Privately Maintained Travelway Pavement Design

- A. (602.15) Travelways maintained by associations/owners for commercial development shall be designed in accordance with the following:
1. (602.15.A.1) Travelways and parking areas for commercial and office developments shall have at a minimum a six (6) inch base and a one and one-half (1-1/2) inch bituminous surface to ensure a dustless surface.
 2. (602.15.A.2) CBR tests shall not be required. The methods and materials used in the construction of these facilities shall conform to the current VDOT road and bridge specifications, or the standards specified in this manual.
- B. (602.15.B.) Association/owner maintained travelways for residential development shall be designed in accordance with the following:
1. (602.15.B.1) Parking areas shall have, at a minimum, a six (6) inch base and two (2) inch bituminous surface. The curb and gutter shall have a minimum of four (4) inches aggregate base material, which will extend ~~six (6)~~ twelve (12) inches behind the back of curb. CBR tests are required.
 2. (602.15.B.2) Privately maintained travelways shall have pavement sections that conform to Detail ~~650-06~~ 650.01 of this manual.

~~(602.18.E) If subgrade CBR is ten (10) or greater, no additional subbase shall be required. Alternate pavement design may be substituted with the approval of the Director of Transportation, when designed by the Vaswani method.~~

602.09. Driveways and Entrances

602.09.01. General

- A. (602.07.J) A standard CG-11 entrance shall be used for commercial and residential street intersections and commercial entrances.
- B. (602.07.P) All entrances, except single family detached driveways carrying less than one thousand (1,000) VPD, which access a public street, shall incorporate a two percent (2%) landing for a minimum of twenty five (25) feet from the existing edge of pavement.
- C. (602.07.Q) Entrances intended to carry over one thousand (1,000) VPD shall incorporate the use of standard landings in accordance with Detail 650.34.
- D. (602.07.O) In general, standard intersection landings shall be required for all streets with lower traffic counts intersecting with streets carrying a higher volume of traffic in accordance with Detail 650.34. Alternative intersection landing locations may be approved if future traffic movements and intersection conditions justify such alternatives.
- E. All entrance design and construction shall accommodate pedestrian and bicycle users in accordance with VDOT [Policy for Integrating Bicycle and Pedestrian Accommodations](#).
- F. (602.09.D) ~~Except as provided in Section 601.07~~ Single family residential lots shall not access arterials ~~or major collector streets~~. Common driveways designed in accordance with *Section 602.09.03 Common Driveways for Two Lots* may be used along collector streets to minimize curb cuts and reduce conflict points between vehicles, pedestrians, and cyclists.

- G. (602.07.K) For all local and collector streets, a distance of at least one hundred thirty (130) feet shall be maintained between the ends and beginnings (PTCR and PCCR) of curb returns of all commercial entrances (including single family attached and multifamily). For all major collector and higher category streets, a distance of at least two hundred eighty (280) feet shall be maintained between ends and beginnings (PTCR and PCCR) of curb returns of commercial entrances (including entrances for single family attached and multifamily). The separation shall be the same between curb returns of an entrance and a roadway intersection. If the street is a state-maintained road, the spacing shall be in accordance with VDOT [Access Management Standards](#).
- H. (602.15.B.4) A privately maintained travelway serving a multifamily development that intersects with a state-maintained street shall have a standard landing in accordance with Detail 650.34 of this manual.
- I. Single family residences shall not be permitted to install two private driveway entrances to a roadway in order to minimize curb cuts and reduce conflict points between vehicles, pedestrians, and cyclists. Circular driveways and private turnarounds shall be contained within the private property-, except that parcels greater than two (2) acres with a minimum of two hundred (200) feet of frontage may be permitted to install two private driveways with County approval.
- J. (602.07.M) In general, driveway entrances on corner lots shall be located on minor streets or the street where a stop sign is posted and outside of sight distance easements. Single family residences on corner lots shall not be permitted to construct two private driveway entrances or driveways that connect between two roads in order to minimize curb cuts and reduce conflict points between vehicles, pedestrians, and cyclists. Circular driveways and private turnarounds shall be contained within the private property.
- K. A standard VDOT CG-9 entrance shall be used for private driveway entrances on curb and gutter streets. A standard VDOT PE-1 entrance shall be used for private driveway entrances on streets with shoulders and ditches.
- L. (602.07.S) A divided or channelized entrance will be provided for any entrance projected to carry five thousand (5,000) or more VPD in commercial, office or industrial developments. To enhance development aesthetics, the median shall be landscaped such that required sight distances are maintained. Entrances to residential subdivisions that have medians shall be landscaped such that required sight distances are maintained.

602.09.02. Street Access

~~(601.04.A) When the traffic generated from an entire development is projected to exceed two thousand five hundred (2,500) vehicles per day (vpd), the development shall access an existing state street in two locations. If approved by the Director of Transportation, one of the required connections may be made to a street constructed to state standards to be included in the State street system. A VDOT permit shall be required prior to any construction within the state maintained right-of-way.~~

~~(601.04.B) In situations where two (2) access points in accordance with the above cannot be physically made (due to restrictions in topography or sight distance, or due to limitations in state street frontage), a single connection may be allowed where specifically approved by the Director of Transportation, subject to the following conditions:~~

- ~~1. The single access shall be of a four (4) lane divided standard, extending at least three hundred (300) feet into the development for the first two thousand five hundred (2,500) vehicles per day (vpd) generated. For every additional five hundred (500) vehicle trips generated, or portion thereof, the four (4) lane divided street standard shall be extended an additional one hundred (100) feet.~~
- ~~2. Private entrances shall not access a proposed four (4) lane divided street when that street is designed in accordance with Section 601.01B(1). Internal streets and travelways in a development shall access an arterial street where a crossover is permitted.~~

- A. To ensure the connectivity of the road and pedestrian network with the existing and future transportation network, new developments shall provide connectivity between adjacent developments and undeveloped parcels. These direct and alternative routes provide connectivity that can help reduce the burden on major roadways, vehicle miles traveled, and improve emergency response times. Connectivity is defined as connections to an existing publicly maintained street, adjacent property, or stub out that will allow for future street connection to an adjacent property.
- B. All subdivision developments are required to have at least two external connections. Additional connections are required for individual network additions (phases of development) regardless of the size or number of lots within the development. A development with only one ingress and egress point may not be accepted into the state system as it does not meet the overall connectivity standards contained in the [Secondary Street Acceptance Requirements \(SSAR\)](#). The following qualify as acceptable connections between a development and ~~VDOT-state~~ maintained street:
 1. Physical link with an existing street in the VDOT network or other publicly maintained street, such as a road in a Virginia town or city, or
 2. Construction of a stub out for current or future connection, or
 3. Construction of a stub out to a future network addition within the same development.
- C. The SSAR provides flexibility to waive or modify the required second connection under the following circumstances:
 1. The adjoining property is:
 - i. Completely built out with relation to its current land use, and
 - ii. Its state is such that redevelopment within twenty (20) years is unlikely, as determined by the PWC Comprehensive Plan, zoning, and subdivision ordinances, and
 - iii. There is no stub out either constructed or platted adjacent to the network addition
 2. Adjoining property is zoned for a use in which traffic is incompatible with the use of the property being developed. However, in no case shall retail, residential, or office uses be considered incompatible with other retail, residential, or office uses.
 3. There is no reasonable connection possible to any adjoining property or adjacent highways due to a factor outside the control of the developer of the network addition, such as:
 - i. Conservation easements not put in place by the developer of the network addition

- ii. Water features such as rivers, lakes, or jurisdictional wetlands
- iii. Grades in excess of fifteen percent (15%) whose total elevation change is greater than five (5) feet
- iv. Limited access highways
- v. Railroads
- vi. Government property to which access is restricted

D. In addition to the requirement for two connections between a network addition and VDOT state maintained road, network additions shall provide an additional external connection for:

1. Each additional two hundred (200) dwelling units or portion above the initial two hundred (200) dwelling units

- i. For example, network additions with one to two hundred (1-200) dwelling units would require two (2) connections to VDOT state maintained roads, while two hundred one to three hundred ninety nine (201-399) dwelling units would require three (3) connections to VDOT state maintained roads.

2. Two thousand (2,000) VPD or portion over and above

- i. For example, two thousand five hundred (2,500) VPD would require a total of three (3) connections for the network addition

- E. (601.04.C) All single family detached dwelling lots, unless otherwise specified in the Zoning Ordinance, shall have frontage on and access to existing state maintained public streets or streets approved and bonded to be constructed to a standard acceptable for addition to the State Secondary Street system. The amount of frontage shall be established in accordance with the regulations for the zoning district, as provisioned in [Zoning Ordinance Chapter 32](#).
- F. (601.04.D) Commercial, institutional, and industrial lots may be approved for recording without public street frontage provided that lots have an access easement. To assure maintenance of the access easement, an association of owners must be established prior to the approval of any plats or plans. Improvements within the access easement must be sufficient to accommodate the type and volume of traffic anticipated and constructed to the standards.
- G. (601.04.E) Single family attached, multifamily, mobile home, commercial, and industrial development shall have access to a state-maintained street. This access may be via private travelways, provided they meet the appropriate design standards in accordance with Details 650.06, 650.07, and 650.08. An association must be established for the ownership and perpetual maintenance of travelways in a development. Travelways serving residential development shall not carry greater than one thousand (1,000) vehicles per day (VPD).
- H. (601.04.F) Travelways in single family attached and multifamily developments, where the design traffic count exceeds one thousand (1,000) vehicles per day (VPD) shall be designed and constructed in accordance with Detail 650.07 of this manual. These streets do not provide on street parking and are to be utilized only in developments where there is adequate off- street parking in separate parking bays- and no individual unit fronts directly on the street.

- I. (601.04.G) In a residential mobile home (RMH) development, streets with projected vehicle counts greater than ~~four hundred twenty (420)~~ four hundred (400) VPD shall be designed and constructed to a standard acceptable for incorporation into the State Secondary Street system. All streets in an RMH shall be named and signed accordingly to include directional signs to the addresses as well as the units displaying legible address lettering. In addition, all streets shall have appropriate traffic control signs according to the [MUTCD](#).
- J. (601.04.H) Privately maintained travelways shall be platted such that all lot owners are assured perpetual right of- access to a state maintained street. Single family lots approved for suburban cluster standards may be platted with frontage and access consisting of a pipestem driveway where permitted by [Zoning Ordinance Sec. 32-300.61](#). In such cases, the development shall conform to the requirements for pipestem driveways in accordance with *Section 602.09.04. Pipestem Driveways*.
- K. (601.04.I) In commercial, institutional and industrial lots or developments, adequate interparcel travelways shall be required to provide perpetual interparcel access for the movement of vehicles. An easement shall be provided for the interparcel access. The recorded plat shall note the perpetual interparcel access as "privately owned and privately maintained by the lot owner(s)."
- L. (601.07.A) Development along arterial streets shall utilize common driveways and intraparcels connectors to limit the number of properties with direct vehicle ingress or egress to the arterial street, minimize curb cuts, and reduce conflict points between vehicles, pedestrians, and cyclists. The reverse frontage concept, which allows internal public street frontage, ~~is encouraged such that not lot has direct ingress or egress along a major collector, minor arterial, or primary arterial street. If this is not feasible, common driveways and interparcel connectors shall be utilized.~~ may be utilized such that pedestrian and cyclist connectivity to the arterial street and adjacent development is maintained.

~~(601.07.B) Development that cannot be served by common driveways and interparcel connectors shall have a service drive fronting on major collectors, minor arterials or primary arterials to prevent direct access to such streets. The service drive shall extend the full frontage of the development along such streets, tie into neighboring development as an interparcel connector, and provide limited access as the appropriate designated intersection. Service drive design and construction shall be in accordance with Detail 650.21 of this manual.~~

602.09.03. Common Driveways for Two Lots

- A. (602.17.A and 602.17.B) ~~In large lot subdivisions,~~ Two (2) lots may be served by a common driveway as permitted by the Zoning Ordinance. The width of the common driveway shall be eighteen (18) feet. An ~~adequate~~ access easement of ~~at least forty (40)~~ twenty six (26) feet wide shall be provided.
- B. Common driveways should be centered on the property line bordering the two lots sharing the drive where feasible. Common driveways located exclusively on one property shall include an access easement to permit both owners a perpetual right to use the driveway for accessing their respective properties.

602.09.04. Pipestem Driveways

- A. (602.16.1.A) When permitted by the Zoning Ordinance, the lots served by pipestem driveways shall be limited to twenty percent (20%) of all lots within a subdivision.
- B. Pipestem lots shall be designed to take advantage of the natural land features, and shall be located, to the extent possible, so as to abut areas of common or dedicated open space.

- C. (602.16.1.B) The length of a pipestem driveway serving five (5) or fewer lots shall not exceed a distance of ~~three hundred fifty (350) feet where the required lot size is ten thousand (10,000) square feet or less, and shall not exceed four hundred (400) feet where the required lot size is greater than ten thousand (10,000) square feet but less than fifteen thousand (15,000) square feet~~ two hundred (200) feet. Longer pipestem lengths may be permitted ~~where the lot size exceeds the minimum requirements of the Zoning Ordinance but~~ to provide required frontage per the Zoning Ordinance the or to accommodate the natural terrain, vegetation, or density of mature trees but shall not exceed the maximum length allowable for a cul-de-sac street.
- D. (602.16.1.C) When allowed by the Zoning Ordinance, a pipestem driveway shall serve a maximum of five (5) lots, and shall be designed in accordance with Detail 650.32 of this manual.
- E. No more than one (1) such driveway connection shall be permitted on the cul-de-sac portion of any public street, and then only if there is no driveway connection on the same cul-de-sac for a driveway permitted by the Zoning Ordinance.
- F. (602.16.1.D) When more than one (1) pipestem driveway is proposed on the same side of an existing street or street to be dedicated to public use, the centerlines of the pipestem driveways shall be spaced at least two (2) lot widths apart, but in no case less than one hundred forty (140) feet. ~~For acceptable typical pipestem layouts, refer to Detail 650.33A of this manual.~~
- G. (602.16.1.G) When a pipestem driveway is proposed opposite an existing or proposed street, its centerline shall be either aligned with the centerline of the opposing street or offset from its centerline by at least two hundred (200) feet.
- H. No more than ten (10) pipestem lots shall be served by a common driveway built to private street standards as set forth in this guide. Such driveways shall be privately maintained by a bona fide homeowners association. Such driveways shall have two public street connections, shall not connect with any other pipestem or common driveway, and shall be permitted only in locations specifically approved.
- I. (602.16.1.E) Ingress and egress easements shall be provided for a pipestem driveway. An easement for a pipestem driveway serving one (1) lot shall be a minimum of eighteen (18) feet in width, and for a pipestem serving two (2) or more lots, the easement shall be ~~forty (40)~~ thirty (30) feet in width. The paved portion of the pipestem driveway shall be ten (10) feet in width when serving one (1) lot, and eighteen (18) feet in width when serving two (2) or more lots.
- J. (602.16.1.F) Lots with public street frontage and contiguous to a pipestem driveway shall not contain a structure within fifteen (15) feet of the access easement line.
- K. (602.16.1.H) Lots served by a pipestem driveway shall have a combined frontage width not to exceed the width of the access and maintained easement for that driveway.
- L. (602.16.1.I) The slope of a pipestem driveway shall not exceed eight percent (8%). A landing sloped at two percent (2%) shall be incorporated into a pipestem driveway for the first twenty (20) feet. Landings shall be constructed in accordance with Detail 650.32 of this manual.
- M. (602.16.1.K) Mailboxes shall be located adjacent to a public street according to a coordinated standard, to serve all lots on a pipestem driveway.

- N. (602.16.1.L) Suitable turnarounds shall be provided at the end of a pipestem driveway serving three or more lots in accordance with Details 650.30 and 650.31 of this manual. ~~When the length of a pipestem driveway exceeds two hundred fifty (250) feet measured from the edge of pavement of the road to the first edge of the last driveway entrance; a turnaround that could accommodate an emergency vehicle used by the Fire Marshall's Office shall be provided.~~ Pipestem driveways that are one hundred (100) feet or less in length shall be provided with turnarounds conforming to Detail 650.31. Pipestem driveways longer than one hundred (100) feet shall utilize Shape #4 of Detail 650.31 to accommodate a thirty (30) foot single unit truck and may require a turnaround that could accommodate an emergency vehicle used by the Fire Marshall's Office. Turnaround shall not be allowed between dwelling units or lots. The turnaround slope shall not exceed five percent (5%).
- O. (602.16.1.M) All pipestem driveways shall have a minimum centerline radius of sixty (60) feet.
- P. (602.16.1.N) To ensure that proper drainage is achieved, grading for the pipestem driveways shall include cuts and fills defining the ditch lines and the locations and size of driveway culverts. Additional drainage easements may be required in accordance with Detail 650.32 of this manual.
- Q. (602.16.1.O) Pipestem driveway elements shall include two (2) feet wide gravel shoulders with well-prepared, compacted subgrade and sloped eight percent (8%) grade away from the edge of pavement. Where appropriate, well-defined swales or side ditches shall be provided. Alternative shoulder treatment may be approved where positive drainage can be demonstrated.
- R. (602.16.1.P) On ditch section pipestem driveways, driveway entrances for the lots shall be designed in accordance with Detail 650.45 (DE-4) of this manual.
- S. (602.16.1.Q) The typical cross section for a pipestem driveway shall have a normal crown with 2.08% slopes. Straight slope with 2.08% maximum can be considered, provided that the drainage design shall ensure positive drainage away from the pavement structure.
- T. (602.16.1.R) The pavement design for pipestem driveways shall be the same as that of the adjacent street where they are connected. Five (5) inches of plain Portland cement concrete is acceptable as an alternative subject to the following:
1. Class of concrete shall be Class A-3 in accordance with VDOT standards.
 2. The methods of construction such as forming, crack controls, jointing, finishing, curing, and protection of concrete pavement from the initial traffic should be in accordance with VDOT road and bridge specifications.
 3. Spacing of transverse control joints shall be a maximum of fifteen (15) feet. Longitudinal control joints shall be provided in all pavement sections wider than twelve (12) feet.
 4. Drainage or storm water runoff shall not be allowed to flow longitudinally within the paved portion of the pipestem driveway. Positive drainage shall be maintained. Storm runoff shall be channeled away from the pavement, through the side ditches or gutter pan.
- U. (602.16.1.S) A centerline profile for a pipestem driveway serving two (2) or more lots shall be provided to ensure appropriate landings, grade ties, and appropriate drainage design are achieved.

- V. (602.16.1.T) Grading plans for all pipestem driveways serving two (2) or more lots shall be provided and included on construction plans, together with the appropriate turnarounds and necessary easements.

(602.16.1.U) ~~Design configuration of pipestem layouts shall be in accordance with Detail 650.33A of this manual.~~

- W. (602.16.1.V) The methods and materials used in the construction of pipestem driveways shall conform to the current VDOT road and bridge specifications unless specified herein.
- X. (602.16.1.W) Entrance/intersection and vertical sight distance shall be verified and maintenance easement required when necessary on all pipestem driveway entrances.

602.09.05. Alleyways in Planned Districts

- A. Alleyways shall be discouraged in proposed residential developments (other than townhouse or two-over-two developments) where street networks are planned and designed to be publicly maintained. However, they may be allowed in town centers subject to Special Use Permit (SUP) Conditions, small area plans, and in any PMD, PMR, or MXD Zoning Districts.
- B. (602.16.2.A) Alleyways shall be a minimum of twelve (12) feet wide if one-way. Two-way alleyways in rural and suburban contexts shall be eighteen (18) feet wide measured from edge of pavement to edge of pavement and may include curb and gutter for drainage. Two-way alleyways in urban contexts shall be twenty (20) feet wide measured from edge of pavement to edge of pavement and may include flush curbs and center-running drainage structures (Refer to Detail 650.18). ~~Parking along alleyways shall not be allowed and traffic control signs (“No Parking,” “Stop” signs, etc.) shall be required.~~
- C. (602.16.2.B) Ingress/egress and maintenance easements shall be required for all alleyways. The easement width for a one-way alley shall be eighteen (18) feet and for a two-way alley shall be ~~twenty-eight (28)~~ twenty six (26) feet. Additional easement width will be required at the intersections to accommodate signage and ensure clear intersection sight distance.
- D. (602.16.2.C) Standard maintenance note for alleyways will require the notification of owners of lots being served by the street of their obligation for the maintenance of the road.
- E. (602.16.2.D) Geometric, vertical, and horizontal design of alleyways shall be in conformance with the requirements of *Section 602.09.05. Alleyways in Planned Districts* unless deemed not necessary by the Director of Transportation.
- F. (602.16.2.E) The length of the driveway accessing an alleyway shall be eighteen (18) feet measured from the edge of pavement or face of curb of the alleyway to the edge of the garage.
- G. (602.16.2.F) Dead-end alleyways are generally discouraged, but if allowed due to special circumstances, a standard turnaround shall be provided if required by the Fire Marshal.
- H. (602.16.2.H) Adequate intersection sight distance shall be required and verified on alleyway intersections in accordance with *Section 602.12.06. Sight Distance*. On-street parking shall not be allowed on street intersection approaches where lines of sights are verified to achieve clear adequate sight distance.
- I. (602.16.2.I) Entrances to and exits from alleyways should be designed with turning radii adequate to accommodate the size and type of vehicles expected to access the alleyways, such as solid waste collection and emergency vehicles. Alleyways will require the review and approval of the Fire Marshal if they are designated as a fire access road.

602.10. Cul-de-sac Streets

602.10.01. General

- A. (602.09.B) The maximum centerline grade at the cul-de-sac shall not exceed five percent (5%). Any slope within the cul-de-sac pavement area shall not exceed five percent (5%). The cross slope of the street leading to the cul-de-sac shall be a minimum of two percent (2%).
- B. A cul-de-sac shall have a minimum pavement radius of thirty (30) feet to the face of curb or edge of pavement. Approval from the Fire Marshal (and VDOT if on a public street) shall be required when the cul-de-sac pavement radius is less than forty five (45) feet.
- C. Parking shall not be allowed when the cul-de-sac pavement radius is less than forty five (45) feet to the face of curb or edge of pavement. Appropriate traffic control signs, pavement markings, and curb markings shall be provided.
- D. All cul-de-sac streets and streets with turnarounds shall be limited to six hundred (600) feet in length, as measured from the center of the turnaround to the center of the nearest intersection.
- E. Cul-de-sacs with landscaped center islands or medians shall comply with the following:
 - 1. A cul-de-sac with an unpaved center shall have a minimum pavement radius of sixty (60) feet to the face of curb or edge of pavement. The unpaved area shall have a minimum radius of thirty (30) feet and a maximum radius of sixty (60) feet. A ten (10) foot clear zone shall be maintained around the circumference of the unpaved area.
 - 2. Landscaped cul-de-sacs should utilize appropriate plant selection and green infrastructure/low impact development techniques, including curb cuts, to increase stormwater runoff capacity and reduce urban heat island effects.
 - 3. The minimum travelway width for the cul-de-sac shall be fifteen (15) feet from face of curb to face of curb for urban streets or between pavement edges for rural streets. The minimum roadway width shall be twenty three (23) feet when on-street parking is provided along one side of the roadway. Appropriate traffic control signs and markings shall be provided when parking is not permitted.
 - 4. A Right of Way Maintenance Agreement acceptable to the County must be provided between the developer or the homeowners association, VDOT, and the County for landscaping and maintenance of the island within the cul-de-sac.

602.10.02. Residential Cul-de-sac Streets

- A. The lots served by cul-de-sac streets shall be limited to thirty percent (30%) of all lots within a subdivision.
- B. (602.08.A) A cul-de-sac ~~servicing a residential development shall be designed to a length that will carry a maximum of two hundred fifty (250) vpd~~ street shall serve only single family detached, single family attached, or duplex homes. ~~The minimum pavement radius of the cul-de-sac shall be forty five (45) feet to either the face of the curb for urban streets or the edge of pavement for rural streets.~~

(602.08.B) ~~In the case where a residential cul-de-sac street intersects with a street presently carrying, or projected to carry, greater than three thousand (3,000) vehicles per day (vpd), the Director of Transportation may require a cul-de-sac radius of fifty (50) feet.~~

- C. Cul-de-sac streets, streets with turnarounds, and pipestem driveways shall comply with the length requirements specified in *Section 602.10.01.D.* and *Section 602.09.04.C.* Such facilities shall not be constructed in series such that the effective length of such facility exceeds eight hundred (800) feet as measured from the center of the turnaround to the center of the nearest intersection that connects to a non-cul-de-sac through street.
- D. Cul-de-sac streets shall be oriented to connect to the street network such that they provide the most direct path between the cul-de-sac and the nearest external connection in order to minimize VMT. Overly circuitous pathways between cul-de-sac streets and external connections shall be avoided wherever feasible. For enhanced pedestrian circulation, cul-de-sac streets shall provide a pedestrian connection (sidewalk or shared use path) to any roads classified as a collector or greater bypassing the cul-de-sac on its closed side within three hundred (300) feet.
- E. (602.08.E) On the circular segment of a public cul-de-sac street, only one entrance (CG-11) to a single family attached or multifamily development shall be permitted. The entrance shall align at one hundred eighty (180) degrees with the centerline of the public street.

602.10.03. Commercial and Industrial Cul-de-sac Streets

- A. Industrial and commercial development should utilize interconnected streets to provide for adequate emergency vehicle access, reduce VMT, and increase street network connectivity. A cul-de-sac or appropriate turnaround in accordance with Detail 650.31 shall be provided when natural terrain, vegetation, or density of mature trees prevents interconnected streets.
- B. (602.08.C) ~~A cul-de-sac serving a commercial and industrial development shall be designed to a maximum length of one thousand (1,000) feet.~~ The minimum pavement radius of the cul-de-sac serving industrial or commercial development shall be fifty (50) feet to the face of curb or edge of pavement.
- C. (602.08.D) For offset cul-de-sacs where the minimum radius is fifty (50) feet, the layout of the offset segment as shown in Details 650.23, 650.24, 650.28, and 650.29 shall be considered in the design.
- D. (602.08.E) On the circular segment of a public street cul-de-sac, one (1) commercial or industrial entrance (CG-11) aligned at one hundred eighty (180) degrees with the centerline of the public street shall be permitted. If feasible, three (3) entrances shall be allowed for commercial and industrial developments, provided their centerlines align at ninety (90) degrees to each other.

602.11. Connectivity

- A. (601.01.C) The arrangement of streets in a development shall provide for the continuation with developed adjoining properties and for their extension into undeveloped adjoining properties ~~The interparcel connecting arrangement shall be accomplished by the use of utilizing stub streets or temporary cul-de-sac streets to provide for basic public services; allow movement of vehicular, bicycle, and pedestrian traffic; and to provide a corridor for and utilities.~~ Developments shall be required to connect to stub streets and temporary cul-de-sac streets of adjacent developments with compatible land uses. In no case shall retail, residential, or office uses be considered incompatible. In general, developments shall provide interparcel connectivity via sidewalks, shared use paths, trails, travelways, and/or streets whenever feasible. ~~If a waiver is requested, it is the developer's responsibility to provide a detailed narrative why an interparcel connection between developments could not be achieved or provided or why such a connection would not be beneficial to the County as required by this section.~~

- B. (601.01.D) Interparcel connecting streets shall be designed in consideration of the anticipated future traffic from undeveloped adjacent tracts based on the land use classifications of the [Long-Range Future Land Use Plan Map](#).
- C. (601.01.G) ~~When~~ Interparcel connections ~~are made, residential local streets shall be laid out~~ shall provide appropriate traffic calming measure to discourage high-speed vehicle cut-through ~~movements of vehicles, and to minimize or avoid four-way intersections.~~ traffic and ensure safety for all road users. Traffic calming features should utilize geometry and physical elements that reinforce the design speed. Streets should not rely strictly or primarily on signage to convey the intended safe driving speed for the context.
- D. (602.05.H) ~~Where interparcel connections are planned and required in developments where they are appropriately essential, traffic calming devices such as multi-way stop signs, roundabouts, choker islands, chicanes, etc. shall be provided as necessary and as required by the Director of Transportation.~~
- E. (601.01.E) The [Roadway Plan](#) indicates the necessity for ~~major~~ collector and arterial streets. The design and provision for the continuation of these streets shall be addressed in the design of all developments. The streetscape of collectors and arterials will vary as they transition through different contexts including current and future land use, current and future development intensity, and in accordance with relevant small area plans.
- F. (602.08.F) The street network proposed by a development shall be designed to provide orderly access progression ~~from~~ between local streets, collector streets, and arterial streets. The planning and/or design of intersections to arterial or higher category roadways shall only be allowed with the same or next category of street (~~major collector~~) unless it can be properly demonstrated that existing and/or projected traffic counts do not require a ~~major~~ collector or arterial category for the connecting road.
- G. (601.06.A) All streets shall be constructed to the property boundary with adjoining properties if eligible to be accepted into the State Secondary System and shall terminate with an onsite temporary turnaround. However, off site temporary turnarounds may be allowed if the developer can obtain temporary turnaround easements from the adjacent property owners. If said easements are provided, the developer shall escrow funds for the maintenance and removal of the temporary turnaround. The construction of the temporary turnaround shall conform to the pavement design of the street where it is located.
- H. (601.06.B) All planned interparcel connections shall be constructed to the subdivision or site boundary limit with adjoining properties. If a temporary turnaround is required onsite, the right of way for the turnaround shall be dedicated and all setback requirements referred from the right of way line or the temporary turnaround easement whichever is more restrictive. In the event that the interparcel connection is not constructed due to topographic or other physical constraints and/or a change in the needs of the community, the temporary turnaround shall be converted to a permanent cul-de-sac acceptable to VDOT and the temporary easement converted to a permanent right of way.
- (601.06.C) ~~If the aforementioned construction of streets or interparcel connection to the property line causes hardship to the developer, the Director of Transportation may allow the street construction to stop a distance from the property line, to be determined at the time of site development plan review.~~
- I. (601.06.D) The developer shall provide on-site temporary construction easements of sufficient width and right of way dedication to accommodate the permanent turnaround in the event such planned interparcel connection will not be realized. The dedicated right of way area shall be vacated in the event the connection is made.

- J. (601.06.E) Escrow shall be made for the following:
1. Maintenance and removal of the temporary turnaround.
 2. Future completion of the street to the property line.
 3. Grading and stabilization of disturbed areas within the easement.

602.12. Intersections and Crossings

602.12.01. General

- A. (601.05.A) Existing and proposed crossovers ~~planned or approved by the Director of Transportation and VDOT~~ shall serve as the intersections for all development along existing and future divided highways.
- B. (602.06) Minimum crossover spacing along a divided street ~~shall be provided in accordance with Table 6-6 or if the street is a state maintained road, the spacing shall~~ be in accordance with VDOT Access Management Standards. ~~The values for desirable distance between crossovers shown in the table shall be utilized in the design of all streets which will carry greater than seven thousand (7,000) vehicles per day (vpd).~~
- C. (602.07.A and 602.07.B) ~~Along arterial and collector streets,~~The centerline separation of street intersections ~~within the same lot, parcel, or development,~~ including roundabouts, ~~shall follow the minimum distance between crossovers as noted in Table 6-6. If the street is a state maintained road, the spacing shall~~ be in accordance with [VDOT RDM Appendix F Access Management Design Standards for Entrances and Intersections](#). A distance of at least two hundred (200) feet shall be maintained between centerlines of local street intersections and collector streets.
- D. Roundabouts or other innovative intersections shall be considered when a project includes reconstructing or constructing new intersections, signalized or unsignalized. Unsignalized innovative intersections, including but not limited to roundabouts, are the PWC and VDOT preferred alternative if the analysis shows that they are feasible due to the proven substantial safety and operational benefits as well as the reduction in long-term maintenance costs for traffic signals. Roundabouts shall be designed in accordance with [VDOT RDM](#) and [NCHRP Report 1043 Guide for Roundabouts](#).
- E. (601.05.B) The number of intersections of local streets with collector or arterial streets shall ~~be held to a minimum to avoid hazard, delay, and preserve their integrity~~ conform with all spacing, geometric, and accessibility requirements as defined in this manual and shall be coordinated with crossover locations for existing and future divided highways. An interconnected street network shall be provided to facilitate a high level of multimodal connectivity such that VMT is minimized.
- F. New or reconstructed intersections along arterials within one-half (0.5) mile of an existing or proposed school site shall include intersection controls, such as crosswalks, pedestrian refuge islands, or pedestrian bridges to increase safety and provide Safe Routes to School. Refer to the [MUTCD](#) for traffic control signal warrants for pedestrian volume and school crossings.
- G. (602.07.C) All ~~local~~ ~~designed to carry traffic volume up to one thousand (1,000) vehicles per day (vpd)~~ streets shall intersect at right angles for a minimum tangent distance of ~~one hundred (100) fifty (50) feet. The tangent shall be measured from the face of curb or edge of pavement of the major street. All streets designed to carry traffic volumes exceeding one thousand (1,000) vehicles per day (vpd)~~ collector and arterial streets shall intersect at right angles for a minimum tangent distance of ~~two hundred (200)~~ one hundred (100) feet.

- H. (602.07.D) All shoulders of ditch type streets shall be paved at intersections in accordance with Detail 650.50 of this manual.

602.12.02. Design Vehicle

- A. The minimum turning area for emergency vehicles along travelway turnarounds shall be in accordance with Detail 650.31. The design vehicle shall be a forty five (45) foot fire engine as required by the Fire Marshal.
- B. All subdivision streets shall be designed to accommodate, at a minimum, S-BUS-36 school buses and SU-30 single-unit trucks. ~~Minimal encroachment into the opposing lane of traffic of the receiving street by the design vehicle is expected.~~ The minimum radius of the curb return shall not be less than fifteen (15) feet.
- C. For dual left turn lanes, the AutoTurn analysis shall consider, at a minimum, simultaneous side-by-side turning movements by the design vehicle in the outer left turn lane and a passenger car in the inner left turn lane.

602.12.03. Turn Lanes

- A. (602.07.E) Along roadways classified as ~~Category VI~~ collector and higher, left turn lanes and right turn lanes shall be ~~provided at all intersections, crossovers, and/or entrances to developments. In addition, a signalized dual left turn lane shall be provided where existing or projected turning volume counts exceed three hundred (300) peak hour volumes (PHV) or design hourly volumes (DHV) or as otherwise warranted~~ required in accordance with VDOT Road Design Manual and AASHTO requirements at all intersections, crossovers, and/or entrances to developments.
- B. At intersections with observed or anticipated pedestrian activity, left turn lanes may be limited to a single left turn lane. A capacity analysis should be used to evaluate the performance of an offset left turn lane with permissive turn phase in accommodating the design volume. Dual left turn lanes should be considered as a last resort and the designer must consider the safety and operational benefits of additional turn lanes while balancing the safety benefits to pedestrians and cyclists by minimizing intersection crossing distance. Offset left turn lanes may be considered as an alternative to multiple left turn lanes as they provide better visibility of opposing through traffic; decreased possibility of conflict between opposing left turn movements within the intersection; more left turn vehicles stored in a given period of time, particularly at a signalized intersection; and can be achieved by increasing pedestrian and bicyclist crossing distance by as little as four (4) feet instead of ten to twelve (10-12) feet for an additional turn lane.
- C. (602.07.F) An exclusive right turn lane and taper shall ~~be required at any intersection approach on a roadway that carries six thousand (6,000) or more vehicles per day (vpd)~~ provided when the right turn volume exceeds three hundred (300) vehicles per hour (VPH) and the adjacent through volume exceeds three hundred (300) VPH.
- D. ~~Right turn slip lanes are generally a negative facility from the multimodal perspective due to the emphasis on fast, easy vehicle travel and shall not be implemented within Town Centers, Small Area Plans, Activity Centers, TOD, and at intersections with large volumes of observed or anticipated pedestrian activity including near transit, parks, and schools. If determined to be necessary, slip lanes may be incorporated at the intersections between two arterials, an arterial and parkway, and at highway interchanges. R1-5, R1-6, and R1-9 series signs shall be incorporated at slip lane locations with pedestrian and/or bicycle activity.~~

~~(602.07.H) When deemed necessary by a traffic impact analysis, the Director of Transportation and VDOT, a protected left turn lane shall be required at all street intersections where existing or projected turning volume county on either street exceeds three thousand (3,000) vehicles per day (vpd).~~

- E. In general, when left turn volumes are higher than (one hundred) 100 VPH, an exclusive left-turn should be considered. Signalized dual left turns shall be considered where peak left turn movements exceed three hundred fifty (350) VPH. Refer to VDOT RDM and AASHTO for additional guidance on turn lane warrants.
- F. (602.07.G) All required standard deceleration or turn lanes and tapers shall be designed in accordance with ~~VDOT and AASHTO standards (see Table 6-7)~~ the minimum values shown in Table 6-7 when traffic data is not available. When traffic data is available, a capacity analysis shall specify turn lane geometry. Projects that impact VDOT ROW shall require a design waiver when deceleration distance is less than the minimum VDOT taper length.
- G. Turn lanes should be installed where warranted even when the distances in Table 6-7 cannot be achieved. A waiver is required for reduced turn lane distances.

602.12.04. Curb Returns

~~(602.07.I) All curb returns shall have a minimum of thirty five (35) feet radius for streets with curb and gutter. However, on industrial intersections and streets without curb and gutter, a minimum fifty foot pavement return radius is required.~~

- A. The radius of the curb return (actual curb radius) should be no greater than that needed to accommodate the design turning radius such that the design vehicle does not encroach into the adjacent or opposite lanes when making a turn. The minimum radius of the curb return shall be fifteen (15) feet. The minimum effective turning radius shall be twenty five (25) feet (Refer to *A Policy on Geometric Design of Highways and Streets Section 5.3.5* for additional information). In industrial areas with no on-street parking, the minimum radius of the curb return shall be thirty (30) feet. A larger radius or additional pavement at the intersection may be required in shoulder and ditch sections to avoid shoulder rutting. For skew intersections, radii shall be twenty five (25) feet for the acute angle and thirty (30) feet for the obtuse angle of the intersection street.
- B. Where vehicles are turning into a roadway with multiple lanes, the corner radius may be reduced as the vehicle could turn into the far lane. In addition, if either roadway has on-street parking and/or bicycle lanes, the turning vehicle is not immediately adjacent to the curb when they turn; therefore, smaller corner radii can be used. Smaller corner radii increase safety and benefit pedestrians by reducing crosswalk lengths and making pedestrians more visible to drivers.

602.12.05. Curb Ramps

- A. (602.07.R) Pedestrian accessible ramps in accordance with [VDOT IIM-LD-55](#) shall be provided at all curbed intersections, even when sidewalks and shared use paths are not present and shall be constructed in accordance with VDOT standards or ~~ADAAG (American with Disability Act Accessibility Guidelines)~~ [Public Right-of-Way Accessibility Guidelines \(PROWAG\)](#), whichever is more restrictive.

602.12.06. Sight Distance

- A. (602.07.L) Corner lots on street intersections, especially on curvilinear streets, shall be designed taking into consideration intersection sight distance easement requirements. Intersection sight distance easements should not occupy twenty five percent (25%) or more of the total area of corner lots.

- B. (602.07.N) All parking spaces on single family attached, multifamily, commercial, institutional and industrial developments should be designed such that their locations shall not obstruct the line of sight as graphically shown on Detail 650.35.
- C. Fencing, walls, and landscaping to include hedges, trees, bushes, and unmoved vegetation shall not restrict sight distance at driveways and private entrances such that pedestrians, cyclists, or drivers along the street would be obstructed from drivers' view.
- D. (602.05.A) Each new street shall be designed with horizontal and vertical curves meeting or exceeding the minimum stopping sight distance outlined in Table 6-4, and the minimum horizontal/intersection sight distance outlines in Table 6-5. Vertical curves shall have a minimum length of ~~one hundred (100)~~ fifty (50) feet except on cul-de-sac roll outs and intersections.

~~(602.05.B) Sag vertical curves are required to provide not less than the sight distance shown in Table 6-4.~~

~~(602.05.C) Sight distance for sag vertical curves shall be calculated for all ranges of algebraic difference in grade based on a headlight of two (2) feet and one degree upward divergence of the headlight beams. For horizontal sight distances, the location of the driver's eye should be set fourteen and a half (14.5) feet from the edge of the outermost through lane of the roadway in question, as shown and specified in Detail 650.35 of this manual. (approved 8-4-15)~~

~~(602.05.D) Table 6-4 assumes an eye height of three (3) feet, six (6) inches and a height of object (2) two feet.~~

~~(602.05.E) Desirable sight distance values in Table 6-4 shall be used as the minimum values on all streets which carry greater than seven thousand (7,000) vehicles per day (vpd).~~

~~(602.05.F) The K value in Table 6-4 is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide the minimum sight distance. K value shall be used to provide the minimum sight distance.~~

~~(602.05.G) Table 6-5 assumes an eye height of three (3) feet, six (6) inches and a height of object of three (3) feet, six (6) inches.~~

~~(602.05.H) The term "major street" in Table 6-5 refers to the street with the highest vehicles per day (vpd) of the two (2) intersecting roads.~~

~~(602.05.I) All existing VDOT maintained streets are considered major streets. For divided streets where the median widths are greater than sixty (60) feet, each direction can be considered separately.~~

~~(602.05.J) For more than four (4) lanes on a major street, or for large truck volumes on a minor street with twenty percent (20%) to twenty five (25%) of the average daily trips (ADT), crossover or commercial entrance, use values in the latest edition of the "Policy on Geometric Design of Highways and Streets" published by AASHTO.~~

~~(602.05.K) After each street has been designed in accordance with the criteria above, each intersection shall be checked for compliance with Table 6-5, and other intersection items such as standards landings (Detail 650.24), channelization, etc. Each connection to existing streets shall be checked to insure that the proper sight distances are achieved. The verification of these sight distances should be done graphically, checking both the horizontal and vertical alignments.~~

- E. Only the minimum sight distance needed shall be provided at a roundabout. Additional intersection sight distance can encourage higher vehicle speeds and increase conflicts between drivers, bicyclists, and pedestrians. Landscaping within the central island can be effective in restricting sight distance to the minimum needed while creating a “terminal vista” on the approach to improve visibility of the central island. Refer to [NCHRP Report 1043 Guide for Roundabouts](#) for additional guidance on determining roundabout sight distance.

602.12.07. Pedestrian Access Routes at Intersections and Crossings

- A. The crosswalk cross slope shall be two percent (2.0%) maximum at all intersections where pedestrian access routes are contained within crosswalks with yield or stop control, including roundabouts. Where pedestrian access routes are contained within crosswalks without yield or stop control, the cross slope of the pedestrian access route shall be five percent (5.0%) maximum. Where pedestrian access routes are contained within midblock crosswalks, the cross slope of the pedestrian access route shall be permitted to equal the street or highway grade.
- B. Pedestrian access routes along roads with medians shall include pedestrian refuges within the median at unsignalized intersections. Medians shall be a minimum of six (6) feet wide and include detectable warning surfaces as detailed in [PROWAG R305 Detectable Warning Surfaces](#). Pedestrian refuges along roads maintained by VDOT shall comply with VDOT Standard CG-12.
- C. Pedestrian refuges should be provided at crossings along divided roads and shall be required along undivided roads when the total crossing distance exceeds sixty (60) feet.
- D. A leading pedestrian interval shall be provided for signalized intersections within Small Area Plans and at intersections within school zones, within one-quarter (0.25) miles of park entrances, one-quarter (0.25) miles of transit stops, and other areas with large volumes of observed or anticipated pedestrian activity.
- E. Staggered or Z crossing configurations should be used for midblock crossings with medians wherever feasible to increase pedestrians’ visibility of oncoming traffic, especially along multilane streets and near transit stops, trail connections, schools, parks, and other areas where high volumes of pedestrians are observed or anticipated. Staggered crossing configurations encourage bicyclist speeds similar to those of pedestrians and may be supplemented with signage directing cyclists to dismount or walk the bicycle through the crossing.
- F. Midblock crosswalks should be considered when protected intersection crossings are spaced greater than six hundred (600) feet so that crosswalks are located no greater than three hundred (300) feet apart in areas where a relatively high demand of foot traffic is observed or anticipated and as warranted based upon an engineering study and approval by VDOT and/or PWC.
- G. Midblock crosswalks should be located at least one hundred (100) feet from the nearest side street to ensure appropriate sight distances for turning vehicles. Raised crosswalks should be located at least two hundred (200) feet from the nearest intersection. See [Section 602.20. Traffic Calming](#) for additional information on raised crosswalks.
- H. Curb extensions, illumination, and signing should be considered at midblock crossings to increase visibility among pedestrians, bicyclists, and drivers.

- I. Rapid Rectangular Flashing Beacons (RRFBs) are appropriate on roads with two or more lanes that generally have AADT above 1,500 and may be considered as an additional crossing treatment to supplement marked crosswalks on roadways where the speed limits are less than or equal to 45 mph. Refer to [MUTCD Chapter 4L](#) for additional guidance.
- J. Pedestrian Hybrid Beacons (PHB) may be used to control a midblock pedestrian crossing in accordance with [MUTCD Chapter 4J](#). PHB shall only be installed where the crossing volume for any four (4) consecutive fifteen (15) minute periods of an average day is equal to or greater than twenty (20) pedestrians.

602.12.08. Bicycle and Micromobility Considerations at Intersections and Crossings

- A. A bicycle stop bar, used in conjunction with a curb extension, may be placed closer to the intersection than the motor vehicle stop bar in a location that does not block the crosswalk to improve bicyclist and driver visibility. Green paint may be used to further enhance bicyclist visibility. Refer to [NACTO Urban Bikeway Design Guide](#) and [MUTCD Chapter 9](#) for additional guidance.
- B. Bicycle boxes placed between the crosswalk and vehicle stop bar should be considered at intersections with on-street bicycle facilities, particularly at skewed intersections and those with large volumes of observed or anticipated bicyclist left turns. Green paint, including along the approaching bicycle lane, and appropriate signing shall be used to clearly demarcate where vehicles and bicyclists should stop respectively. Refer to [NACTO Urban Bikeway Design Guide](#) and [MUTCD Chapter 9](#) for additional guidance.
- C. The through bike lane shall be placed to the left of any right turning lane(s). Green paint should be used along the approach and/or adjacent to the turning lane(s) to increase bicyclist visibility and alert drivers to anticipated through movements by bicyclists. Advance Intersection Lane Control signs (R3-8 series) may be used to display the arrangement of a standard or buffered bicycle lane in relation to other lanes in the same direction that are present on a roadway approach to an intersection. Shared lanes, contraflow bicycle lanes, and shared use paths shall not be displayed on Advance Intersection Control signs.
- D. Intersection markings should be considered for all through bicycle lanes, particularly at intersections with right turn lane(s) and when the bicycle lane and/or adjacent travel lanes shift through the intersection. Green paint may be used to increase the visibility of intersection markings.

602.12.09. Roundabouts

- A. No commercial entrance shall be within one hundred fifteen (115) feet minimum measured from the outer edge of the inscribed circle of a roundabout. If an entrance is approved within one hundred fifteen (115) feet, it shall be a "Right-In, Right-Out" only.
- B. Roundabouts provide an opportunity for aesthetic improvements and should include landscaping, sculptures, or stormwater harvesting. All decorative elements shall provide for appropriate sight distance and clearance requirements as specified in [Section 602.12.06. Sight Distance](#) and [NCHRP Report 1043 Guide for Roundabouts](#).

- C. Mini-roundabouts may be used to improve unsignalized intersection capacity and safety without requiring additional right of way. Mini-roundabouts should be used on new or existing streets with posted speeds less than or equal to thirty (30) mph, maximum total daily traffic volume of approximately fifteen thousand (15,000) vehicles or less, low truck volumes (<5%), and low frequency of bus route use. Mini-roundabouts include a fully traversable island that allows for the majority of traffic to pass through the facility within the circular roadway. Central islands and splitter islands may use a combination of striping and curb as needed to accommodate school buses. Mini-roundabouts should be designed in accordance with VDOT RDM Appendix A3 Innovative Intersection and Interchange Design Guidelines.

602.13. Drainage

602.13.01. Curb and Gutter

- A. (601.08.A) Curb and gutter shall be provided within subdivisions requiring urban street sections. This excludes rural residential zoning districts requiring a minimum lot size of one (1) acre and greater and in low impact developments (LID).
- B. (601.08.B) Any required improvements to existing state-maintained streets, necessitated by development, shall provide curb and gutter and sidewalk/shared use paths if the adjoining properties meet the requirements for curb and gutter.
- C. (601.08.C) On privately maintained travelways, curb and gutter contiguous to a fire hydrant shall be painted ~~yellow, fifteen (15) feet to each side of the hydrant in~~ accordance with [DCSM Section 300 Fire Safety Systems](#). This clear access area shall be marked as a fire lane.

602.13.02. Ditches

- A. (602.12.A) Paved ditches shall be designed and constructed in accordance with VDOT specifications.

602.13.03. Underdrains

- A. (602.12.A) Underdrains shall be designed and constructed in accordance with VDOT specifications.
- B. (602.12.B) A standard VDOT combination underdrain UD-1 and/or UD-2 shall be provided at all low points of street vertical curves.
- C. (602.12.C) UD-1 must be used with high water table. UD-2 must be used with raised grass median.
- D. A standard VDOT sidewalk underdrain UD-3 shall be provided when the sidewalk longitudinal gradient is three percent (3%) or more and when the underlying soil has thirty four percent (34%) or more passing the No. 200 sieve and has a PI of thirteen (13) or less, or when the area has a history of sidewalk undermining.
- E. (602.12.D) UD-4 shall be provided in the pavement design when 21-B aggregate material is used.

602.14. Guardrail

- A. (602.12.A) Guardrails shall be designed and constructed in accordance with VDOT specifications ~~and VDOT Guardrail Installation Training Manual (GRIT)~~.

- B. (602.12.E) A guardrail shall be required along roadways where fill height exceeds seven and one-half (7.5) feet and there is a non-recoverable slope of 3H:1V or steeper. A guardrail shall be required along secondary and frontage roads with traffic volumes between two hundred fifty (250) and one thousand (1,000) ADT where fill height exceeds fifteen (15) feet and there is a non-recoverable slope of 3H:1V or steeper. A guardrail shall be required at obvious needs such as bridges, large end walls, parallel water hazards, etc., and fills where recommended during field inspection. Refer to [VDOT RDM Appendix J](#) Tables J-3-1 and J-3-2 ~~and VDOT Guardrail Installation Training Manual~~ for additional guidance.
- C. (602.12.F) In general, design and locations of guardrails will necessitate the need of additional right of way especially in fill conditions. In the event that guardrail has to be located outside the standard ROW width, additional right of way dedication must be provided to accommodate the guardrail.
- D. (602.12.G) Guardrails shown on the approved plan shall be installed after the asphalt base course of the roadways is in place and/or prior to the issuance of occupancy permit for uses within the development.

602.15. Sidewalks, Trails, Shared Use Paths, and Pedestrian Access Routes

602.15.01. General

- A. (602.18.A) Sidewalks or shared use paths shall be required along all proposed streets and where improvements to such streets are necessitated by development.
- B. Sidewalks shall have a minimum width of five (5) feet. The minimum clear width shall be in accordance with [PROWAG](#) requirements. Wider sidewalks may be appropriate in Town Centers, Small Area Plans, Activity Centers, and at locations with large volumes of observed or anticipated pedestrian activity including near transit, parks, and schools.
- C. Shared use paths shall have a minimum width of ten (10) feet. Wider paths may be appropriate at locations with increased pedestrian or bicyclist volumes including near transit, parks, and schools. In very rare circumstances, a reduced width of eight (8) feet may be used only where the following conditions prevail: when bicycle traffic is expected to be low, even on peak days or during peak hours; pedestrian use of the facility is not expected to be more than occasional; horizontal and vertical alignments provide frequent, well-designed passing and resting opportunities; and the path will not be regularly subjected to maintenance vehicle loading conditions that would cause pavement edge damage. In addition, a path width of eight (8) feet may be used for a short distance due to a physical constraint such as an environmental feature, bridge abutment, utility structure, fence, etc. Shared use paths less than ten (10) feet wide require a VDOT design waiver when the facility will be state maintained. Warning signs that indicate the pathway narrows (W5-4a), per the [MUTCD](#) should be considered at these locations.
- D. (602.18.B) In general, and to the extent set forth in subsection A above, sidewalks or shared use paths shall be required within the street right of way of any development or subdivision with curb and gutter (urban section) streets. Sidewalks shall be provided as required by VDOT standards or as shown on the standard typical street section and as determined in the plan approval process. In some cases, pedestrian trails/shared use paths may be located outside the street right of way, in lieu of the standard sidewalk required and, in this case, shall be maintained by the developer and/or homeowners association.

- E. (602.18.D) All developments shall include a trail/sidewalk system to connect residents to parks, schools, transit, and other community facilities. Sidewalks or shared use paths shall interconnect with those of surrounding developments to ensure safe and direct access to schools, parks, and transit.
- F. Walkways, shared use paths, and trails along cul-de-sacs, pipestem driveways, and pipestem driveways built to private street standards should connect to similar facilities along adjacent collector and arterial streets within three hundred (300) feet, as measured from the nearest edge of each street's ROW.
- G. Walkways, shared use paths, and trails along internal streets within residential, commercial, office, and mixed-use developments should connect to similar facilities along adjacent collector and arterial streets within three hundred (300) feet at a maximum spacing of one-quarter (0.25) mile in order for larger developments to have multiple multimodal access points to surrounding neighborhoods and the greater transportation network.
- H. (602.18.E) No occupancy permit shall be issued until all sidewalks and/or shared use paths in the general area of the units scheduled for occupancy have been constructed, inspected, and approved.
 - ~~(602.18.G) A sidewalk or trail/shared use path system shall be provided in an R-4 and R-2 cluster development in accordance with section 32-300.61 of the Zoning Ordinance.~~
 - ~~(602.18.H) Substitution of sidewalks for trails/shared use paths or vice versa in cluster development shall only be approved in instances where safe and sufficient pedestrian circulation is provided between recreation facilities, passive open space areas, and other off-site amenities likely to be used by residents.~~
 - ~~(602.18.I) In multifamily and single-family attached development, sidewalk and shared use path systems shall be designed to be continuous and connect to a public street. Sidewalks shall be provided on both sides of the privately-maintained travelways in accordance with Detail 650.06 of this manual.~~
 - ~~(602.18.J) A profile of the proposed trail/shared use path construction shall be included in the plans. Typical cross-sections shall be provided for all critical (e.g., deep cuts, change in alignment, etc.) points along the length of the trail/shared use path.~~
- I. (602.20.A) The safety of pedestrians and bicyclists shall be a prime consideration in trail/shared use path design. Shared use paths shall be constructed ~~adjacent to the street curb or pavement~~ with a minimum eight (8) foot buffer between the face of curb and inside edge of the path. Shared use paths located adjacent to streets with speed limits exceeding twenty-five (25) miles per hour and have slopes greater than ~~six percent (6%)~~ five percent (5%) ~~may require~~ shall consider ~~special~~ enhanced safety measures, such as the installation of barriers or ~~other safety devices~~ an increase in the buffer width between the path and the street.
- J. (602.20.B) Standard signing and markings, as specified by the Department of Parks and Recreation or the [MUTCD](#), shall be included in the design and construction of the trail/shared use path.
- K. Additional markings may be used to delineate space between cyclists and pedestrians when shared use paths are included along both sides of the street including between segments of on-street and off-street facilities, along bridges, and at transitions between sidewalks and shared use paths. Such configurations shall include a solid white pavement marking to separate the pedestrian and bicycle facilities and may include a R9-7 Shared Use Path Restriction Sign and/or green paint along the bicycle facility.

- L. (602.20.C) The design engineer shall address stopping and intersection sight distances at all trail/shared use path intersections (between multiple trails/shared use paths, private entrances/driveways, and streets), curves, and especially where steep grades are proposed at intersections with streets. Refer to [VDOT RDM](#) for design criteria.
- M. A minimum five (5) foot wide separation is required from the edge of a sidewalk when adjacent to a parallel water hazard, other obvious hazard, or a downward slope of 2:1 or steeper with a drop of four (4) feet or more. When the separation from the edge of the sidewalks to the top of the slope is less than five (5) feet, a physical barrier such as VDOT Standard Handrail (HR-1 Type II) is required. When a railing is required and the grade of the sidewalk is 5% or greater a gripping handrail is required.
- N. A minimum five (5) foot wide separation is required from the edge of a shared use path when the path is adjacent to a parallel water hazard, other obvious hazard, or a downward slope of 3:1 or steeper. When the separation from the edge of the shared use path to the top of the slope is less than five (5) feet, a physical barrier such as VDOT Standard Handrail Type III (HR-1, Type III) or chain link fence (FE-CL) is required in the following situations:
1. Slopes 2:1 or steeper, with a drop of four (4) feet or greater
 2. Slopes 3:1 or steeper, with a drop of six (6) feet or greater
 3. Slopes 3:1 or steeper, adjacent to a parallel water hazard greater than two (2) feet deep or other obvious hazard
 4. Slopes of 1:1 or steeper, with a drop of one (1) foot or greater
- O. Physical barriers, railing, or chain link fence along sidewalks and shared use paths shall begin prior to, and extend beyond the area of need. Physical barriers shall be offset a minimum of one (1) feet from the edge of the shared use path. The ends of the physical barrier shall be flared away from the edge of the shared use path.
- P. (602.20.E) Barricades shall be provided at trail access locations to prevent unauthorized vehicular access. The barricades shall have locking/unlocking devices to permit access by authorized maintenance and emergency vehicles. Barricade designs are subject to approval by the Director of Transportation.
- Q. (602.22.A) ~~A grade of one percent (1%)~~ longitudinal slope of 0.5% shall be required for sidewalks/trails/ shared use paths, except in sags where proper drainage is provided by the cross slope. ~~A slope of one percent (1%) to six percent (6%) is generally required for all trails/shared use paths. If, due to topography, this requirement cannot be met, then a slope of six percent (6%) to ten percent (10%) may be allowed with approval by the Director of Transportation.~~ The longitudinal slope for sidewalks/trails/shared use paths located within the ROW shall not exceed five percent (5%) or the longitudinal grade established for the adjacent street. The longitudinal slope for sidewalks/trails/shared use paths not contained within the ROW shall not exceed five percent (5%). Refer to [PROWAG R302 Pedestrian Access Routes](#) for additional guidance.
- (602.22.B) ~~Cross-slope shall be a minimum of one quarter (1/4) inch per foot width of trail/shared use path with a maximum of a half (1/2) inch per foot width of trail. Where slopes exceed these standards, the design engineer shall submit a special design, including use and safety consideration, for review and approval by the Director of Transportation.~~

- R. Sidewalks and shared use paths shall have a two and one-tenths (2.1%) maximum cross slope. Designers should consider designing sidewalks with a one and one-half percent (1.5%) cross slope to accommodate variations that may result during construction. Refer to *Section 602.12.07. Pedestrian Access Routes at Intersections and Crossings* for additional guidance on slope at street crossings.
- S. (602.22.C) Trail/shared use ~~centerline turning radii~~ paths within the ROW shall ~~be in accordance with Detail 650.36 of this manual; however with the approval of the Director of Transportation, the actual design may be based upon the expected use and site conditions~~ utilize turning radii in accordance with [VDOT RDM Appendix A\(1\)](#).
- T. (602.22.D) Drainage design for trails/shared use paths outside the ROW shall be designed in accordance with the storm drainage requirements in *Section 700.00* of this manual. Shared use paths within VDOT ROW shall meet the VDOT standards for drainage.
- U. (602.22.E) As a general guide, where a trail/shared use path is cut into a hillside, a swale shall be placed along the high side of the path to prevent sheet flow across its width. Appropriate drainage improvements shall be provided along longitudinal slopes exceeding ~~six percent (6%)~~ five percent (5%).

602.15.02. Sidewalk, Trail, and Shared Use Path Bridges and Steps

- A. (602.23.A) When a crossing of a watercourse is required, a pedestrian bridge ~~or a fair weather crossing~~ shall be required.
- B. (602.23.B) Pedestrian bridges shall be designed using a prefabricated steel truss. Bridge decking may consist of pressure treated timber decking or engineered composite materials similar to Trex. Engineered composite materials shall include a non-slip surface or coating. ~~Bridge specifications may be obtained from the Department of Parks and Recreation. Special designs shall be reviewed for locations requiring spans greater than fifty (50) feet or other special design considerations.~~
- C. (602.23.C) If a bridge is required along a trail/shared use path ~~greater than 6 feet in width, the bridge must be a minimum of 1 foot wider on each side of the center line of the trail/shared use path (total of 2 feet)~~ the minimum clear width shall be the same as the approach paved shared use path plus the minimum two (2) foot wide clear areas on each side of the path.
- D. Railings, fences, or barriers on both sides of a path on a structure shall be a minimum of fifty four (54) inches (4.5 feet) high. In situations where the structure crosses a high speed or high volume road and objects are subject to being thrown (dangerously) off the structure, it may be desirable to totally enclose the path with fencing. Totally enclosing a path may also be desirable in other areas such a waterway crossing.

(602.24.A) ~~Trail/shared use path steps shall be provided only in instances where requested by the Director of Transportation.~~
- E. (602.24.B) Trail/shared use path steps shall be concrete and construction shall be in conformance with VDOT standards. An alternative pedestrian access route in accordance with [PROWAG](#) requirements shall be provided within one hundred (100) feet of trail/shared use path steps. Wayfinding signage shall direct trail/shared use path users to the accessible route and back to the trail.

602.15.03. Sidewalk, Trail, and Shared Use Path Maintenance

~~(602.19.A) When sidewalks/shared use paths located within the right of way are not eligible for VDOT acceptance and maintenance pursuant to the Subdivision Street Requirements Manual, a standard tri-party maintenance agreement, developed by the County, shall be executed among the County, the developer, and the homeowners association prior to the final subdivision or site plan approval. This agreement shall be deemed a part of the final subdivision or site plan. The Director of Transportation is hereby authorized to endorse the agreements and amendments described in this section on behalf of the Board of County Supervisors as the County's agent.~~

- A. (602.19.B) If a homeowners association is not established at the time of plan approval, the developer shall enter into a written agreement, developed by the County, under which the developer will assume full responsibility to maintain the sidewalks/shared use paths. This does not apply to sidewalks and shared use paths within VDOT ROW. When a homeowners association is created and enters into a written amendment to the agreement by the County and developer, which amendment is signed by the homeowners association, the County, and the developer, under which the homeowners association assumed maintenance responsibility for the sidewalks/shared use paths, the developer will be relieved of the maintenance responsibility undertaken by the homeowners association. This agreement, and all amendments to the agreement, whenever executed, shall be deemed part of the final approved subdivision or site plan.

602.15.04. Sidewalk, Trail, and Shared Use Path Easements

- A. (602.21.A) Where the typical road section does not include sufficient width to meet the minimum required trail/shared use path, the road section shall be evaluated for potential reductions in lane widths, median width, parking, and other geometric adjustments. When the standard ten (10) foot shared use path still exceeds the existing ROW, the following outcomes shall apply:
1. Additional area shall be placed in an easement adjacent to the street ROW and dedicated to the County in the form of a public trail/shared use path easement to accommodate the trail/shared use path and required buffers.
 2. Reduce the shared use path to eight (8) foot minimum only if (1) bicycle traffic is expected to be low, even on peak days or during peak hours, (2) pedestrian use of the facility is not expected to be more than occasional, (3) there will be good horizontal and vertical alignment providing safe and frequent passing opportunities, and (4) during normal maintenance activities the path will not be subjected to maintenance vehicle loading conditions that would cause pavement edge damage.
- B. (602.21.B) Trail easements shall have minimum widths in accordance with ~~Details 650.37, 650.38, 650.39, and 650.40 of this manual~~ the [PWC Trail Standards Guidelines](#). ~~Additional temporary grading easements may also be required, depending on the slopes~~
- C. (602.21.C) Where trail design requires the construction of a retaining wall, the wall shall be located completely within the easement. This may require the expansion of the easement to accommodate the wall.
- D. (602.21.D) Where trail easements are proposed to encroach in utility easement areas, appropriate coordination must be accomplished with, and approval obtained from, the affected utility owner.

602.16. Bicycle Facilities

602.16.01. General

- A. All proposed improvements which impact public and private roadways shall consider bicycle accommodations. Streets shall include appropriate bicycle facilities as designated in the [Countywide Trails Map](#) or where required by VDOT. The design of these facilities shall conform to the requirements and standards of VDOT and AASHTO and should incorporate design enhancements as specified in the [NACTO Urban Bikeway Design Guide](#).
- B. Intersection markings including bike lane edge striping and/or shared lane symbols may be provided to guide bicyclists through connections to receiving shared lanes, bike lanes, or shared use paths. Green paint may be used to increase bicyclist visibility and alert drivers to expect increased bicycle volumes. Refer to *Section 602.12.08. Bicycle and Micromobility Considerations at Intersections and Crossings* and [MUTCD Chapter 9](#) for guidance on bicycle facility treatments at intersections and crossings. Green paint is not eligible for state maintenance.
- C. Where bicycle facilities, shared use paths, and sidewalks interconnect, an appropriate directional navigation or tactile guidance-surface-directional indicator (TDI) shall be used. Special consideration shall be given where on-street bicycle facilities or off-street trails connect to sidewalks and shared use paths. Refer to VDOT RDM Appendix A3 for use of TDI within VDOT ROW.

~~(602.18.C) Where required by VDOT or designated in the Comprehensive Plan, Class I and Class II bike trails should be provided. The design for Class I and Class II bike trails shall conform to the requirements and standards of VDOT and AASHTO.~~

~~(602.18.F) Trails/shared use paths shall be designed and constructed in accordance with the Details 650.36, 650.37, 650.38, or 650.40 of this manual.~~

602.16.02. Shared Lanes

- A. Shared lane markings provide the lowest level of comfort and protection for cyclists and should only be used on streets with slow vehicle speeds, maximum AADT of approximately five thousand (5,000) VPD, and maximum grades of approximately five percent (5%). Shared lane markings shall not be used as a substitute for bicycle lanes where roadway geometric conditions permit bicycle lanes to be marked.
- B. Shared lane markings should be placed immediately after an intersection and spaced at intervals of two hundred fifty (250) feet maximum thereafter.
- C. Shared lane markings shall be centered in the travel lane. Special consideration shall be given to ensure proper placement along shared lanes with adjacent on-street parking to encourage proper bicyclist positioning and reduce the likelihood of a bicyclist impacting the door of a parked vehicle.
- D. Shared lanes shall include appropriate signage to supplement pavement markings.
- E. On roads with grades steeper than approximately five percent (5%), shared lane markings are more appropriate along the downhill lane as the speed differential between bicyclists and vehicles will be relatively small. Where feasible, a dedicated bike lane should be provided along the uphill lane due to the relatively high speed differential between bicyclists and vehicles.
- F. ~~Shared lanes shall have a maximum lane width of fifteen (15) feet. Lanes wider than fifteen (15) feet shall consider dedicated bicycle lanes. Shared lane widths greater than fourteen (14) feet may encourage the undesirable operation of two motor vehicles in one lane, double parking, or loading/unloading, and unsafe passing distances between vehicles and bicycles and therefore are not recommended. Lanes fifteen (15) feet and wider should consider lane width reductions to accommodate five (5) foot separated bicycle lanes.~~

- G. Shared lane markings may be used along streets with a maximum speed limit of twenty five (25) mph, along Urban County Roads, streets within Small Area Plans, and through intersections to guide bicyclists to receiving shared lanes.
- H. Enhanced shared lane markings include dashed white lines at the edges of the shared lane marking to better demarcate the intended lateral positioning for cyclists to avoid instances of vehicle occupants opening a door into the path of a bicyclist and to reinforce to drivers that bicyclists are allowed to occupy the entire lane. Enhanced shared lane markings may be larger than the standard shared lane marking symbol. Enhanced shared lane markings should be placed more frequently, as closely as fifty (50) feet. Enhanced shared lane markings may be used along streets with a maximum speed limit of ~~thirty twenty five (3025)~~ mph, along Urban County Roads, streets within Small Area Plans, and through intersections to guide bicyclists to receiving shared lanes.
- I. Black background markings may be used in combination with shared lane marking to enhance contrast and should be considered when shared lane markings are applied to an existing roadway that is not being resurfaced.

602.16.03. Standard Bicycle Lanes

- A. A standard striped bike lane may be used to accommodate one-way bicycle travel along local streets, collector streets, Urban Center Streets, and streets within Small Area Plans with a maximum speed limit of thirty five (35) miles per hour and maximum AADT of approximately eight thousand (8,000) VPD.
- B. The minimum width of a bike lane is five (5) feet minimum from the face of the curb to the bike lane stripe for streets without a gutter pan. The width of a bike lane is four (4) feet minimum from the edge of pavement (face of gutter pan) to the bike lane stripe for streets with curb and gutter. Greater bike lane widths shall be used where AADT exceeds approximately six thousand (6,000) VPD or where substantial truck and bus volumes are observed or anticipated. Bike lanes wider than six (6) feet shall consider introducing a buffer instead of increasing width. Bike lanes shall have a maximum width of eight (8) feet. Bike lane widths greater than seven (7) feet may encourage the undesirable parking or standing of motor vehicles, especially in urban areas, and therefore are not recommended.
- C. Bike lanes may utilize green paint to increase facility visibility. Treatments may include continuous green paint, spot treatments at intersection approaches, spot treatments at the beginning of receiving bike lanes, and/or spot treatment surrounding midblock bike lane symbols.
- D. Bike lanes shall be placed to the left of right turn lane(s). Appropriate transitions, including striping and signage, shall be provided along the approach prior to the introduction of a right turn lane.
- E. Bike lane symbol markings should be placed immediately after an intersection and spaced at intervals of five hundred (500) feet maximum thereafter.

602.16.04. Buffered Bicycle Lanes

- A. Buffered bike lanes may be used to accommodate one-way bicycle travel along streets classified as minor arterial or lower, Urban Center Streets, and streets within Small Area Plans with a maximum speed limit of forty (40) mph and maximum AADT of approximately twelve thousand (12,000) VPD.

- B. Buffered bike lanes shall have a minimum width of five (5) feet and minimum buffer width of eighteen (18) inches. Widths of ~~seven-six (76)~~ feet ~~or greater~~ are preferred as they allow for passing or side-by-side riding. Combined buffer and Buffered bike lane widths greater than ~~seven-eight (78)~~ feet may encourage the undesirable parking or standing of motor vehicles, especially in urban areas, and should consider physical separation. (Refer to Section 602.16.05. Physically Separated Bicycle Lanes).
- C. The minimum buffer shall be two parallel white lines spaced eighteen (18) inches apart. Buffers wider than two (2) feet shall include chevron or diagonal striping to enhance the visibility of the facility and reduce driver encroachment into the buffer. Buffers wider than three (3) feet should consider physical separation.
- D. Bike lane symbol markings should be placed immediately after an intersection and spaced at intervals of five hundred (500) feet maximum thereafter.
- E. Bike lane symbol and directional arrow markings should be placed more frequently on wider buffered bike lanes to discourage wrong-way riding by bicyclists.

602.16.05. Physically Separated Bicycle Lanes

- A. Physically separated bike lanes may be used to accommodate one-way bicycle travel on roads classified as minor arterials or lower, Urban Center Streets, and streets within Small Area Plans with a maximum speed limit of forty five (45) mph and maximum AADT of approximately fifteen thousand (15,000) VPD. Physical separation types (in approximate increasing order of relative protection) include delineators, bollards, parking stops, zebra/armadillo separators, curbs, planters, vehicle parking lanes, bollards, and barriers, and curbs.
- B. Refer to [FHWA Separated Bike Lane Planning and Design Guide](#) for guidance on physical separation type, physical separation spacing, and buffer widths.

602.16.06. Contraflow Bicycle Lanes

- A. Contraflow bicycle lanes may be used to accommodate one-way bicycle travel in the opposite direction of vehicle traffic on one-way streets. Contraflow bicycle lanes are often used in combination with shared lanes or dedicated bicycle lanes used on the opposite side of the street, in the same direction as vehicular travel. Refer to [NACTO Urban Bikeway Design Guide](#) for additional design requirements and recommendations. Contraflow bicycle lanes are subject to Director and VDOT approval.
- B. Contraflow lanes may be used on roads classified as collector or lower, Urban Center Streets, and streets within Small Area Plans with a maximum speed limit of thirty five (35) mph and relatively low traffic volumes. A buffer should be considered for contraflow lanes along streets with speed limits greater than twenty (20) mph.
- C. Special consideration should be given to intersection treatment to prevent wrong way vehicle access. The R5-1 “DO NOT ENTER” sign or R6-1/R6-2 “ONE WAY” sign should be used with supplemental R3-7bP “EXCEPT BICYCLES” at intersections to prevent vehicles from entering the one way road using the contraflow lane. Bicycle lane markings, signage, and green colored paint should be used at intersections to guide bicyclists and further enforce that the contraflow lane is restricted to bicycle use.

602.16.07. Pedestrian and Bicyclist Counters/Trail Sensors

- A. Bicycle and pedestrian counters should be considered at or near trailheads, connections between multiple trails/paths, and along shared use paths near schools, parks, and transit stops. Bicycle and pedestrian counters are an important and effective tool for the County to measure and assess progress towards the goals outlined in the [Prince William County 2040 Comprehensive Plan](#) and the [Community Energy and Sustainability Master Plan](#). Bicycle and pedestrian counters help to demonstrate a need for multimodal infrastructure and provide data that can support competitive grant applications for external funding of additional multimodal infrastructure.

602.17. Transit

602.17.01. General

- A. Small Area Plans, Town Centers, Activity Centers, and TOD shall be connected to public transportation services and include appropriate street configurations, lane treatments, loading areas, and transit amenities where practical.
- B. At minimum, a four (4) foot clear path must be available from the pedestrian through zone to any transit door, as well as into transit shelters and to access ~~any~~ transit amenities such as (e.g., ticket vending machines, maps, and wayfinding (refer to NACTO Transit Street Design Guide Chapter 3. Stations & Stops: Accessible Paths & Slopes for additional guidance).
- C. A solid, stable boarding pad that is five (5) feet wide by eight (8) feet deep must be accessible to at least the front door of a transit vehicle to accommodate deployment of bridge plates or ramps for passengers using wheelchairs. While five (5) feet is the minimum curb length for a receiving facility at each boarding door, it is preferred for platforms should to be continuous through all doors (refer to NACTO Transit Street Design Guide Chapter 3. Stations & Stops: Accessible Paths & Slopes for additional guidance).
- D. Transit shelters should be provided at all transit stops to the maximum extent practicable, especially at transfer points, stops in weather-exposed locations or without nearby potential sheltering locations, and at stops with a relatively high use by senior and child passengers. Shelters shall include trash receptacles and either a bench or leaning rail.
- E. Transit shelter design within County and private right of way should be dictated by anticipated wind exposure, sun exposure, right of way constraints, and ridership to determine the level of coverage and capacity needed. Two-sided shelters provide good protection from precipitation and some protection from wind, with open sightlines to approaching vehicles. On narrower sidewalks, place the shelter ahead of the front door loading zone, as the path from the shelter to the front door is not blocked by a shelter wall, allowing a four (4) foot deep shelter to be placed as close as a foot from the curb. Three-sided shelters offer protection from wind and more intense storms, but usually require an opening in the rear side of the shelter or a large space between the shelter and curb to provide an accessible path. Four sided shelters, usually with an entrance at both the sidewalk and curb side, can enhance comfort from extreme winter weather and rainstorms, though they must be at least five (5) feet deep to provide an accessible path into the shelter, be set back from the curbside to provide an accessible pedestrian path, and must have an opening at least thirty two (32) inches wide. Shelters open at both front and back, including cantilever shelters or post shelters, are easy to place and provide protection from sun and light rain, but little wind blockage. Refer to NACTO Transit Street Design Guide Chapter 4. Station & Stop Elements and OmniRide for additional guidance.
- F. At transit stops where a shelter is provided, the boarding pad can be located either within or outside of the shelter.

- G. Shelters serving high-capacity bus services such as BRT should include real-time displays with up-to-date wait times, route maps and schedules, lighting, trash receptacles, and benches or lean bars. Benches installed at transit stops should have armrests [or other discreet features] at the middle of the bench for the comfort of riders and to discourage its use for activities other than a short-term wait for public transportation. Benches shall be a minimum of forty two (42) inches long with twenty (20) inch minimum depth and twenty four (24) inch maximum depth. The top of the bench seat surface shall be seventeen (17) inches minimum and (nineteen) 19 inches maximum above ground level.
- H. Shelters with seating must provide a minimum two and one-half (2.5) foot by four (4) foot clear space for wheelchair users located entirely within the shelter space. Clear zone must not overlap with the seating area, consisting of seat and a seating zone extending one and one-half (1.5) feet in front of the seat.
- I. Parallel to the roadway, the slope of the bus stop boarding and alighting area shall be the same as the roadway, to the maximum extent practicable. Perpendicular to the roadway, the slope of the bus stop boarding and alighting area shall not be steeper than 48:1.
- J. Transit stops should be designed as neighborhood mobility hubs, with bikeshare, carshare, and/or dedicated micromobility parking facilities within the sightlines of alighting passengers.

602.17.02. Transit Stop Placement and Intersection Configuration

- A. Placement of bus stops is context-specific and consideration should be given to adjacent traffic control for bus stops at or near intersections. Along signalized corridors, far-side bus stops are generally preferred so that passengers are not boarding at a green light and so that buses are not dwelling at a red light after passengers board. Along stop controlled corridors, near-side bus stops are generally preferred as they prevent the need for buses to “double stop.”
- B. Periodic pull-out stops should be provided along corridors with primarily in-lane bus stops to allow periodic opportunities for vehicles to pass while the bus is boarding.
- C. Near-side pull-out stops may create significant challenges for buses re-entering the traffic stream and may require queue jump lanes with active transit signal priority or upstream early red phases to accommodate quicker and safer transit maneuvers. This design should only be used for higher-capacity bus services such as BRT. Near-side pull-out stops should be set back from the crosswalk at least 15 feet from the crosswalk to prevent blocking the visibility of pedestrians.
- D. Where very high right turn volumes are present, an in-lane stop may be located on a boarding island between the through/transit lane and right turn lane.
- E. Boarding islands can be incorporated for in-lane stops along streets with buffered bicycle lanes. Dedicated bicycle facilities shall continue behind the stop.
- F. Shared bicycle lane and transit stops may be used to retrofit constrained transit streets with in-lane stops if a boarding island configuration does not fit in either the street or the sidewalk. The slope of the bicycle lane ramp leading to the boarding area shall not exceed 1:8. Appropriate marking and signage shall be provided to ensure cyclists yield to pedestrians boarding or waiting for the bus. Shared bicycle lane and transit stops shall comply with [PROWAG](#) requirements for pedestrian accessible routes. [Refer to NACTO Transit Street Design Guide Chapter 3. Station & Stops: Stop Configurations – Side Boarding Island Stop for additional guidance.](#)

- G. Mid-block stops may be used where large destinations, such as schools or parks, justify high-volume access away from an intersection. Pedestrian crossings at mid-block stops should include refuge islands, traffic calming elements, and/or signalization. Mid-block crossings should not be provided where safe pedestrian crossings cannot be provided. Mid-block crossings should be provided behind the bus stop to enhance pedestrian sightlines, as well as visibility to oncoming traffic.
- H. For center-running transit facilities such as BRT, parking shall be prohibited at stops and the general traffic lane shall bend around the platforms to the right.
- I. Provide five to ten (5-10) feet of distance between each additional transit vehicle expected to be dwelling at the platform consistently throughout the day. This is most applicable to major transfer facilities serving multiple bus routes.
- J. Platform height may be adjusted to improve boarding times and reduce ROW needs. Near-level boarding platforms place the curb height at eight to eleven (8-11) inches and allow an operator to either kneel the bus or deploy a short bridge plate, which require far less space than a full-height bus ramp. Level boarding platforms place the curb height at the floor of transit vehicles, typically twelve to fourteen (12-14) inches, and eliminate the need for kneeling or bus ramps, reducing delay and improving transit reliability. Detectable warning surfaces shall be installed along the edge of near-level and level boarding platforms, except when part of an existing sidewalk.
- K. Transit boarding platforms shall comply with [PROWAG](#) requirements.
- L. Bus pads should be incorporated at bus stops to prevent asphalt deformation due to the weight of the bus. Bus pads should be at least eight and one-half (8.5) feet wide to accommodate both wheels of a bus. At in-lane stops, the bus pad should extend across the full width of the lane and end on the lane line. At pull-out stops, bus pads should be provided for the full length of the clear curb zone, ending before reaching the crosswalk. At in-lane stops, bus pad length should be determined based on the length of the full bus zone. The ideal length of a comparable pull-out stop (with the same bus vehicle length and number of berths) can be used to determine the length of the bus pad.
- M. At pull-out bus stops where the bus crosses a bike lane, the concrete bus pad should end at the right edge of the bike lane or the left edge of the bike lane (including its full width), to prevent the creation of a longitudinal seam within the bike lane. Where bicycles pass stopped buses, as on shared bus-bike lanes, bus pads should be provided across the full width of the lane to provide a level surface to both buses and bicycles. Bus pads should end before the crosswalk to prevent lateral or longitudinal pavement seams in the crosswalk. If a bus pad must be extended into a crosswalk, it should extend across the full width of the crosswalk to prevent wheelchairs from encountering seams between concrete and asphalt.

602.17.03. Transit Lanes

- A. Shared/mixed transit lanes, in which transit operates and/or stops in the same lane as other motor vehicles, may be used on streets with low to moderate traffic congestion where transit can operate reliably with minimal delay. Dedicated transit lanes may be considered on streets where traffic conditions degrade transit performance, leading to slow and unreliable transit service.

- B. Red pavement may be used to enhance the conspicuity of locations, station stops, or travel lanes in the roadway exclusively reserved for vehicles of public transit systems or multimodal facilities where public transit vehicles such as buses, streetcars, trolleys, light-rail trains, and rapid transit fleets are the primary mode. Refer to [MUTCD Chapter 3H.07](#) for additional guidance on red pavement.
- C. Red pavements may be used where engineering judgement determines that one or more of the following conditions are expected to result from its application:
1. Increased travel speeds will be expected by the public transport vehicle after an exclusive lane or facility is provided.
 2. Reduced overall service time through the corridor will be expected by the public transport vehicle.
 3. Decreased rates of illegal parking or occupation of the transit or multimodal lane or facility will be expected.
- D. Red pavement shall be installed for the full width of the lane and may be used for full-time or part-time operations. Red pavement may be installed in a broken pattern where entrance into the transit lane is permitted by general traffic, for example where general traffic is allowed in a transit lane in advance of a turn.
- E. Appropriate regulatory signage shall be used to establish the allowable use of the lane and when it is determined that other vehicles will be allowed to enter the lane to turn or bypass queues.
- F. Bus lanes may be ten to eleven (10-11) feet wide when offset by parallel parking or dedicated bicycle facility, and eleven to twelve (11-12) feet (including the gutterpan) when configured curbside or in transitway adjacent to an opposing lane of bus traffic.
1. The Corridor Matrix adopts VDOT's minimum lane width of eleven (11) feet for a shared or dedicated transit lane, but a ten (10) foot dedicated transit lane may be acceptable on roads that are not owned and maintained by VDOT. Lane widths in the VDOT Road Design Manual do not include the curb and gutter (See VDOT Road Design Manual Appendix A).
- G. Where space is available, use buffers rather than widened lanes to reduce side-swipe risks without increasing design speed. In mixed-travel lanes, added width should be assigned to a buffer zone to visually narrow lanes.
- H. Shared bus-bike lanes may be ten to eleven (10-11) feet wide along segments where neither is expected to overtake the other, such as where bus volumes and speeds are low. Passing at stops may be accommodated with a thirteen (13) foot shared lane (including the gutterpan), which should be marked as a nine (9) foot lane with a four (4) foot striped buffer along the left edge of the lane. The buffer may consist of diagonal white lanes or a dashed white line with green paint/pavement through the length of the bus stop/bus pad.

602.17.04. Transit Signal Priority

A. Transit signal priority, a form of pre-timed or “passive” signal priority, set at realistic travel speeds for on-street transit can significantly reduce transit delay and improve reliability. Typical signal priority set at or near the speed limit can cause transit vehicles to fall behind the signal progression after making a stop, and long signal cycles can impose additional delay on transit. A short signal cycle with offsets that account for dwell time, especially at high-volume stops, allow transit vehicles to remain within the “green wave” of signal progression. Short signal cycles combined with low-speed progressions further reduce the penalty for falling behind the signal progression. Transit signal priority may be utilized on signalized streets with a high volume of transit vehicles, typically more than ten (10) per hour or with combined headways less than four to six (4-6) minutes, and in mixed-traffic or dedicated transit lanes.

A. While specific speeds vary, blocks without a transit stop can often be set at twenty to twenty-five (20-25) mph, while the block before a stop will be set at twelve to fifteen (12-15) mph due to deceleration. The signal after the stop should account for both the full door-open-to-door-closed dwell time, and the low average speed achieved during acceleration. Streets with transit in a dedicated lane may benefit from speeds of fifteen to twenty (15-20) mph if the bus can catch up to the progression after a stop.

A. Timing signal progressions to lower speeds provides additional efficiency benefits to bicyclists and promotes a safer urban street environment for all users by discouraging high speeds. Where bicycles and buses share a lane, prevailing bicycle speeds should be used to set transit progression speeds to prevent leapfrogging. Bicycle speeds are typically twelve (12) mph for flat terrain, lower for uphill, and as high as twenty (20) mph for downhill sections.

602.18. Micromobility

602.18.01. Bikeshare and Dockless Mobility Devices

- A. Bikeshare, dockless mobility devices (including e-scooters and e-bicycles), and transit are complementary modes. Bikeshare and dockless mobility devices can play an important role in expanding a locality’s overall transportation options. Bikeshare stations and bicycle corrals (for dockless mobility devices) ~~and bicycle corrals or dockless mobility parking areas~~ should be placed in close, visual proximity to train stations and major bus stops, building entry points, intersections, other bicycle parking areas, schools, and parks. However, since transit stops are likely to have heavier than average pedestrian volumes, extra consideration should be given to ensure that bikeshare stations and dockless mobility device parking areas are placed in ways that do not impede pedestrian access to sidewalks, shared use paths, or transit stops. Bicycle corrals may be located within no-parking clear distances at intersections. Striped curb extensions and bollards should be used to provide a dedicated parking area on-street for dockless micromobility devices, including e-scooters and e-bicycles.
- B. Bikeshare stations shall include a pedestrian wayfinding map that indicates locations of nearby bikeshare stations, transit connections, landmarks, schools, and parks.
- C. Bikeshare stations may be located in curb lanes of roadways, on sidewalks, in parks and plazas, in medians and buffers, or on publicly accessible private property.
- D. Bikeshare stations are composed of four to fifteen (4-15) plates and range from forty to one hundred fifty (40-150) feet long) with fifteen to fifty nine (15-59) docks. Each modular plate is three (3) feet deep and ten (10) feet long and can accommodate four (4) docked bicycles.

- E. Accommodating a bikeshare station and bicycles requires a space at least eight (8) feet wide with no utilities (such as manholes) under the plates.
- F. The bikeshare station should receive at least three (3) hours of sunlight per day for solar power.

602.18.02. Bicycle Repair Stations

- A. AOne (1) bicycle repair station or equivalent facility shall be required at multifamily dwellings (except townhomes/two-over-two developments) with ten (10) or more units and buildings with more than fifty thousand (50,000) square feet of commercial gross floor area. The repair station should be co-located with long-term bicycle parking (See *Section 603.10. Bicycle and Micromobility Parking*) and include a repair stand. The repair stand shall include a clear area measuring a minimum of ninety (90) inches by forty five (45) inches, with the back of the repair stand placed at least twelve (12) inches from the wall. A basic repair stand should have:
 - 1. A supporting arm to hold a bicycle without causing damage.
 - 2. Basic tools attached to the stand with tamper-proof hardware.
 - 3. An air pump attached to the stand with tamper proof hardware.

602.19. Wayfinding Signage

- A. Wayfinding signage along streets should be spaced a maximum of one-quarter (0.25) mile apart, with additional signs at any intersections requiring a turn towards the destination. This ensures pedestrian walking three (3) mph will encounter a wayfinding sign approximately every five (5) minutes.
- B. Wayfinding signage along separated and off-street trails should be spaced a maximum of one-half (0.5) mile apart. This ensures that a pedestrian walking three (3) mph will encounter a wayfinding sign approximately every ten (10) minutes and bicyclist traveling ten (10) mph will encounter a wayfinding sign approximately every three (3) minutes.
- C. Streets with pedestrian and/or bicyclist facilities, especially multimodal corridors, should incorporate wayfinding signage within one-half (0.5) mile of elementary schools, one (1) mile of middle schools, and two (2) miles of high schools; within one (1) mile of public parks, libraries, and recreation facilities; and within one (1) mile of transit stops.
- D. Wayfinding signage should include directional arrows, point of interest name, distance in miles ~~(and kilometers if space permits)~~, and travel time in minutes.
- E. Wayfinding signage shape, size, and color shall be designed in accordance with [MUTCD Chapter 2D.55 Community Wayfinding Signs](#).

602.20. Traffic Calming

- A. Refer to the [Prince William County Residential Traffic Management Guide](#), [VDOT Traffic Calming for Neighborhood Streets](#), and NACTO design guides for traffic calming design guidance and implementation.
- B. Full or half-closures, diagonal diverters, and forced turn islands (including forced right-turns) are not desirable speed reduction measures as they restrict traffic.
- C. Newly constructed streets shall incorporate appropriate traffic calming elements as necessary to reinforce design speed and ensure safety for all road users, including pedestrians, bicyclists, and drivers.

602.21. Unpaved Facilities

602.21.01. Low-Volume Unpaved Streets (LVUS)

- A. The geometric design of Low-Volume Unpaved Streets (LVUS) presents a unique challenge because the very low traffic volumes and reduced frequency of crashes make designs normally applied on higher volume roads less cost effective.
- B. LVUS are typically classified as local roads with a design ADT of two hundred fifty (250) VPD or less. LVUS primary function is to provide access to residences, farms, businesses, or other abutting property. Through traffic is not a primary purpose, although some traffic may occasionally use these streets. LVUS may include streets classified as collector streets when the design average daily traffic volume is two hundred fifty (250) VPD or less. Where traffic volumes vary substantially from season to season, design should be based on the ADT during the peak season.
- C. LVUS may be utilized in a wide variety of contexts that primarily serve local, familiar traffic.
 - 1. Residential – Serve almost exclusively to provide access to adjacent property, often as cul-de-sac streets, loops, or alleys. Traffic is largely composed of passenger vehicles or other smaller vehicle types, though these streets need to be accessible to school buses, emergency vehicles (such as fire trucks), and maintenance vehicles (such as snow plows or garbage trucks).
 - 2. Industrial and Commercial – Serve developments that may generate a significant proportion of truck or other heavy vehicle traffic with the primary purpose of providing access from a factory/commercial use. These LVUS are typically very short and in many cases do not serve through traffic.
 - 3. Agricultural – Serve primarily to provide access to fields and farming operations. Traffic is typically composed of combines, tractors, trucks, and other large and slow-moving vehicles that may be wider than a typical truck.
 - 4. Resource Recovery – Serve logging or mining operations and typically found only in rural areas. These streets are distinctly different from other LVUS in that they are primarily or exclusively used by specialized vehicles and professional drivers. Traffic operations may be enhanced through radio communication between drivers to enable these LVUS to built and operated as single-lane streets.
- D. LVUS provide an economic alternative for low-volume streets for which the cost of constructing and maintaining a paved surface would be prohibitive. Provision of roadside clear zones, flatter slopes, or traffic barriers is generally inconsistent with the economic decision to build and maintain an unpaved surface and is generally not necessary for the low-speed environment of a LVUS.
- E. In addition to economics, LVUS are less likely to negatively impact the environment, roadway, and roadside aesthetics, existing development, historic and archeological sites, and endangered species.
- F. Crash rates for unpaved roads are lower for narrower roadway widths (NCHRP Report 362). Existing LVUS should avoid widening of lanes and shoulders, changes in horizontal and vertical alignment, and roadside improvements except in situations where such improvements are likely to provide substantial safety benefits based on evidence of a site-specific safety problem that may be corrected by widening.
- G. LVUS shall include signage for roadway names, private road identification, and traffic control, as may be appropriate.

- H. LVUS constructed of gravel must include a fifty (50) foot paved apron only when accessing an existing paved road.
- I. Dead-end LVUS not deemed a fire access road shall require a permanent turnaround when the street exceeds four hundred (400) feet in length, measured along the centerline from the last intersection with a public or private roadway to the end of the unpaved street.
- J. Newly constructed LVUS shall utilize minimum centerline curve radii in accordance with *Table 6-14 Low Volume Unpaved Street Design*. The minimum centerline radius of curvature should be fifty (50) feet. Refer to the United States Forest Service [FSH 7709.56 Chapter 43.1 – Horizontal Alignment](#) for additional guidance.
- K. Superelevation along LVUS shall be limited to six percent (6%) and should be reduced further on grades to accommodate slow truck traffic. Superelevation should generally be avoided on LVUS with design speeds of less than twenty (20) mph.
- L. Road gradient has a major effect on the environmental impact of a road, particularly in terms of erosion, and has a significant effect on maintenance and user costs. LVUS with native soil or aggregate-surface roads should maintain a minimum grade of two percent (2%) to facilitate surface drainage where possible. Where flat grades occur on level ground, crowning the road surface is recommended. Maximum grades along LVUS primarily used by trucks should be limited to eight percent (8%) or twelve percent (12%) for a pitch of up to three hundred (300) feet in length. Steeper road grades increase the impacts of erosion potential and the power of water velocity and adversely impact the performance of loaded trucks.
- M. Refer to the United States Forest Service [FSH 7709.56 Chapter 43.2 §3. Vertical Curves](#) and AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (2001) Chapter 4 for detailed guidance on calculating minimum vertical curve lengths for crests and sags. The minimum vertical curve length shall be fifty (50) feet.
- N. Newly constructed LVUS shall utilize sight distances in accordance with Table 6-15 Low-Volume Unpaved Street Sight Distance. Note that these values apply to horizontal curves, crest vertical curves, and sag vertical curves.

602.21.02. Unpaved Parking Lots

- A. Gravel, grasscrete, reinforced grass or gravel systems, or other suitable materials may be used for access and parking areas for agricultural and rural economy uses. Elsewhere, such materials may be used for temporary and overflow parking areas, low volume access ways and, when site conditions warrant, standard parking areas. The parking areas shall be well drained with defined travel aisles and designated parking bays. If, due to the rural nature of the facility, it is not feasible or practical to provide defined travel aisles and designated parking bays, the land development application shall provide a note explaining how this requirement shall be met (i.e., parking attendants, signs, etc.).
- B. The walking surfaces of pedestrian access routes, elements, and spaces that are required to be accessible per the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA) shall be stable, firm, and slip resistant surface in compliance with [PROWAG Section R302.6 Surfaces](#) and the [ABA Standards Section 302 Floor or Ground Surfaces](#). A stable surface is one that remains unchanged by contaminants or applied force, so that when the contaminant or force is removed, the surface returns to its original condition. A firm surface resists deformation by either indentations or particles moving on its surface. A slip-resistant surface provides sufficient frictional counterforce to the forces exerted in walking to permit safe ambulation.

602.22. Existing Roadways and Retrofit Standards

- A. Existing roadways shall be designed and constructed in general accordance with the provisions of previous sections of this document with consideration of ROW limitations, existing and anticipated land use, and community/neighborhood context.

(602.04.C) ~~On existing streets, the design speed shall be determined by Table 6-3.~~
- B. Design speed for existing roadways shall align with the provisions of *Section 602.02. Design Speed* and Table 6-3.
- C. Where existing ROW and development impedes the introduction of expanded or dedicated multimodal facilities, reductions in curb return radii may provide the most effective solution to increase safety for all road users. Refer to *Section 602.20. Traffic Calming* for strategies to reduce vehicle speeds and pedestrian/bike crossing distances.
- D. Reconstruction of existing roadways without pedestrian facilities shall provide a minimum 5' sidewalk on at least one side of the street. Reductions in the number of lanes, lane widths, or on-street parking should be considered such that new pedestrian and/or bicycle facilities can be accommodated within the existing ROW.
- E. When shared lane markings are added to an existing roadway, excessive lane widths should be avoided. Edge line striping or buffer striping should be considered along the outside of the lane to provide traffic calming effects.
- F. For restriping or reconstruction of multilane roads using lanes of unequal width, locating the wider lane on the outside (right) provides more space for larger vehicles that usually occupy that lane, can better accommodate in-lane transit stops, provides more space for bicycles in shared lanes, and allows drivers to keep their vehicles at a greater distance from the right edge. The widths needed for all lanes and intersection design controls should be evaluated collectively with consideration of all user modes and the adjacent land use. A wider right-hand lane may be attained by providing a narrower left turn lane.
- G. Any reductions in the travelway shall be evaluated for enhanced pedestrian facilities, dedicated bike facilities, and dedicated transit facilities, particularly along roadways identified in the [Prince William County Countywide Trails Map](#), [Prince William County 2040 Comprehensive Plan Transit Connectivity Map](#), [Prince William County 2040 Comprehensive Plan Future Transit Alternatives Map](#), and within Small Area Plans as shown on the [Prince William County 2040 Comprehensive Plan Roadway Plan Map](#).
- H. Contraflow bicycle lanes may be retrofitted to existing divided or one-way streets to address known issues with wrong-way bicycling.

603.00. PARKING

603.01. General

- A. (610.01.A) The off-street parking and loading spaces required by this section are minimum standards. Additional parking and loading spaces may be required as part of the site plan review, special use permit, and zoning map amendment processes. All uses shall provide parking and loading spaces in a number sufficient to handle the normal demand of employees, customers, and deliveries. When separate parking tabulations are required for components of a use, the square footage used for a component use shall be deducted from the square footage of the total use for general parking tabulation requirements. For uses not specifically listed in Table 6-8, the Director of Transportation, with the concurrence of the zoning administrator, shall require a minimum number of parking and loading spaces, based on the most similar use that is listed. For any individual use, the Director of Transportation may require additional off-street parking and loading spaces when the operation of that use shows a repeated need for more spaces, based upon the intensity of a particular use proposed, by reference to the general standards provided in these sections.
- B. (610.02.B) When ancillary uses are itemized in conjunction with a calculation for nonresidential uses, the square footage calculated for ancillary use shall be deducted from the square footage of the overall use.
- C. (610.01.B) The off-street parking and loading spaces required by Table 6-8 shall be reserved for, and located upon the same property, as the use for which they are required, except as provided in Section 603.11. Shared Parking. No off-street parking shall extend into any public ROW or required buffer area. Parking and loading spaces required for all uses, except one-family and two-family residential uses, shall have direct access from an interior driveway, and shall not necessitate backing from the space into any public street.
- D. (610.01.C) Parking and loading spaces (based on the square footage of a building) shall be calculated on the net floor area. Spaces based on the number of employees shall be calculated on the ~~maximum~~ number of employees normally present ~~at any one time~~ during a major shift. Spaces based on the capacity of a building shall be calculated on the occupancy load allowed by the VUSBC. Spaces based on the number of seats, when benches are used, shall be calculated on every eighteen (18) inches of bench space counting as one seat.
- E. (610.01.C) When the calculations of parking and loading spaces result in a fraction of five-tenths (0.5) or greater, the next greatest whole number shall be used. Parking and loading spaces required for two (2) or more uses on the same property shall be the sum of each use after rounding each uses' total down as described above, except as described in Section 603.11. Shared Parking and Section 603.08. Parking Reductions.
- F. (610.03.D) All parking credit ~~allowances~~ reductions other than those provided in Table 6-16 shall be subject to the authority of the zoning administrator to increase spaces under the provisions of this manual.
- G. (610.04) Up to fifty percent (50%) of the required spaces may be deferred provided there is sufficient area, as shown on the site plan, to construct the deferred spaces, and provided a written agreement, binding on all present and future property owners, is submitted stating that the deferred spaces shall be constructed when, in the opinion of the Director of Transportation and the zoning administrator, such construction becomes necessary.
- H. (610.06.M) Generally, parking areas shall be graded at a slope not to exceed five percent (5%) with a maximum slope not to exceed ten percent (10%), ~~with the exception of accessible spaces~~ except that accessible parking spaces and pedestrian access routes shall comply with PROWAG. ~~However, design should take into consideration accessibility requirements.~~

603.02. On-Street Parking

- A. Parallel on-street parking spaces shall be identified by appropriate signage, striping, and curb markings in accordance with [PROWAG](#) and [MUTCD](#) guidance. [Pavement markings and signage plan are subject to approval by VDOT on public streets.](#)
- B. Parking should be restricted within twenty (20) feet of any marked or unmarked street crossing or within fifteen (15) feet of any crosswalk with a curb extension to ensure pedestrian visibility and maintain sight distances. Accessible parking spaces and micromobility parking (bikeshare stations and bicycle corrals) may be provided within these clear zones.
- C. On-street parking spaces designated exclusively for residential parking, commercial vehicles, or law enforcement vehicles shall not be required to comply with on-street accessible parking requirements.

603.03. Off-Street Parking

~~(610.02.A) Off-street parking and loading spaces shall be provided for every use allowed by the Zoning Ordinance in accordance with the provisions of Table 6-8.~~

- A. Refer to Table 6-8 for base parking requirements for specific land uses.
- B. Surface parking lots and above-ground parking structures should be sited to the rear or side of buildings or interior to a group of buildings in Small Area Plans, Local Activity Centers, MultiModal Hubs, and Transit Districts of Centers. Buildings should generally provide rear entry to accommodate rear-sited parking.

~~(610.01.H) In circumstances where no customer or public entrance or access is located at the rear, no more than five percent (5%) of the required spaces shall be located in the rear of buildings or retail uses.~~

~~(610.01.I) In the event a question shall arise regarding the classification of a use for application of these standards, the Director of Transportation shall determine the classification after consultation with the zoning administrator.~~

- C. (610.06.A) All parking and loading spaces (including required accessible parking), driveways, entrances, and exits shall be designed and surfaced in accordance with *Section 650.00. DETAILS*.
- D. (610.01.J) *Except as provided in Section 602.21.02. Unpaved Parking Lots, A* all required access streets, aisles, travelways, and parking lots, except those used for single family detached lots or areas used for vehicle storage in the M-1 and M-2 zones, shall be constructed and maintained with a paved surface. In commercial developments, paved parking areas shall be required or demonstrated to be available for each tenant requesting an occupancy permit. Paved parking areas and structures shall be designed in accordance with this section and Detail 650.06 of this manual. The Director of Transportation may allow a waiver for the use of alternate surfaces such as dustless surface, GEO GRID or grass reinforcing for aisles, travelways, off-street parking in commercial developments, or developments maintained by the property owner. It will be based upon determination that such alternative of modifications will not have an adverse impact on the surrounding area and on the site. The adverse impact may include but not be limited to circulation, public safety, storm drainage and/or stormwater management, water quality, and erosion and sediment controls.

- E. (602.07.T) All vehicles that are permitted to be parked or stored on residential properties on one (1) acre or less shall be parked or stored only on areas that are improved. Such parking or storage areas and similarly improved driveways shall not occupy more than thirty-five (35) percent of or seven hundred and twenty (720) square feet of the minimum required front yard, whichever is greater. In the case of pipestem lots, areas that are contained within the ingress and egress easement shall not be included when calculating the coverage of the front yard by parking areas and driveways. This maximum coverage requirement may be modified as a part of the consideration of a modified dwelling unit type as indicated in the [Zoning Ordinance Sec. 32-300.02](#).
- F. (602.16.1.J) Each cluster pipestem lot shall have a paved driveway large enough to accommodate three (3) vehicles exclusive of the garage. The required parking shall not be located within the pipestem portion and shall be located outside of the ingress/egress easement.
- G. (602.16.2.G) If parking is not permitted along the main roadway fronting single family detached lots served by rear alleyways, three (3) on-site parking spaces, exclusive of the garage, shall be provided for each lot.
- H. (610.05) Parking and loading spaces, and travelways, except for one-family and two-family residential use, shall be set back as follows:
1. At least ten (10) feet from any street ROW
 2. At least ten (10) feet from all other property lines, except at least fifteen (15) feet from property lines where a nonresidential use abuts a residential district
 3. Interior driveways or travelways shall be subject to the setbacks in paragraphs 1 and 2 of this section, except where joint driveways or travelways are utilized. Entrances and exits off a public street shall be subject to the setbacks in Minimum Standards of Entrances to State Highways Manual of VDOT, except where joint driveways or travelways are utilized.
 4. All setback areas required under this section shall be landscaped and/or screened in accordance with *Section 800.00* of this manual.
- I. (610.01.D) Up to fifty percent (50%) of the required off-street parking may be located on an adjacent or abutting property if permitted by [Zoning Ordinance Sec. 32-400.26](#). In addition, where pedestrian access in the off-street parking requires traversing a public or private street designated or presently carrying traffic volumes ~~equal or greater than major collector or arterial roadways~~ 7,000 VPD, a pedestrian underpass, overpass, or traffic signal shall be required. Wherever parking is permitted pursuant to this section, appropriate instruments noting the restricted use of the adjacent property for parking purposes shall be recorded among the land records.
- J. (610.01.E) For churches or places of religious worship or assembly or religious institutions with related facilities in the agricultural and residential zoning district, up to fifty percent (50%) of the required off-street parking may be located on one (1) adjacent lot per *Section 603.03.J* of this manual, or on one (1) satellite parking lot with special use permit (in accordance [Zoning Ordinance Sec. 32-300.07](#)), provided appropriate instruments noting the restricted use of the adjacent or satellite property for church, religious institution, or public use (such as a commuter lot) parking purposed shall be recorded among the lang records, and provided the satellite parking lot is zoned agricultural or residential.
- K. (610.01.G) Parking lots may be provided on a lot other than that lot on which the principal use is located, provided:

1. The entire parking lot is within five hundred (500) feet of the nearest boundary of the record lot on which the use is located; and
 2. A legal arrangement assures the permanent availability of the parking lot and is secured prior to final site plan approval.
- L. (610.01.K) Visitor parking spaces should be dispersed evenly throughout the development in close proximity to the units they serve.
- M. (610.06.D) Before occupancy of any single family attached unit, the parking spaces assigned to the particular unit should be demarcated or marked (labeled) on the curb.
- N. (610.06.B) For single family attached/fee simple and condominium development except on medium to high rise (3 story and above) development with private driveways and parking areas owned by a homeowners association, required off-street parking, except parking required for boats, trailers, and similar vehicles, shall be provided on each lot or within one hundred fifty (150) feet of each dwelling unit measured over sidewalks or other paved surfaces. Parking spaces must be labeled (e.g., street address, lot number, etc.), either to designate the single family attached dwelling unit they serve or to indicate that they are reserved for visitors.
- O. (610.06.C and 610.06.I) For single family attached and multifamily developments, required off-street parking spaces shall be demarcated by four (4) inch white lines painted on the pavement or the curb. Full delineation by four (4) inch wide lines painted on the pavement showing the full width or length of the parking stall or parking spaces shall be required on commercial, office, and industrial developments. Where paved parking areas are not required, delineation of parking spaces shall be by the use of individual wheel stops or other acceptable means for each unpaved parking space.
- P. (610.06.J) Off-street parking areas shall include appropriate bumper guards where needed, as determined by the Director of Transportation. Header curb may be substituted for bumper guards, provided it is located at least ten (10) feet from any property line. This will avoid vehicle overhang into adjacent properties.
- ~~(610.06.K) When a nonresidential use abuts a residential use, the parking and loading spaces in the nonresidential use shall be set back fifteen (15) feet from the property line and the screening requirements shall be met.~~
- ~~(610.06.L) Off street parking is to be provided with safe and convenient access to a street. Where spaces and travelways are located contiguous to a street, they shall be set back at least ten (10) feet from the right-of-way. The side of the parking area and travelways adjacent to the street shall be curbed, allowing for ingress and egress through approved driveway locations. Design necessitating backing from a space into a street or entrance shall not be permitted.~~
- Q. (610.06.N) Travelways shall be a minimum width of twenty-two (22) feet. A one-way travelway may be a minimum of twelve (12) feet in width, provided there is no perpendicular parking along its length, it is clearly marked with signs and pavement markings, and provided it is not labeled as a fire lane. Angle parking may be provided in accordance with Table 6-10 of this manual.

- R. (610.06.O) The minimum dimensions of an off-street standard parking space should be in accordance with Table 6-10 and ~~6-11 of this manual~~. When the angle of parking is ninety (90) degrees to the aisle and wheel stops are provided, a two (2) foot overhang measured from the face of the wheel stop contacted by vehicle tires shall be allowed, provided it does not overlap with the required area of surrounding spaces, encroach on the required landscape setback, or restrict pedestrian access. For angle parking other than ninety (90) degrees, the minimum dimensions required shall be in accordance with Table 6-10.
- S. (610.06.Q) Parking spaces designated for compact cars may be provided. Each space shall be clearly marked. Such spaces shall not constitute more than twenty percent (20%) of the entire parking space requirement and meet the minimum dimensions outlined in Table 6-10. If compact parking spaces are provided, it is preferred to site them adjacent to pedestrian access routes, sidewalks, trails, shared use paths, or walkways to prevent large vehicles from overhanging and restricting pedestrian access.
- T. Parking spaces designated for motorcycles or scooters may be provided. Such spaces shall not constitute more than five percent (5%) of the entire parking space requirement and meet the minimum dimensions outlined in Table 6-10.
- U. (610.06.R) Parallel parking spaces shall have a minimum length of twenty-two (22) feet and a minimum width of nine (9) feet, except that along Urban Center Streets the width may be reduced to eight (8) feet.
- V. (610.06.S) All structured parking not below ground level shall meet the definition of “parking deck or garage” as defined by the [Zoning Ordinance Sec. 32 Article I](#). Parking decks or garages are subject to the building setbacks for the zoning district in which they are located.

603.04. Off-Street Stacking Spaces

- A. (610.07.A) For all uses with a drive-up window (banks, kiosks, etc., except restaurants) and for all uses involving customers waiting in line while in their vehicles (car washes, drive-in theatres, etc.), in addition to the parking space requirements of this section, off-street stacking spaces for at least six (6) motor vehicles shall be provided for the first window or unit, and thereafter five (5) off-street stacking spaces shall be provided for each additional window or unit. Where development uses require fewer than the required stacking spaces by a justifiable study, a waiver request may be considered on a case-by-case basis by the Director of Transportation.
- B. (610.07.B) For restaurants with drive-in, drive-up, or drive-through units or windows, eleven (11) on-site stacking spaces with at least six (6) queuing spaces from each order board shall be required. Five (5) stacking spaces shall be required between the order board and pickup window.
- C. (610.07.C) For pharmacies with drive-up, or drive-through units or windows, four (4) stacking spaces shall be required for each window.
- D. (610.07.D) The minimum dimension for a stacking space shall be eighteen (18) feet by eleven (11) feet in its entirety. The stacking spaces shall not interfere with the travelways, parking, loading spaces, or island curbs.
- E. (610.07.E) The design of drive-through lanes for businesses that provide no more than one drive-through lane shall include provisions for an unencumbered lane that allows customers to bypass stacked vehicles.

603.05. Off-Street Loading

- A. Refer to Table 6-8 for off-street loading requirements for specific land uses.

- B. Off-street loading spaces shall be sited to minimize conflicts between vehicles, pedestrians, and bicyclists.
- C. Off-street loading spaces must be located on the same lot as the use served, unless the loading spaces are approved to be shared between two or more uses.
- D. (602.06.P) The minimum dimension of a standard loading space shall be at least twelve (12) feet by forty-five (45) feet and shall have a minimum vertical clearance of at least fourteen (14) feet. ~~However, in a commercial, industrial project of more than one building, some of the required loading spaces could be reduced to thirty-five (35) feet as long as one standard loading space of twelve by forty five (12 x 45) feet provided for each building.~~ Developments requiring more than one loading space must provide at least one standard twelve foot wide by forty five long by fourteen feet high (W12' x L45' x H14') loading space but may utilize a reduce length of thirty-five (35) feet (W12' x L35' x H14') for subsequent loading spaces.

603.06. Adequate Receiving Facilities (ARF)

- A. Adequate Receiving Facilities (ARF) are required for all structures that are likely to receive or make deliveries from vehicles of a size or at a frequency that may interfere with vehicle parking or circulation on the parcel or surrounding developments. ARF are intended to accommodate delivery vans, rideshare pickup/dropoff, or other short-term parking need.
- B. ARF are not subject to the size restrictions for loading spaces described in *Section 603.05.D.* such that they provide sufficient space for loading activities without encroaching into or interfering with traffic circulation, drive aisles, pedestrian/bicycle facilities, or other parking spaces. Acceptable ARF may include:
 1. Reserved parking spaces with sufficient space for loading activities
 2. Pull off area along the curb that does not restrict vehicular movement with sufficient space for loading activities that does not restrict pedestrian/bicyclist movement
 3. Area within a structure for loading activities
 4. Undeveloped areas of a parcel not designated for parking or landscaping and not necessary for vehicle, pedestrian, or bicycle circulation.
- C. ARF shall be located near an entrance to the building.
- D. ARF shall not block or restrict access to an accessible parking space or pedestrian access route.
- E. A minimum of one (1) ARF shall be required for all multifamily developments with more than eight (8) units
- F. Wayfinding signage should be located near ARF to assist delivery services and ensure ARF availability through quick vehicle turnover.

603.07. Accessible Parking

- A. On-street and off-street accessible parking ~~and building or sidewalk accessibility shall be provided in accordance with the current edition of the current edition of the Virginia Uniform Statewide Building Code~~ comply with [PROWAG](#) and VUSBC.
- B. (610.08.B) Accessible parking spaces shall be identified by above grade signs and demarcated in accordance with Details 650.57 and 650.58 of this manual and [ADAAG](#) standards.

- C. Parallel on-street accessible parking spaces shall be twenty four (24) feet long minimum and thirteen (13) feet wide minimum and shall not encroach on the traveled way. Refer to [PROWAG R310 On-Street Parking Spaces](#) for additional guidance and exceptions.
- D. The center fifty percent (50%) of the length of the sidewalk, or other surface, adjacent to parallel on-street accessible parking spaces shall be free of obstructions including parking identification signs, parking pay meters, and parking pay stations.
- E. Parallel on-street accessible parking spaces and off-street accessible parking spaces shall connect to pedestrian access routes. If needed, a curb ramp or blended transition in accordance with [PROWAG](#) shall be provided at either end of the parking space and shall not reduce the required width or length of the parking spaces. Where two or more accessible parallel parking spaces are provided contiguously, each space shall have an independent connection to the pedestrian access route.
- F. The portion of a pedestrian access route within a street that connects an accessible parallel on-street parking space to the nearest crosswalk at the end of the block face or the nearest midblock crosswalk is not required to comply with *Section 602.15. Sidewalks, Trails, Shared Use Paths, and Pedestrian Access Routes*.
- G. **(610.07.C)** On-street accessible parking spaces shall be located as closely as possible to a crosswalk. Off-street accessible parking spaces shall be located as close as possible to a main building entrance ramp or walkway. However, the Director of Transportation may require some spaces at alternate locations to provide greater accessibility for the entire development. A combination of ramps, walkways, crosswalks, or curb ramps shall be required in conjunction with those spaces.
 - ~~(610.07.D) Where curb exists between the parking lot and sidewalk, an inclined approach shall be provided to allow convenient access for wheelchairs. Built-up curb ramps shall be located so that they do not project into traffic lanes. This approach shall have a slope of not more than one (1) foot in twelve (12) feet and be three (3) feet wide, exclusive of flare sides. Inclined approaches shall be provided and arranged to allow convenient access to a building entrance and from one (1) curb area to another. Such approaches shall be provided at intervals not exceeding one hundred (100) feet.~~
 - ~~(610.07.E) A request for modification of any of the requirements of this section must be submitted in writing to the Director of Transportation.~~
- H. Detectable warning surfaces are not required on curb ramps and blended transitions used exclusively to connect passenger loading zones, accessible parallel on-street parking spaces, and access aisles for perpendicular and angled parking spaces to pedestrian access routes.
- I. Where on-street parking spaces are provided and metered or designated by signs or pavement markings, accessible parking spaces shall be provided in accordance with [PROWAG Table R211](#); generally four percent (4%) of total parking spaces. Where parking is designated by signs or pavement marking, but individual spaces are not marked, each twenty (20) feet of street where parking is designated shall be counted as one parking space.

- J. Where permanently designated passenger loading zones other than transit stops are provided, at least one accessible passenger loading zone shall be provided in every continuous one hundred (100) feet of loading zone space, or fraction thereof. Accessible passenger loading zones shall provide a vehicular pull-up space that is ninety six (96) inches wide minimum and twenty (20) feet long minimum. Vehicle pull-up spaces shall have adjacent access aisles that are sixty (60) inches wide minimum extending the full length of the vehicle pull-up space. Access aisles shall be at the same level as the vehicle pull-space they serve and shall not encroach on the traveled way.
- K. Where on-street parking spaces are altered, the accessible parking requirements shall apply only to the affected parking spaces until the minimum number of accessible on-street parking spaces as specified in [PROWAG Table R211](#) are provided.
- L. Where parallel on-street parking spaces are altered but the adjacent pedestrian circulation path is not, any accessible parking spaces may have the same dimensions as the adjacent parallel on-street parking spaces if they are provided nearest the crosswalk at the end of the block face or nearest a midblock crosswalk, and a curb ramp or blended transition is provided serving the crosswalk.

603.08. Parking Reductions

- A. Refer to Table 6-16 for parking reductions for specific land uses, with by-right reductions permitted based on land use, development area classification, proximity to transit, and walkability.
- B. Parking reduction requests not subject to, or beyond the by-right reductions, can be submitted as a waiver to DOT. Requests will be subject to DOT review and approval (if part of site plan review) or DOT review and Board of County Supervisors approval (if part of a development case such as rezoning or special use permit).

~~(610.03) Up to thirty percent (30%) of the required parking spaces may be waived when the use is located in a Mixed Use District (MXD) or an area of development that normal individual demand will not be generated. In considering this waiver request, weight shall be given to the availability of public transportation, the proximity of commercial parking garages or lots, and the expected overlap of commercial and employment activities in the area.~~

603.09. Electric Vehicle (EV) Parking

- A. Electric vehicle parking spaces should be considered for all developments, especially multifamily, commercial, and offices.
- B. EV parking spaces may consist of traditional, hardwired charging equipment or an accessible 240V outlet to accommodate portable Level 2 charging equipment.
- C. Publicly accessible charging stations, particularly Direct Current Fast Charging (DCFP) stations, shall be encouraged to use the Open Charge Point Protocol (OCPP).
- D. Charging stations shall enable multiple forms of payment, including credit card, smart phone applications, keyless fobs, and toll-free number payment support. As much as possible, stations shall have open access and prohibit network subscription-based services.
- E. Charging station outlets and connector devices shall be mounted to comply with state code and must comply with all relevant Americans with Disabilities Act (ADA) requirements.
- F. Charging station equipment shall be protected by wheel stops or concrete filled bollards.
- G. Charging station equipment shall not reduce the size of the parking space below current minimum requirements.

- H. Cords shall be retractable or have a place to hang the connector and cord sufficiently above the pedestrian surface. Any cords connecting the charger to a vehicle shall be configured so that they do not cross a driveway, sidewalk, or passenger unloading area.
- I. Equipment mounted on pedestals, lighting posts, bollards, or other devices for on-street charging stations shall be designed and located so as not to impede pedestrian travel or create trip hazards within the right-of-way.
- J. Site lighting shall be provided where a charging station is installed unless charging is for daytime purposes only.
- K. Each charging station shall be posted with signage indicating the space is only for electric vehicle charging purposes. The following information shall be posted at all electric vehicle charging stations:
 - 1. Voltage and amperage levels.
 - 2. Hour of operations if time limits or towaway provisions are to be enforced by the property owner
 - 3. Usage fees
 - 4. Safety information
 - 5. Contact information for reporting when the equipment is not operating or other problems
- L. Charging stations shall use managed charging solutions – including networked and smart charging capabilities – to support flexible and responsive electrical load management to better align charging needs with electrical system requirements. Such managed charging may also offer local electrical distribution grid integration opportunities in the future.

603.10. Bicycle and Micromobility Parking

603.10.01. General

- A. Refer to Table 6-13 for short-term and long-term bicycle parking requirements for specific land uses.
- B. Bicycle parking shall include parking designated for bicycle, e-bicycles, scooters, e-scooters, bikeshare, or other micromobility devices.
- C. Bicycle parking may be provided within on-street parking lanes and should include striping, signage, physical barriers (bollards, rubber curbs, parking stops, etc.), and bike racks to designate these areas for private and dockless micromobility devices. Bikeshare stations may also be provided on-street.
- D. All existing residential buildings with eight (8) or more units are required to provide a reasonable number of bicycle parking spaces within thirty (30) days after written request from one or more tenants or property owners. A reasonable number shall be defined as the lesser of the minimum required bicycle parking spaces or enough bicycle parking to meet the requested demand.
- E. All substantially rehabilitated residential buildings with eight (8) or more units shall provide the minimum number of bicycle parking spaces in accordance with Table 6-13. A building shall be deemed new or substantially rehabilitated if the building permit is issued on or after the adoption of these rules.

- F. Where it can be demonstrated that providing the minimum bicycle parking spaces required for substantially rehabilitated residential buildings is not physically practical, that undue economic hardship would result from full compliance, or that the nature of the building use is such that bicycle parking spaces would not be used, approval may be granted to provide a reduced number of bicycle parking spaces. Prior to an approval of reductions in bicycle parking, adjacent on-street and onsite off-street vehicle parking should be evaluated. A reduction in one standard vehicle parking space can accommodate up to ten (10) bicycle parking spaces via five (5) bicycle parking racks.
- G. Bicycle parking may be reduced by one (1) space for every two (2) public bikeshare stalls within 500 feet walking distance of the development. This reduction shall not apply to permit a reduction below the absolute minimum provided within Table 6-13.
- H. (610.02.C) Bicycle racks, lockers, or docking stations for bikeshare programs shall be considered in the vicinity of all existing and proposed transit stops along arterial and collector corridors within the County by a designated public transit agency operating within the County or be private development with proffered or conditioned commitments to provide a transit stop in conjunctions with development approval. If determined to be appropriate by the County, a minimum of five (5) bicycle spaces will be provided at each designated transit stop. The following factors will be considered by the County for a determination:
1. Whether existing bicycle racks and/or bicycle locker facilities and docking stations are already in place at or within one-quarter (0.25) mile
 2. Where there is substantial proximate residential, commercial, and office development in the vicinity
 3. Whether the transit stop is located on an arterial or collector road facility
 4. Anticipated demand for bicycling in the area
 5. Safety considerations
 6. Ability to accommodate bicycle parking facilities within the transit stop footprint

603.10.02. Short-Term Bicycle and Micromobility Parking

- A. Short-term bicycle parking facilities should be installed wherever people will need to leave their bicycles unattended for a short period of time. In general, bicycle parking should be considered wherever motor vehicle parking is provided and in areas where motor vehicle parking is not provided at individual properties, such as downtown areas or other high-density locations. Priority locations include stores, restaurants, apartments and condominium complexes, offices, and public facilities such as transit stops, schools, parks, and libraries.
- B. Short-term bicycle parking facilities must be accessible to the public and located in a convenient, well-lit area that is central to the units intended to utilize the bicycle parking and clearly visible to both a visitor to the building and a person who is on the sidewalk that accesses the building's main entrance. Short-term bicycle parking shall include a bicycle rack to which a bicycle can be locked and within 100 feet of:
1. The main entrance of each building within the development, and closer than the nearest non-accessible vehicle parking space; or
 2. At least one main entrance of a building with more than one main entrance; or
 3. An approved alternative location during the site plan or conditional use process.

603.10.03 Long-Term Bicycle Parking and Micromobility Parking

- A. Long-term bicycle facilities shall be provided for all multifamily developments with eight (8) or more multifamily dwellings. Long-term bicycle parking facilities should provide a high degree of security and protection from the weather and are intended for situations where the bicycle is left unattended for long periods of time, such as apartments and condominium complexes, schools, places of employment, and transit stops. Long-term bicycle parking may include covered and enclosed structures, lockers, monitored parking areas, or a dedicated space or room within a building or parking garage. Long-term bicycle parking facilities should be well lit, provide protection from weather and the elements, and accessible to provide a high degree of personal security. Signs may be provided to direct bicyclists to long-term parking. Long-term bicycle parking facilities should generally be located in one or more central locations and within the same approximate distance as the nearest non-accessible vehicle parking space.
- B. Long-term bicycle parking facilities shall include at least one dual-outlet receptacle for every four spaces, evenly distributed throughout the long-term bicycle parking facility and easily accessible, to enable charging of e-bicycles, e-scooters, and other electronic mobility devices.
- C. Long-term bicycle parking facilities contained within rooms, cages, or garages may utilize vertical racks on walls or “double decker” racks, provided that a minimum of thirty percent (30%) of required long-term bicycle parking racks are horizontal, at floor level. “Double decker” racks are required to offer a device that assists in lifting bikes to the second level.
- D. A minimum of twenty percent (20%) of required long-term bicycle parking shall be provided within common areas, except that multifamily stacked developments may provide 100% of required long-term bicycle parking in-unit.
- E. In-unit bicycle parking shall consist of a dedicated closet, alcove, or wall-mounted bicycle rack. In-unit bicycle parking for multifamily stacked developments may be accommodated within private garages if provided on-site. In-unit bicycle parking may not be provided within unenclosed/unscreened patios, balconies, or other areas exposed directly to the elements.
- F. In-unit bicycle parking shall be permitted within all ground-floor units. In-unit bicycle parking shall only be permitted above the ground floor when:
 - 1. Elevators provide access to upper-floor units; or
 - 2. Attached parking structure ramps provide access to upper-floor units. Ramps must provide direct, level access to hallways or units and residents shall not be required to utilize a staircase to transport a bicycle to in-unit bicycle parking.
- G. Long-term bicycle parking facilities shall maintain a minimum five (5) foot aisle width between standard single level racks and vertical racks on walls. A minimum seven (7) foot aisle width shall be required between “double decker” racks. Vertical clearance for vertical racks on walls and “double decker” racks shall be as specified by the bicycle rack manufacturer.

603.10.04 Bicycle Racks

- A. The most common bicycle racks include “post and ring”, “swerve”, and “u-rack” designs. Alternative, custom, or artistic bicycle racks may also be used provided racks meet the following criteria:
 - 1. Installed on a permanent foundation, such as concrete or asphalt;
 - 2. Securely anchored into or on the foundation with tamper-proof nuts if surface mounted, or be of sufficient size and weight to prevent easy removal.

3. Support an upright bicycle by its frame horizontally in two (2) or more places.
 4. Keeps both bicycle wheels on the ground and does not suspend any part of the bike in the air or require that the bicycle be lifted to get it into position, except for the portion of long-term bike parking racks that may be vertical as described in *Section 603.10.03.C*.
 5. Prevents the bicycle from tipping over.
 6. Do not bend wheels or damage other bicycles parts.
 7. Do not contain protruding elements or sharp edges.
 8. Supports a variety of bicycle sizes and frame shapes.
 9. Space to secure the frame and one or both wheels to the rack with a cable, chain, or u-lock.
- B. Galvanized or stainless steel racks are recommended (and required for racks on public property). Outdoor racks must also be coated with PVC or thermoplastic.
- C. “Wave” racks or “ribbon racks” shall not be used, as they are commonly used incorrectly and when used as intended do not provide adequate support or spacing. “Schoolyard” racks, also referred to as a “dish-rack” or “comb” rack, shall not be used and those still in use should be replaced as they support the bike only by the front wheel and do not support proper locking to provide adequate theft prevention.
- D. When multiple bicycle racks are aligned side by side, they shall be spaced a minimum of three (3) feet apart to allow for the placement of two bicycles on each rack. This includes bicycle racks that are sold as multiple rack units attached together, except for the portion of long-term bike parking racks that may be vertical. Wider spacing of four (4) feet between bicycle racks may better accommodate cargo bicycles and should be considered near retail, restaurants, schools, and transit stops.
- E. When multiple bicycle racks are aligned end to end, there shall be a minimum eight (8) foot distance from the nearest vertical component of a neighboring rack. Consideration shall be given to ensure pedestrian access routes and required clear widths are maintained when adjacent to a sidewalk or shared use path.
- F. Bicycle racks placed perpendicular to the curb shall be a minimum of four (4) feet from the curb to the center of the rack. Bicycle racks placed parallel to the curb shall be a minimum of two (2) feet from the curb. When adjacent to on-street parallel parking, bicycle racks placed parallel to the curb may consider increased offsets of three to four (3-4) feet to better accommodate vehicle entry and exit.
- G. Assuming access is needed from both sides, bicycle racks placed perpendicular to a wall shall be a minimum of four (4) feet from the wall to the center of the rack. Bicycle racks placed parallel to a wall shall be a minimum of three (3) feet from the wall, except for the portion of long-term bike parking racks that may be vertical.

603.11. Shared Parking

- A. (610.01.F) For mixed use developments located with MXD districts, parking requirements shall be calculated by the applicant and submitted for evaluation at the time an application is submitted for a zoning request. The applicant shall submit the methodology, assumptions, and data used in performing the calculations. Parking standards shall be established with a rezoning approval of the mixed use development. The following shall apply:

1. In the MXD, the minimum number of spaces set forth in Table 6-8 of the DCSM may be reduced in accordance with *Section 603.08. Parking Reductions*.
 2. In all MXD districts, parking provided shall not exceed 120% of the minimum parking requirement contained in the DCSM, unless a parking structure is provided.
 3. Interim and special situations may obtain a credit allowance through approval by the Director of Transportation and concurrence with the Planning Director in accordance with County Code Sec. 32-700.04 and *Section 101.05 Waivers*.
- B. (610.03.B) Credit may be given for parking spaces required for one use when parking spaces required for another use on the same lot, or on an adjacent lot, approved under Section 610.01.D of this manual, can be used because of a difference in normal operating hours. This credit may be given for up to seventy-five percent (75%) of the required spaces when no overlap in normal operating hours occurs, and up to twenty-five percent (25%) of the required spaces when an overlap of less than four (4) hours per day occurs, provided a legally sufficient agreement is executed when different property owners are involved.
- C. (610.03.C) When public parking is available within ~~five hundred (500)~~ six hundred (600) feet walking distance of a site, nonresidential developments may request a modification of up to thirty percent (30%) of the parking standard provided no additional credit for parking spaces is applied. The request for modification must include a parking tabulation study for all nonresidential development within ~~five hundred (500)~~ six hundred (600) feet walking distance of the public parking facility.

603.12. Layout and Design for Motor Vehicle Fuel Sales and Convenience Stores

- A. (610.09.A) Off-street parking spaces shall be demarcated with paint and equipped with wheel stops where deemed necessary by the Director of Transportation.
- B. (610.09.B) Stacking spaces shall not interfere with the travelway traffic or the designated parking spaces. The width of a drive-through travel lane shall not be less than eleven (11) feet. A stacking space shall have a minimum length of eighteen (18) feet.
- C. (610.09.C) Each gasoline pump island shall be located so that there is a refueling area of at least ten (10) feet in width on both sides of the pump island. A minimum of twenty (20) feet is required between pump islands. Gasoline pump islands shall be protected at each corner by a vertically imbedded metal post filled with concrete at least thirty (30) inches in height above the ground and three (3) inches in diameter.
- D. (610.09.D) Travel lanes shall be a minimum of twenty-two (22) feet in width between any refueling area at the pumps and any parking spaces provided onsite.
- E. (610.05.D) Motor vehicle service fuel sales facilities shall have a minimum setback distance from the pump islands to the ultimate ROW in accordance with Table 6-9.
- F. (610.05.F) Self-service gas stations shall be approved by the Fire Marshal's Office and installed in accordance with their specifications, and the requirements of VUSBC.

603.13 Layout and Design of Surface Parking Lots

- A. Surface parking lots shall include pedestrian walking routes connecting the primary building entrance to an abutting pedestrian facility. Pedestrian walking routes may be striped within vehicle travel aisles or provided as separate walkways between parking aisles. Pedestrian walking routes within surface parking lots are not required to comply with [PROWAG](#) requirements, except for those connected to accessible parking space(s) and the associated pedestrian access route. Pedestrian walking routes within surface parking lots should be provided as follows:
1. A minimum of five (5) feet wide
 2. Designed to serve the most heavily used of the provided off-street parking spaces
 3. Designed to serve pathways between the primary entrance used by order fulfillment employees and associated curbside pickup/mobile order pickup parking spaces
 4. Connect to the primary entrance of the principal building. Where an offsite pedestrian access route (sidewalk, trail, shared use path) abuts the parking lot and is within ROW, the surface parking lot pedestrian walking route must connect to it
 5. Clearly marked with hatched pavement markings or contrasting pavement material when crossing a travel aisle
 6. May serve the parking spaces located directly across the travel aisle if the pedestrian route is adjacent to the principal structure. In this instance, pavement markings for a crossing of the travel aisle are not required.
- B. Site modifications or additions that increase the required or provided number of parking spaces shall include pedestrian accommodations as detailed in *Section 603.13.A*.
- C. Surface parking lots shall be designed to minimize conflict points between pedestrians and vehicles. Primary travelways should limit crossings with pedestrian walking routes. Primary travelways should be designed to prevent vehicles from “cutting through” the parking lot and direct vehicles around the perimeter of the parking lot, not directly adjacent to store entrances where high volumes of pedestrians exist.
- D. Curbside pickup/mobile order pickup spaces should be sited near the entrance primarily used by order fulfillment employees such that conflict points are minimized between vehicles and employee walkways.

~~(610.10) Parking lots shall be landscaped in accordance with Section 800.00 of this manual.~~

604.00. LIGHTING AND LANDSCAPING

604.01 Street Planting

- A. [\(602.25.A\)](#) If required by *Section 800.00* of this manual, street plantings shall be provided in the ROW in accordance with VDOT’s current Guidelines for Planting Along Virginia’s Roadways.
- B. [\(602.25.B\)](#) When landscaping located within the ROW is not eligible for VDOT acceptance and maintenance, a standard tri-party agreement shall be executed among the County, the developer, and the homeowners association prior to the final subdivision or site plan approval. The Director of Transportation is hereby authorized by the Board of County Supervisors to sign all agreements described in this section on behalf of the County as its agent. Such agreements shall be deemed a part of the approved final subdivision or site plan.

- C. (602.25.C) If a homeowners association is not established at the time of plan approval, the developer shall be responsible for maintaining the landscaping located within the ROW until such time that the homeowners association is established and enters into a written amendment to the landscaping agreement, signed by all parties, under which the homeowners association accepts landscaping maintenance responsibility from the developer. This agreement, along with any amendments, whenever executed, shall be deemed part of the final subdivision or site plan.

604.02. Street Lights

- A. (601.09.A) All roadway luminaires shall be installed, owned, and maintained by the supplying utility company, upon approval of the County.
- B. (601.09.B) The developer shall pay for the cost of installation.
- C. (601.09.C) On public roadways, the County shall assume the operation and maintenance costs of the luminaires once they are energized and all installation costs and overages have been paid in full by the developer.
- D. (601.09.D) Bonding for the cost of installation of roadway luminaires is required.
- E. (601.09.E) Prior to the issuance of occupancy permits for lots in the vicinity of the roadway luminaires, the developer shall be required to show that the luminaires have been energized. If the roadway lighting installations are delayed prior to occupancy due to no fault of the developer, then the "Acknowledgement of Street Lights Installation" form must be completed by the contract purchasers or property owners at the time occupancy is granted. The luminaire shall be energized and a paid receipt from the servicing power company shall be submitted to the site inspector before bond reduction or bond release.
- F. (601.09.F) For the construction of all new developments, each roadway luminaire and related wiring must be installed by the servicing utility company in a dedicated utility easement.
- G. (602.13.A) Utility easements shall be provided on the utility plats along the frontage of all lots in a residential development. The developer will be responsible for granting utility easements and ensuring that all bonded roadway luminaires are installed.
- H. (601.09.G) Estimates for both roadway luminaire(s) and main line installations must be requested by the developer from the servicing utility company. Roadway luminaires and main lines should be installed simultaneously.
- I. (601.09.H) All roadway luminaire installations and required easements shall be shown on the approved plans and shall conform to VDOT specifications.
- J. (601.09.I) The Street Lighting Branch or the servicing utility company will inform the developer of any modifications that may require compliance with current County and VDOT specifications and standards.
- K. (601.09.J) The developer must submit a design request letter, County approved plan and bond sheet to the servicing utility company with roadway luminaire locations within ten (10) days of the Pre-Construction meeting.
- L. (601.09.K) Street lighting at the entrances of residential communities and commercial developments shall be the cobra head type fixtures of the expressway/interstate type fixtures and shall be in accordance with Detail 650.61. Decorative, area, or security lighting fixtures are acceptable as internal roadway lighting if the fixtures provide Type III light distribution.

- M. (602.13.C) In single family detached residential developments, a minimum of two (2) luminaires shall be provided at all entrances to the development. A minimum of two (2) luminaires shall be provided at all street intersections where the minor street carries greater than four hundred (400) VPD. One (1) luminaire shall be provided at all public and private cul-de-sacs, stub-outs, and dead ends, including temporary cul-de-sacs.
- N. (602.13.E) In single family attached and multifamily developments, a minimum of two (2) luminaires shall be provided at all primary entrances to each section of the development accessing onto the main public roadway and all secondary entrances, which carry greater than four hundred (400) VPD. One (1) luminaire shall be provided at all public and private cul-de-sacs, stub-outs, and dead ends, including temporary cul-de-sacs.
- O. (602.13.F) Two (2) roadway luminaires shall be provided at all entrances of commercial and industrial developments that carry greater than four hundred (400) VPD. One (1) roadway luminaire shall be provided at all primary and secondary entrances of commercial and industrial developments that carry greater than two hundred (200) VPD.
- P. (602.13.D) Intersection luminaires must overhang the approach lanes of the street carrying the larger volume of traffic. The overhang should be at ninety (90) degrees from the edge of pavement.
- Q. (602.13.B) Roadway luminaires must be either breakaway type or be located outside the right-of-way or the minimum required clear zone, whichever is greater. Roadway luminaires and arm brackets shall not overhang the travel way/through lane by more than one (1) foot. On sections with turn lanes, the luminaire and arm bracket may overhang the entire turn lane but shall not extend over the travel way/through lane by more than one (1) foot.
- R. (610.11) Where required by Zoning Ordinance site plans submitted to the County shall include illumination plans conforming to the policy, details, illumination level standards and requirements [Zoning Ordinance Sec. 32-250 Division 12](#), VDOT/AASHTO Roadway Lighting Standards, and this manual. Photometric plans, illumination plans, and details prepared by an illumination engineer shall be provided for review and approval.

604.03. Parking Lot and Parking Structure Lighting

- A. (610.06.E) In general, private travelways and parking areas owned by the homeowners association (HOA) which are not illuminated by the required street entrance lights shall be illuminated. The average illumination level required shall be 0.2 to 0.5 foot-candles (2.20 to 5.50 lux). High pressure sodium luminaires with three thousand eight hundred (3,800) initial lumens on mounting height not to exceed eighteen (18) feet are desirable. At a minimum, four (4) luminaires (two on each side) spaced at one hundred (100) feet maximum within the parking bays and/or travelways shall be provided. However, at the discretion of the engineer and the utility company, an equivalent type of fixture will be allowed with the approval of the Director of Transportation. The luminaires shall be directed downward. Areas opposite the single family attached units or main entrances of multifamily buildings will require illumination on one (opposite of building or row of units) side only.
- B. (610.06.F) Outdoor lighting shall be provided in accordance with [Zoning Ordinance Sec. 32-250 Division 12](#). All outdoor lighting fixtures shall be designed, shielded, aimed, located and maintained to shield adjacent properties and to prevent glare onto adjacent properties or roadways. Parking lot light fixtures and light fixtures on buildings shall be full cut-off fixtures.
- (610.06.G) ~~The engineer or developer can provide different design, arrangement, and/or types of luminaires if approved by the utility company. Such design will require the approval of the Director of Transportation prior to installation.~~

- C. (610.06.H) The cost of luminaires shall be bonded with the County during the site plan approval. The luminaires shall be installed prior to occupancy of any unit in which the luminaires service. Deviation from this requirement, due to utility company policies, will be reviewed and approved on a case-by-case basis by the Director of Transportation.

605.00. SUBMISSION REQUIREMENTS

605.01. Plans

- A. (603.02.A) Plans for public streets and privately maintained travelways, access aisles, and parking areas shall include either a typical section or a reference to a specific standard and pavement design. The plans shall include the items listed in this section and the design standards of *Section 602.00. PLANNING AND DESIGN*.
- B. (603.02.B) The plans shall indicate street construction for the full frontage of all lots. All street construction, including sidewalks, shall be within the dedicated street right-of-way. Grading or filling may be done in adjoining easements.
- C. (603.02.C) Plans for street construction within the one hundred (100) year floodplain shall be in accordance with [Section 700.00 Environmental Systems](#) of this manual.

~~(603.02.D) All site plan names are subject to approval by the DoIT and shall comply with the following:~~

- ~~• Duplication or close approximation of names already in use shall not be permitted.~~
- ~~• The name of the recorded subdivision shall apply.~~
- ~~• Names shall not be changed subsequent to approval of the name during site development plan review.~~

- D. (603.02.E) A profile of proposed sidewalk/shared use path construction shall be included in the plans.
- E. (603.02.F) A sign and pavement marking plan shall be submitted for all development that will generate greater than five hundred (500) VPD. The plan shall utilize the latest requirements in the [MUTCD](#) and [Virginia Supplement to the MUTCD for Streets and Highways](#).

~~F. Refer to PWC Land Development Division for plan sheet formatting.~~

605.02. Topographic Information and Grading Plans for Streets

- A. (603.03.A) Existing topography, and all proposed grading for streets, shall be shown at two (2) foot intervals.
- B. (603.03.B) Plans which propose coordinated street and site grading shall indicate house or building locations in accordance with grading requirements in [Section 700.00 Environmental Systems](#) of this manual.
- C. (603.03.C) Plans limited to street design shall not indicate grading beyond twenty-five (25) feet from the right-of-way line. However, if grading beyond twenty-five (25) feet from the right-of-way line is deemed necessary, a grading permit shall be required.
- D. (603.03.D) The site development plan shall provide a note that a smooth grade shall be maintained from the centerline of the existing street to the proposed curb and gutter, to preclude the forming of false gutters and/or the ponding of water on the roadway.

605.03. Street Station Points and Centerline Curve Information

- A. (603.04.A) Station points shall be indicated on the plans for the following:
 - 1. Every one hundred (100) feet on the street centerline.
 - 2. Points of curvatures (PCs), points of intersection (PIs), and points of tangents (PTs).
 - 3. Centerline intersections.
 - 4. Subdivision or section limits.
 - 5. Turnaround radius points.
- B. (603.04.B) Centerline curve information shall be provided on the plan by:
 - 1. Labeling of all proposed roadway centerline curves.
 - 2. Providing centerline curve data (delta, tangent, length of curve, chord, etc.)

605.04. Street Sight Distances

- A. (603.05.A) Sight distances for all horizontal curves, and at all intersections, shall be shown on the plans.
- B. (603.05.B) Sight distances and design “K” values shall be shown on the profile sheets.
- C. (603.05.C) The profile sheets must indicate the sight distance of existing streets for a minimum distance of three hundred fifty (350) feet or the applicable sight distance, whichever is greater in each direction.
- D. (603.05.D) Adequate horizontal sight distance easements shall be indicated on the plans. The easements shall be located outside the right-of-way to assure that the line of sight will be kept clear of any obstructions that may diminish the available sight distance. An appropriate note to identify the maintenance responsibility of the sight distance easement shall be shown on the plans and plats.

605.05. Building Restriction Line Profiles for Streets

- A. (603.06.A) A profile along the building restriction line shall be included in the plans.
- B. (603.06.B) Where there is no building restriction line, a profile of twenty-five (25) feet from the right-of-way line shall be included in the plans. Any profile distance greater than twenty-five (25) feet shall require approval by the Director of Transportation.
- C. (603.06.C) A building restriction line profile shall be extended three hundred (300) feet beyond the property line or boundary of an adjoining property for all streets that provide access to an adjoining property.
- D. (603.06.D) A building restriction line profile for a cul-de-sac shall be radial to the existing profile at the face of curb and proposed curb grade.

605.06. Street Centerline Profiles

- A. (603.07.A) A centerline profile shall be provided when a proposed street is an extension of an existing street. The profile shall be provided for a minimum distance of three hundred (300) feet to ensure proper grade ties.
- B. (603.07.B) A centerline profile shall be provided when a proposed street intersects with an existing street. The profile shall be provided for a minimum distance of three hundred fifty (350) feet in each direction to ensure an appropriate sight distance in accordance with *Section 602.12.06. Sight Distance*.

- C. (603.07.C) A centerline profile shall be extended three hundred (300) feet beyond the property line or boundary of an adjoining property on all streets that provide access to an adjoining property.

605.07. Street Grade Lines and Cross Sections

- A. (603.08.A) Elevations shall be provided at the beginning and end of all vertical curves.
- B. (603.08.B) Centerline elevations shall be computed and shown on the plans at fifty (50) foot intervals. Centerline elevations in vertical curves shall be computed and shown on the plans at twenty-five (25) foot intervals. Centerline elevations shall be shown on the plans for all street intersections, all street intersections with subdivision boundaries, and all curb returns.
- C. (603.08.C) Points of finished grade shall be shown on a typical section (i.e., for the centerline, top of curb, drainage way, etc.).
- D. (603.08.D) Superelevation rates and transition lengths shall be shown on the profiles in accordance with current VDOT standards.
- E. (603.08.E) Sanitary sewer and storm sewer manholes that are in the paved area of the road shall be shown on the plans with finished elevations.
- F. (603.08.F) Typical cross sections of all streets either standard or modified shall be shown on the plans. Categories and names of the streets shall be indicated on each typical cross section.
- G. (603.08.G) All cross sections of streets including those designed with modifications such as, but not limited to, provisions of sidewalk on only one side of the street, superelevation, or any other modifications, shall be provided on the plans with appropriate station limits.

605.08. Street Cul-de-sacs

- A. (603.09.A) Grade profiles for cul-de-sacs with curb and gutter shall be indicated for the beginning of the curb return, following along the face of the curb around the cul-de-sac, and then to the end of the return, opposite the point of beginning.
- B. (603.09.B) Grade ties of the street entering the cul-de-sac shall be shown on each end of the cul-de-sac grade profile to ensure proper grade connections. Other approved methods may be used, subject to approval of the Director of Transportation and VDOT.
- C. (603.09.C) If a cul-de-sac is proposed as a temporary turnaround at the end of a street, final grading of the proposed extension of the street shall be shown on the grading plans for a distance of three hundred (300) feet beyond the property line.

605.09. Street Pavement

- A. (603.10) A note shall be provided on the plans that subbase depth is based on CBR value of ten (10). ~~CBR tests on subgrade material shall be performed for actual determination of required pavement thickness prior to the placement of subbase/base material. CBR tests are required for streets within single family detached, single family attached, and condominium developments. CBR tests are not required for private streets within multifamily, commercial, office, industrial, or institutional developments. Refer to Section 602.06. Pavement Design for guidance on when CBR tests are required.~~

605.10. Street Curb and Gutter

- A. (603.11) If the proposed curb grades differ from one side of the street to the other, top of right curb elevation and top of left curb elevation shall be shown on the plans.

605.11. Street Landings

- A. (603.12) Standard street landings shall be shown on the plans with an indication of adequate sight distance.

605.12. Street Entrances

- A. (603.13.A) Driveway entrances (including pipestem driveways) shall be shown on the plans, with the size, length, and type of entrance culvert, where required.
- B. (603.13.B) The distance of the entrance to the nearest intersection in both directions shall be shown on the plans.
- C. (603.13.A) The intersection sight distance shall be shown on the plans and verified through a profile. Sight distance easements shall be provided in accordance with *Section 602.12.06 Sight Distance*.
- D. (603.13.A) Adequate vehicular clearance and entrance radii shall be shown on the plans at all entrances to ensure the safe movement of the projected traffic volumes and the types of vehicles using the site.

605.13. Street Ditches

- A. (603.14.A) All roadside ditches shall be shown in plan view. Ditches shall also be shown in profile view where the depth of cut is not in conformance with typical sections.
- B. (603.14.B) The computations for determining the need for a paved ditch shall be shown on the plans.
- C. (603.14.C) Paved street ditches shall be shown on the plans. The limits of paved ditches shall be labeled on the plans and profiles. Easements for ditches shall be shown on the plans when required.
- D. (603.14.D) The plans shall provide the following note: "A joint inspection will be held with the developer and representatives of the County and VDOT to determine if and where paved ditches will be needed. The developer shall be responsible for providing paved ditches as determined by the joint inspection."

605.14. Guardrails

- A. (603.15.A) Guardrails shall be shown on the plans when required in accordance with *Section 602.14. Guardrail* of this manual. Their cost shall be included in the performance bond estimate.
- B. (603.15.B) The plans shall provide the following note: "A joint inspection will be held with the developer and representatives of the County and VDOT to determine if and where guardrails will be needed. The developer shall be responsible for providing guardrails as determined by this joint inspection. The guardrails shall be installed per VDOT standards prior to granting the first occupancy in each section, in which streets are constructed and the guardrails are determined necessary."

605.15. Storm Sewer and Utility Lines in Relation to Streets

- A. (603.16) Proposed and existing storm sewer culverts, storm sewer crossings, and utility crossings shall be shown on all street profiles at the proper location and grade.

- B. (603.16.A) In general, the allowable pipe types for storm sewer systems under or within the public street ROW shall be concrete. However, other types such as high density polyethylene (HDPE) pipes, corrugated steel, corrugated aluminum alloy, or other similar types may be considered subject to compliance with current VDOT standards and specifications.
- C. (603.16.B) HDPE corrugated culverts and storm drain pipes, where allowed and approved by VDOT, shall conform to specification requirements of the most current edition of the Road and Bridge Specifications Manual. They shall also conform to the requirements M252, M294, or MP6-95 of AASHTO and circular IIM-LD-121. Installation shall be in accordance with ASTM D2321. HDPE pipes for storm drains and entrances shall conform to classification Type S. For all other applications, they shall be Type C.
- D. (603.16.C) HDPE pipes and fittings shall be certified by the manufacturer before installation. The certification shall indicate that they have been tested and conform to the VDOT polyethylene-corrugated products quality assurance program. The certification shall be stamped on all shipping bill or invoice forms and be made available upon request of the County inspectors.

605.16. Stream Profiles in Relation to Streets

- A. (603.17.A) Stream profiles at the top of a stream bank shall be provided when a street is proposed parallel to, or near an existing stream or drainageway. In addition, the plans shall provide the computer water elevations and invert (or flow line) of the stream or the open drainageway.
- B. (603.17.B) The stream profiles shall show the relationship of the proposed street grade to the existing profile of the stream or open drainageway.

605.17. Street Slope Easements

- A. (603.18.A) Slope and maintenance easements shall be shown on the plans where required.
- B. (603.18.B) The end of street construction shall indicate a three-to-one (3:1) maximum slope with the necessary easement shown on the plans.

605.18. Erosion Control for Streets

- A. (603.19) The erosion control measures at the end of curb and gutter construction shall be shown on the plans.

605.19. Street Lighting Plan

- A. (603.20.A) A roadway lighting plat showing the proposed luminaire easements shall be shown on utility plats, prepared and recorded by the servicing utility company.
- B. (603.20.B) A roadway luminaire symbol must appear on the final site plan at the required locations. The symbol must be coded as follows:

Street Classification	Standard Lumina Rating	Symbol
Residential Local	8,000 lumens 100-watt HPSV or LED equivalent	SL-10
Collector	14,000 lumens 150-watt HPSV or LED equivalent	SL-15
Arterial Type 1, 2, and 3	23,000 lumens 250-watt HPSV or LED equivalent	SL-25

- C. (603.20.C) The installation of turnpike, expressway, or interstate type roadway lighting fixtures are required for roadways with clear zone distances exceeding twenty (20) feet. The final site plan symbol must be coded as SL-40. This represents a forty four thousand (44,000) lumens four hundred (400) watt High Pressure Sodium Vapor luminaire.
- D. (603.20.D) Lighting plan details or references shall be submitted to the Department of Transportation as part of site development plan review. All luminaires shall be designed to be full cut off styles with Type III light distribution in order to minimize glare and the impact to night skies.
- E. (603.20.E) The design of the lighting plan shall be coordinated with the existing and future locations of easements, utilities, sidewalks, driveway entrances, street signs, tree locations, traffic signal poles, and existing roadway luminaires.
- F. (603.20.F) Alternative roadway lighting fixtures and plans must be submitted to the Department of Transportation and VDOT for review and approval.

605.20. Street Barricades

- A. (603.21) Traffic barricades shall be shown on the plans, where required. This shall be provided in accordance with Detail 650.49 of this manual.

605.21. Street Names

- A. (603.02.D) All new street names are subject to approval by the Department of Information Technology (DoIT) and shall comply with the following:
 1. Duplication or close approximation of names already in use shall not be permitted.
 2. The name of the recorded subdivision shall apply.
 3. The names shall not be changed subsequent to approval of the name during site development plan review.
- B. (603.22.B) Proposed street names shall be shown on all preliminary and final site development plans and plats. DoIT shall require a symbol on the plans that street signs shall be placed in locations that best identify named travelways and streets.
- C. (603.22.C) Subdivision plats shall not be signed and release for recordation, or building permits issued, until approved street names are shown thereon.
- D. (603.22.D) Street type designations which appear on the plans or plats, prior to assignment by DoIT, may be voided and changed.
- E. (603.22.E) Names shown and approved on the preliminary plan or the final plan shall be reserved only for the period that the plan remains valid.

- F. (603.22.F) An applicant may submit street names to DoIT for conditional approval electronically, verbally, or in writing prior to the submission of the plans. Reservation of street names for future use shall not mean that the name has been approved for use.
- G. (603.22.G and 603.22.H) Approval of all street names shall be obtained from DoIT. New street names shall not duplicate or closely approximate (in spelling or sound) street names already assigned or reserved for within the county, cities, or towns which lie within the county boundary, regardless of jurisdiction. Confusing or unusual street name spellings shall not be permitted.
- H. (603.22.H) Street names shall not exceed seventeen (17) characters in length, including spaces between words and excluding the street type designation. Names containing hyphens, apostrophes, or other non-letter characters shall not be approved.
- I. (603.22.I) Street names shall not contain more than three (3) words, with the exclusion of the street type.
- J. (603.22.J) Streets continuing through an intersection shall keep the same name. Exceptions to this requirement may be authorized by DoIT, in the event that a street crosses a major arterial road. Cul-de-sacs directly opposite each other, which intersect with a common street, shall have differing street names.
- K. (603.22.K) Commercial, multifamily, and single family attached developments that have an entrance or access from a publicly maintained cul-de-sac, may be required to have a separate street name for the entrance or access street. This requirement shall apply if the entrance or access street serves, or is intended to serve, a structure(s) which requires assignment of more than three (3) address numbers.
- L. (603.22.L) Compass points, such as “north” and “south” shall not be used in street names.

605.22. Street Names in Relation to Street Type

- A. (603.23.A) Once the street type is determined during the review of the site development plan (usually the last part of the street name) the street name shall be approved in accordance with the street classifications related to the following street type designation guide. These street type designators are the only designators which will be approved by the DoIT.
 1. Principal Arterial – multilane highway normally four (4) lanes, controlled access, divided: Parkway, Boulevard, Pike, Expressway, Throughway
 2. Minor Arterial – multilane, controlled access, secondary traffic arteries carrying high volume traffic: Highway, Avenue, Road
 3. Collector Street – two (2) or four (4) lanes providing access; Avenue, Street, Road, Drive
 4. Local street providing access to individual lots within a subdivision or commercial area: Lane, Drive, Way, Trail, Loop, Circle
 5. Local street having one way in and out such as a cul-de-sac: Court, Place, Terrace, Turn
 6. Ingress/egress to shopping centers or malls: Square, Arcade, Center, Plaza
 7. Travelway usually behind housing and not used for normal through travel: Alley
 8. Pipestem driveways requiring names: Mews

- B. (603.23.B) All permitted private streets and travelways shall be named in accordance with *Section 605.21. Street Names.*

(603.23.C) ~~Street names shall also be subject to the provisions of Chapter 24 of the County Code.~~

605.23. Street Addresses

- A. (603.24.A) Street addresses shall be assigned by DoIT during the final site development plan review and/or site development plan permit application. The assigned addresses shall be returned to the engineer or developer in hard copy or electronic format.
- B. (603.24.B) Determination of the proper street address for corner lots shall be based upon the street from which the driveway is accessed or as determined by DoIT. ~~If a driveway accesses more than one street, the proper address shall be determined by DoIT.~~
- C. (603.24.C) Street addresses shall be subject to the provisions of Chapter 24 of the PWC County Code. Full (street number, street name, street type) or partial addresses shall be conditionally required by DoIT to be posed in multiple locations.
- D. (603.24.D) Addresses shall be drafted onto the original final recorded plat and site plan and resubmitted to the County for review. Plats and/or plans will not be approved without street addresses.
- E. (603.24.E) A sign showing the range of addresses for each lot served by a pipestem driveway shall be provided at the entrance of a pipestem driveway. DoIT shall conditionally require additional address range signs. The sign shall meet all applicable provisions of Detail 650.60 of this manual. A note or symbol referenced to a note shall be placed on the site development plan at the proposed location of the address range sign. The note shall include the proper numbers for each address as assigned by DoIT.
- F. (603.24.F) Multifamily apartment or condominium developments, including conversions, shall have apartment or unit numbers assigned by DoIT with the street numbers.
- G. (603.24.G) The entrance to each commercial or residential building and to units within a building must be clearly identified on the final plans. Floor plans detailing the configuration of the building, separate levels, location of sprinkler rooms, fire alarm control panel rooms, electric rooms and common entrances, as well as individual unit entrances, shall be submitted to DoIT.
- H. (603.24.H) Plans for variable office, warehouse, and retail space shall specify the maximum number of units possible within the overall structure. The number shall be broken down by level for multistory structures.
- I. (603.24.I) Addresses will be assigned only after receipt of the information required to properly assign addresses.

605.24. Plats

- A. (603.25.A) Privately maintained streets and travelways shall be platted such that all lot owners are assured perpetual right of access to a state maintained road.
- B. (603.25.B) The final recorded plat shall note ownership and maintenance responsibility of private streets, travelways, pipestem driveways, and common driveways.

- C. (603.25.C) The plat recorded for residential development served by private roads shall contain the following statement highlighted in a box: “The road serving this development is private and is not eligible for acceptance into the State street system. Maintenance of the road, including snow removal, is not a public responsibility.
- D. (603.25.D) The final plat shall also note the following: “An adequate easement for ingress, egress, construction, maintenance of utilities for County and other emergency vehicles shall provided where a common access easement is sed.” This shall also apply to travelways that provide access to multi-structure commercial, industrial, and residential development. The final plat shall note that the easement is privately owned and maintained by the owners or association.
- E. (603.25.E) Lots served by pipestem driveways shall be noted on the plat as follows: “Owners of lots that access through common driveways assume an obligation for maintenance of the common driveway, which obligation is a condition of their ownership of the property and which runs with the land. Parking shall not be permitted within the minimum ingress/egress easement section required by the Design and Construction Standards Manual.”
- F. (603.25.F) For lots located on a temporary turnaround easement, minimum front setback requirements shall be maintained from the easement line instead of the lot line.

606.00. TRAFFIC IMPACT STUDY

606.01. General

- A. (620.01.A) A Traffic Impact ~~Analysis (TIA)~~ Study (TIS) is a study which provides information on the impacts of vehicle and multimodal trips generated from the proposed land uses on traffic safety and operations within a designated area and provides recommended solutions to mitigate the impacts.
- B. (620.01.B) The purpose of these requirements is to provide a clear, concise set of guidelines for the designation of the area to be studied, the analysis and methodology, and the recommendations to assess the traffic impacts of development proposals on the existing and future transportation network. In addition, they are designed to advise applicants what constitutes a comprehensive acceptable TIS for development proposals in Prince William County.
- C. (620.01.C) Any TIS not meeting the requirements of this section shall be considered incomplete and unacceptable.
- D. (620.01.D) The requirement of a TIS for rezoning and site plan submission may differ. The primary focus of a site plan shall be on site access, circulation, and internal roads. The rezoning study will focus on site access, internal roads, and off-site assessments.

606.02. Requirements

- A. (602.01A) If a previous TIS was submitted at the rezoning or special use permit review stage, and the assumptions used in the TIS are consistent with the submitted site plan, no additional TIS will be required. However, if a previous TIS was not submitted in conjunction with the proposed development, a TIS shall be required for all developments, if the total generated additional trips meet or exceed one (1) or more of the following thresholds:
 1. One hundred (100) or more total site generated peak hour trips or 1,200 trips per day as defined by the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual or by a trip generation study acceptable to the County.

~~Anticipated new trip generation that uses any reserve roadway capacity to a point which changes the existing level of service on a roadway or each lane group at the intersection to “D” or below, based on the highway capacity manual thresholds.~~

2. Applicants should address the development’s impact to maintain LOS E or better for roadways and intersections currently operating at or above LOS E, and not deteriorate roadways and intersections currently operating below LOS E, based on the Highway Capacity Manual thresholds; except it is expected that the LOS will be “E” within the limits of Small Area Plans, Activity Centers, and Redevelopment Corridors (as shown on the [Prince William County Long-Range Land Use Map](#)); MultiModal Hub and Transit District or Center (as shown on the [Prince William County 2040 Comprehensive Plan Transit Connectivity Map](#)); and streets classified as Principal Arterial or Minor Arterial (as shown on the [Prince William County 2040 Comprehensive Plan Roadway Plan Map](#)).
 3. The study area contains a segment of roadway and/or intersection that is considered unsafe. A location is considered unsafe based on the following criteria:
 - i. Two (2) reportable injury crashes have occurred in the prior twelve (12) months.
 - ii. One (1) crash with a fatality has occurred in the prior twelve (12) months.
 - iii. It is within a designated school zone and one (1) reportable crash has occurred in the prior twelve (12) months.
 - iv. It is on the annual list of most hazardous locations, provided by the Prince William County Police Department.
 - v. The 85th percentile speed is more than five (5) mph above the posted speed limit.
 4. The Director of Transportation deems that it is prudent to require such assessment in the plan review process.
- B. (602.01.A) A TIS shall be submitted as part of the site development plan application and shall conform to the Prince William County Traffic Impact Study requirements in accordance with this manual.
- C. Any rezoning proposal that generates more than 5,000 vehicle trips per day will require VDOT coordination and review.

606.03. Administration

- A. (620.02.A) A TIS shall conform to all of the provisions of this section unless the requirements of specific subsections are modified or deemed not necessary by the Director of Transportation as a result of the pre-submission meeting. The applicant shall meet with the Director of Transportation or designee prior to preparation of any TIS to determine the scope of the TIS, which shall include the following:
1. The study area.
 2. Size and phasing of the proposed development.
 3. Clarification, justification, and agreement for all assumptions and methodologies to be used in the analysis.
 4. Submitted or approved plans, within the study area for estimation of background traffic.

5. The future street construction/improvements in the study area which may impact the subject site.
 6. The applicant shall provide a written summary of the pre-submission agreements of the proposed analysis before proceeding.
- B. (620.02.B) The applicant shall provide three (3) copies of the TIS at the time of submission of the site development plan application. Two (2) copies of the TIS shall contain computer disk(s) (CDs) or USB drives containing computer files used in the analysis.
 - C. (620.02.C) If the applicant fails to comply with the technical requirements and the scope of study outlined in the pre-submission meeting, the applicant shall be advised that the TIS must be revised.
 - D. (620.02.D) Each TIS shall contain a signed and sealed Certification of Statement of the responsible person for the contents of the documents. The responsible person shall be certified or licensed to do traffic engineering or planning (PE, PTOE, AICP) professional work in the Commonwealth of Virginia.

606.04. Study Area

- A. (620.03.A) The study area shall be determined with staff in coordination with VDOT during the scoping meeting. ~~However, generally, t~~The study area ~~shall generally~~ consists of the area containing and/or surrounding the proposed development within which the transportation network is impacted in one of the following ways:
 1. At a minimum, the study area shall include all site access driveways and intersections on adjacent roadways and all major internal intersections. If there is a school or school zone within six hundred (600) feet of these boundaries, the study area should be expanded to include roadways and intersections providing connectivity between the development and the school or school zone.
 2. To which twenty five percent (25%), or fifty (50) peak hour trips, of the site generated traffic is assigned, but not less than thirteen (13) trips.
 3. The generated trips from the proposed development changes the LOS of a roadway or intersection below the thresholds described in *Section 602.03. Level of Service*.
 4. An identified dangerous roadway or intersection within an area identified in *Section 606.02.C*.
- B. (620.03.B) The study area shall also include any additional area deemed appropriate based on acceptable transportation engineering criteria.

606.05. Design Year

- A. (620.04) The design year shall be in accordance with Table 6-12.
- B. When regional or local traffic forecasting model is used to develop future traffic volumes for studies submitted to VDOT, the VDOT Travel Forecasting Guidebook V1.2 procedures should be followed.

606.06. Traffic Data Requirements and Existing Conditions

- A. (620.05.A) All existing traffic counts used shall have been conducted within the prior twelve (12) month period. The Director of Transportation shall determine if and what growth factor shall be used to update the counts (i.e., utilizing historical traffic counts or available data from a transportation model). Traffic data collected shall include the following:

1. Turning movement counts, in fifteen (15) minute intervals
 2. Pedestrian counts
 3. Bicycle counts
 4. Heavy vehicle counts (such as trucks or buses)
- B. (620.05.B) The peak hour(s) shall be determined using a minimum three (3) hour counting period on an average weekday (Tuesday-Thursday) not on a holiday, conducted in favorable weather conditions, and when Prince William County Public Schools are in session, or other period as deemed necessary. All count data, including daily traffic volumes, shall be presented in the study.
- C. (620.05.C) Existing conditions of the study area shall be documented including some or all of the following:
1. Roadway configurations (number and length of lanes and lane usage).
 2. On-street parking availability and regulations.
 3. Driveways serving developments on roadways adjacent to subject site.
 4. Transit stops.
 5. Posted speeds and current traffic count data.
 6. Substandard roadway design features.
 7. Adjacent land use.
 8. Roadway geometrics and traffic controls such as traffic signals, turn lane storage and taper lengths, and stop/~~and~~-yield signs.
 9. Pedestrian and bicycle facilities.

606.07. Trip Generation

- A. (620.06.A) The estimated trip generation for each land use shall be obtained by utilizing the current edition of the ITE Trip Generation Manual. ~~The appropriate land use code and independent variable units from the manual shall be indicated for each category.~~
- A. (620.06.B) The R2 value should be at least 0.75, when using the fitted curve equation, as it indicates the recommended acceptable level of correlation between trips generated by a site and the value measured for an independent variable. The average rate should be used when there is no equation given and the standard deviation is less than or equal to fifty five percent (55%) of the average rate. The fitted curve equation shall be used for all trip generation estimates. For those land uses for which the equation is not available, average trip rates shall be used.
- B. (620.06.C) In addition to peak hour trip generation, the daily trip generation for all uses shall also be included in the report.
- C. (620.06.D) For commercial development (e.g., shopping centers), calculations for weekend trip generation, and capacity analysis shall be included in the report.
- D. (620.06.E) The peak hour trip generation for single family attached dwelling shall be calculated by using the single family detached housing category (land use category #210, ITE Trip Generation Manual, current edition). If an adopted local trip generation exists for a specific category, it shall be utilized.

- E. (602.03.A) For residential development, the twenty-four (24) hour trip generation rate per dwelling unit shall be utilized in accordance with Table 6-1.
- F. (602.03.B) For commercial, industrial, institutional, and other development, the rates shown in the current edition of the *ITE Trip Generation Manual* shall be used.
- G. (602.03.C) For evaluating traffic generation of mixed use developments, including transit-oriented development, internal trip-capture estimation may be utilized by a method approved by VDOT and the County Department of Transportation or in accordance with this document.
- H. (602.03.D) All projected ADT and VPD shall be shown at each ingress/egress point and surrounding roadways.
- I. (620.06.F) A pass-by trip reduction factor up to fifteen percent (15%) may be considered for commercial development, upon concurrence of the Direction of Transportation prior to preparation of the report. A pass-by trip reduction factor up to 49% (AM), 50% (PM), and 50% (Saturday) for gas stations, convenience stores, and fast food restaurants that front on a principal or minor arterial street will be considered by the Director of Transportation prior to the preparation of the TIS. Each case shall be considered individually. The following internal capture rates shall apply below. ITE Pass-by Rates can also be applied for specific Land Use Codes from the Pass-by Trips Tables referenced within the ITE Trip Generation Handbook.
 - 1. Residential with a mix of non-residential components - use the smaller of fifteen percent (15%) of residential or fifteen percent (15%) non-residential trips generated.
 - 2. Residential with office use - use the smaller of five percent (5.0%) of residential or five percent (5.0%) of office trips generated.
 - 3. Residential with retail use - for AM peak hour, use the smaller of five percent (5.0%) residential or five percent (5.0%) retail trips generated; for PM peak hour, use the smaller of ten percent (10%) residential or ten percent (10%) retail trips generated; for 24-hour traffic, use the smaller of fifteen percent (15%) residential or fifteen percent (15%) retail trips generated.
 - 4. Hotel/motel with office use - use fifteen percent (15%) of hotel/motel trips, unless the overall volume of the office traffic is more than the overall volume of hotel/motel traffic use in which case use the smaller of ten percent (10%) of the hotel/motel traffic or the office traffic.
 - 5. Multiuse development with more than five million (5,000,000) square feet of office and retail - internal capture rate should be determined in consultation with and approval of VDOT.
 - 6. Office with retail use – use the smaller of five percent (5%) office or retail trips generated
 - 7. Some combination of the above, if approved by VDOT.
- J. (620.06.G) Any trip reduction based on a mixed-use concept, pass-by trips, or transportation demand management (TDM) program, etc., shall be considered during the pre-submission meeting of the TIS. Only the following justifications shall be considered by staff for the purpose of defining a trip reduction rate:
 - 1. Transit service

- i. Development is located within one-half (0.5) mile of a transit station, excluding bus stops and stations, as measured along roadways that have pedestrian accommodations or bicycle accommodations.
- ii. Development is located within one-quarter (0.25) mile of a bus stop or station as measured along roadways that have pedestrian or bicycle accommodations to the bus stop or station.

2. Pedestrian Accommodations

- i. Pedestrian facility coverage in a two thousand (2,000) foot radius of the connections to the development is on or along at least eighty percent (80%) of the road network;
- ii. The pedestrian facilities inside and outside of the development provide direct access to traffic generators; and,
- iii. There are at least two of the ten major land use classifications, as defined by the latest edition of the ITE Trip Generation Manual, within the two thousand (2,000) foot radius.

3. Bicycle Accommodations

- i. Bicycle accommodations within a two thousand (2,000) foot radius of the connections to the development exist on or along at least eighty percent (80%) of the road network;
- ii. The bicycle accommodations inside and outside of the development provide reasonable direct access to traffic generators; and,
- iii. There are at least two of the ten major land use classifications, as defined by the latest edition of the ITE Trip Generation Manual, within the two thousand (2,000) foot radius.

- 4. Any trip reduction rate based on the TDM program concept must include a concise binding plan/program and funding mechanisms for implementation of the proposed TDM program. Any study of a TDM program within the Washington metropolitan area, which is similar in nature to the proposed development, may be submitted to staff to assist them in evaluating the proposed TDM program prior to preparation of the TIS. See *Section 607.00. TRANSPORTATION DEMAND MANAGEMENT* for more information on TDMs.

606.08. Trip Distribution and Assignment

- A. (620.07.A) The documented total future traffic in the report shall include the following:
 - 1. Background traffic, which may be calculated using one or both of the following techniques:
 - i. Existing traffic adjusted by an annual growth factor and based on the design year(s), and the total estimated traffic generated at build-out of submitted and approved development plans within the designated study area; or
 - ii. Project traffic volumes from approved regional or local traffic forecasting models.
 - 2. (620.07.B) Estimated generated trips to and from the site.

- B. (620.08.A) Any one of the following trip distribution and assignment methodologies shall be acceptable with the concurrence of staff. Justifications for trip generation and assignment shall be discussed and approved by staff at the pre-submission meeting. One of the following techniques shall be used:
1. The gravity distribution model technique may be acceptable, but may require collaboration prior to its use, particularly if utilizing an old gravity model for the study area.
 2. Metropolitan Washington Council of Government (MWCOC) latest trip assignments. Portions of MWCOC's trip assignment report related to the study area must be included in the TIS.
 3. Utilization of local and/or regional demographic data.
 4. The current directional distribution based on observed traffic counts is acceptable if justification is provided indicating the directional distribution will not change before the design year, due to future changes in the land use or transportation system improvements.
- C. (620.08.B) Assignment of traffic to the network shall be in accordance with the agreed upon percentage distribution and type of transportation facility. The Director of Transportation shall approve and may provide recommendations prior to preparation of the report.
- D. (620.08.C) Inbound/outbound traffic may not always have similar distribution or assignments, therefore, the approach and/or departure routes may be different. The calculations for inbound/outbound traffic are subject to discussion and concurrence of the Director of Transportation.
- E. (620.08.D) The twenty-four (24) hour (daily) volume shall be distributed and assigned according to the method used for peak hour distribution and assignment.

606.09. Analysis

- A. (620.09.A) Capacity analysis shall be performed for all intersections, streets, ramps, weaving sections, internal circulation, and access points as identified in the TIS scoping meeting. Safety analysis shall be performed to identify potential safety issues to be considered and addressed in design.
- B. (620.09.B) ~~The latest version of the Highway Capacity Software (HCS) operational module shall be used.~~ Level of Service (LOS) analysis shall use the techniques described in the Highway Capacity Manual (HCM) which may be supplemented by other capacity or delay methodologies. The VDOT Traffic Engineering Division's Traffic Operations and Safety Analysis Manual (TOSAM) Version 2.0 provides valuable information to assist in selecting the most appropriate traffic analysis software for projects of different sizes and scopes and additional Measures of Effectiveness (MOE) for traffic and safety analyses. Examples of traffic analysis software to use include Highway Capacity Software (HCS), Synchro/SimTraffic, SIDRA, and VISSIM. All worksheets indicating the inputs and outputs of the traffic analysis software programs used shall be presented in the study. Any deviation from the default values in the programs must be proposed, documented, and agreed to by the Director of Transportation.
- (602.09.C) ~~If approved by the Director of Transportation, Highway Capacity Manual (HCM) "planning procedure" may be used for any proposed intersections being analyzed, subject to the evaluation of ten (10) years or more into the future.~~

- C. ~~(620.09.D) A Level of Service (LOS) “D” or better is the minimum acceptable level of service on existing or planned freeway segments, interchanges, signalized/unsignalized intersections and ramp terminals, multi-lane, two-lane and urban roadways. A level of service “D” also must be maintained for the segment or link of roadways and all individual movements at all analyzed intersections.~~ “E” shall be maintained for all roadways and intersections currently operating at or above LOS “E.” Roadways and intersections currently operating below LOS “E” shall not be further deteriorated. It is expected that the LOS will be “E” within the limits of Small Area Plans, Activity Centers, and Redevelopment Corridors (as shown on the [Prince William County Long-Range Land Use Map](#)); MultiModal Hub and Transit District or Center (as shown on the [Prince William County 2040 Comprehensive Plan Transit Connectivity Map](#)); and streets classified as Principal Arterial or Minor Arterial (as shown on the [Prince William County 2040 Comprehensive Plan Roadway Plan Map](#)).

~~(620.09.E) A level of service (LOS) “C” or better is the minimum acceptable level of service for subdivision streets.~~

- D. (620.09.F) The Director of Transportation may require all intersections be analyzed for off-site/on-site queuing (i.e., queuing analysis to determine the length of a left and right-turn lane[s] and storage area[s]) to assess potential spill-back effects.
- E. (620.09.G) The TIS shall include a capacity analysis for all identified locations within the study area before and after each phase of the proposed development to determine the development’s impact and necessary improvements.
- F. (620.09.H) If roadways and/or intersections within the study area are currently operating or are projected to operate under hazardous conditions or unacceptable levels of service, the improvements needed to mitigate the conditions shall be provided in the recommendations.
- G. If the study area includes residential or mixed use development, includes an arterial street crossing, and is within one-half (0.5) mile of a school or school zone, intersection controls such as crosswalks, pedestrian refuge islands, pedestrian bridges, bicycle intersection markings, or other traffic calming improvements needed to ensure pedestrian/bicyclist crossing safety shall be noted in the recommendations.

~~(602.09.I) Use of any reserve capacity of a roadway or intersection resulting at a level of service “D” or below shall warrant recommendations in the study for future improvements.~~

- H. (620.09.J) On-site traffic circulation analysis may be included in the TIS. The analysis shall include, but not be limited to, major internal intersections, access points, travelways, and parking circulation and queuing analysis.
- I. (620.09.K) If required by the Director of Transportation, a progression analysis shall be performed for arterials having two or more signalized intersections within a mile of the proposed development. Transportation/traffic computer software or programs such as Synchro, HCS, or SIDRA may be utilized for the analysis. Other software may be used when approved by the Director of Transportation.
- J. (620.09.L) Diagrams included in the study should include and identify the existing and proposed spacing(s) of all intersections/entrances and/or crossovers of divided roadways.

606.10. Recommendations

- A. (620.10.A) At a minimum, the TIS shall include recommendations on the following items to mitigate traffic impacts on the study area:

1. Widening and/or construction of roadways and intersections, turn lanes and turn lane extensions, intersection turning movement elimination, signal modifications, installation of medians, shared access and other access management strategies, geometric improvements such as lane geometry improvements, and intersection realignments.
2. Intersection signalization, including but not limited to, signal warrant analysis, timing, phasing and optimization and VDOT approved priority control equipment for Fire and Rescue.
3. Transportation Demand Management (TDM) programs which reduce the number of vehicle trips being generated by the proposed development.
4. Pedestrian, bicycle, or transit facilities which reduce the number of vehicle trips being generated by the proposed development.
5. Transportation system management techniques, such as traffic signal coordination, which optimizes the capacity of the transportation network.
6. Incorporation of alternative traffic control (such as roundabouts or all-way stops).

~~(620.10.B) The recommended improvements must be achievable. The DCSM, HCM, VDOT standards, and AASHTO manuals shall be utilized to design the recommended improvements. Whether or not the recommended improvements can be constructed shall not preclude acceptance of the TIA.~~

- B. The recommended improvements should be discussed with the Director of Transportation to determine feasibility. The DCSM, HCM, VDOT standards, and AASHTO manuals shall be utilized to design the recommended improvements.
- C. (620.10.C) All recommended roadway improvements shall include the description, timing, funding, and source of the construction of said improvements.
- D. (620.10.D) A TIS which does not contain specific recommendations to mitigate any noted negative impacts shall not be considered complete. Mitigation measures must be evaluated with regard to their operational performance, safety impacts, and effectiveness before being recommended. A measure that provides additional capacity but creates an operational or safety problem is not acceptable.

607.00. TRANSPORTATION DEMAND MANAGEMENT

607.01. Purpose

- A. (602.02.1) The purpose of these requirements is to provide a clear, concise set of guidelines for the area to be studied, the analysis and methodology to be employed, and recommendations to assess the effectiveness of a development proposal's Transportation Demand Management (TDM) strategies in reducing congestion while promoting alternative forms of transportation on the existing and future transportation network. In addition, they are designed to advise applicants what constitutes a comprehensive acceptable TDM plan for development proposals.

607.02. What to Include in a TDM

- A. (630.01.A) A TDM plan is a general plan of actions which is designed to change travel behavior in order to improve performance of transportation facilities and to reduce the need for additional road capacity. Methods may include but are not limited to the use of alternative modes, ride-sharing and vanpool programs, and other single-occupied vehicle (SOV) trip-reduction strategies such as providing public shuttle buses or regular bus service from major employer/neighborhood collection points to transfer centers; employer-based incentives such as telecommuting and/or flexible work schedules (which shift demand to non-peak times of day); neighborhood based incentives such as shuttle buses and neighborhood day-care/pre-school childcare services . Operational management strategies are cost effective operational improvements such as restriping of intersections, coordination and synchronization of traffic signals, closure of median breaks, incident management programs, transit management programs, priority transit/emergency vehicle routing, and Intelligent Transportation System (ITS) technologies including electronic toll collection, automated traffic enforcement, real-time parking management, and permanent or portable Closed Circuit Television (CCTV) at common congestion points to monitor traffic conditions. The TDM plan details mode choice not trip generation.
- B. (630.01.B) Any TDM plan not meeting the requirements of this section shall be considered incomplete and unacceptable.
- C. (630.01.C) A TDM plan submitted as part of a rezoning study will focus on site access and off-site impacts. The primary focus of a TDM plan submitted with a site plan shall be site access, circulation, and internal roads. However, the TDM Plan requirements may include but are not limited to the following strategies or any others:
1. Bicycle/Pedestrian Improvements – ~~If included, t~~The applicant should proffer the provision of bicycle facilities and/or shared use paths along or adjacent to streets; public bikeshare stations; appropriate intersection controls such as pedestrian refuge islands or curb extensions; intersection markings such as dashed bike lanes or green-colored pavement/paint treatment; and signal controls such as Accessible Pedestrian Signal (APS), Leading Pedestrian Intervals (LPI), or dedicated bicycle signals. The applicant should indicate when the facilities will be operational and who will be responsible for construction and maintenance.
 2. Multi-Modal Integration – ~~If included, t~~The TDM plan should address the integration of alternative modes of transportation within the existing and planned roadway network, as well as who will provide the alternative modes and when.
 3. Guaranteed Ride Home (GRH) – If included, the applicant should address a guaranteed ride home program. The applicant shall provide receipts from taxis used in the GRH program periodically as a means of monitoring the effectiveness of this program.
 4. Multimodal Facilities – ~~If included, t~~The applicant should address the provision of multimodal facilities including but not limited to walkways, sidewalks and courtyards, public paths, shared use paths, trails, and pedestrian streets linking residential and commercial components of the development independent of street layout.
 5. Traffic Calming – If needed, the applicant shall proffer traffic calming measures per PWC Residential Traffic Management Guide, such as median islands, raised crosswalks, roundabouts, etc., approved by the Director of Transportation which mitigate the additional impacts of the proposed development. The effectiveness of the applicants traffic calming measures shall be included in the TDM.

6. Transit/Private Shuttle Improvements – If included, the applicant shall proffer transit and/or shuttle improvements which may include bus shelters, bus stop/pullout and appropriate siting of transit stops (near-side, far-side, or mid-block) within the existing and planned roadway to include dedicated transit lanes, red colored pavement/paint treatments, transit signal priority, and other transit/shuttle improvements. The applicant should indicate who will provide the transit/shuttle improvements and when the improvements will be operational.
 7. Live/Work & Telecommuting – If included, the applicant should address the provision of surveying telecommuters and/or teleworkers periodically to measure the effectiveness of this program. An effective telecommute/telework program is defined as telecommuting ~~from one to three~~ at least one (1) day per week; how will the program be implemented; when will the program be operational; and who will be responsible for monitoring the program.
- D. (630.01.D) The applicant shall demonstrate how each strategy used in the TDM plan will be monitored periodically. The monitoring strategy must be discussed and approved by the Director of Transportation in the pre-submission meeting for the TDM plan.
1. A Transportation Management Association (TMA) shall be developed as the tool for measuring, quantifying, and enforcing the strategies included in the TDM plan.
 2. The applicant must show that the TMA will be established before construction can begin on the proposed development.

607.03. Administration

- A. (630.02.A) A TDM plan shall conform to all of the provisions of this section unless the requirements of specific subsections are modified or deemed not necessary by the Direction of Transportation as a result of the pre-submission meeting.
- B. (630.02.B) The applicant shall meet with the Director of Transportation prior to preparation of any TDM plan to determine the scope of the TDM plan (pre-submission/scoping meeting). All requirements for a TIS, as detailed in *Section 606.00. TRAFFIC IMPACT STUDY*, must be met in addition to the additional criteria for a TDM plan.
- C. (630.02.C) Analysis: The TDM strategies should be analyzed for their impact on the adopted levels of service. The applicant shall analyze the TDM strategies used in the TDM plan to determine if the strategy improves the overall mode choice by reducing vehicle demand or by maximizing the person throughput of the system. The analysis shall also show if the TDM strategies reduce vehicle trips and/or vehicle miles traveled by encouraging alternative choices. The results of the TIS, as detailed in *Section 606.00 TRAFFIC IMPACT STUDY*, shall be included in the analysis and strategy recommendations of the TDM plan.
1. The latest version of highway capacity software (HCS) operational module ~~Florida Department of Transportation LOS standards~~ or a highway transportation model equivalent shall be used in the analysis when appropriate. All worksheets indicating the inputs and outputs of the HCS program shall be presented in the study. Any deviation from the default values in the program must be proposed, documented, and agreed to by the Director of Transportation.
 2. The TDM plan must be consistent with Metropolitan Washington Council of Government (MWCOC's) TDM program.
 3. The TDM plan analysis shall show demographics by Traffic Analysis Zones (TAZs).

4. The TDM plan analysis shall provide travel behavior data with TDM strategies and without TDM strategies, including commute mode choice and average vehicle ridership.
 5. The TDM plan analysis shall provide market information (i.e., surveys of potential participants) to help determine demand for potential new transportation services and the effects of possible transportation improvements, and to identify barriers and potential problems.
 6. The TDM plan shall show achievement of at least ten percent (10%) reduction in vehicle miles traveled per capita over a twenty (20) year period.
- D. (630.02.D) Recommendations and Implementation: The applicant shall recommend TDM strategies if the strategy improves the overall system LOS by reducing vehicle demand or by maximizing the person throughput (multimodal ~~pedestrian~~-network) of the system.
1. A TDM plan must be a concise binding plan/program with funding mechanisms for implementation of the proposed strategy. Any study of a TDM program within the Washington metropolitan area, which is similar in nature to the proposed development, may be submitted to staff to assist them in evaluating the proposed strategy prior to preparation on the TDM plan.
 2. The recommended improvements must be achievable. The DCSM, HCM, VDOT standards, AASHTO, as well as other known and acceptable standards, guides, and manuals shall be utilized to design the recommended improvements.
 3. All recommended TDM strategies shall include description, timing, and funding for provision of said improvements.
 4. The TDM plan recommendations must be enforceable by written agreement and approved.
 5. A TDM plan which does not contain specific recommendations to mitigate any noted negative impacts (impacts which would be made upon the system if the applicant were not to do a TDM plan) shall not be considered complete.
- E. (630.02.E) Monitoring and Evaluation: Monitoring and evaluation will enable the County to determine how well TDM strategies are contributing to the TDM plan's goals and objectives. Through the monitoring and evaluation of TDM strategies, the applicant shall document and assess activities undertaken to implement and maintain the plan; assess the results of the program and achievement of plan's goals; spotlight activities that need improvement or added emphasis; and identify activities that are ineffective or inefficient.
1. The applicant shall demonstrate how each strategy used in the TDM plan will be monitored. The monitoring strategy and duration and frequency of strategy monitoring will need to be discussed and approved by the Director of Transportation in the pre-submission meeting for the TDM plan. The use of pedestrian and/or bicycle counters is encouraged for monitoring multimodal recommendations with the TDM and provides data that can support future funding applications for network expansion, maintenance prioritization, and provide a more comprehensive understanding of multimodal travel across the County.
- F. (630.02.E) TDM strategies effectiveness will be assessed in two phases related to the time of implementation.
1. Short Term Measures: Number of vehicle trips reduced at the development site compared to the expected number generated without TDM strategies.

2. Long Term Measures: Reduction in vehicle delay (roadway segments) in areas around project sites compared to that expected without TDM strategies. Improvement in roadway LOS in areas around the project site or maintaining current LOS for roadways within Small Area Plans, Activity Centers, or Redevelopment Corridors (as shown on the Prince William County Long-Range Land Use Map), MultiModal Hubs or Transit Districts or Centers (as shown on the Prince William County 2040 Comprehensive Plan [Transit Connectivity Map](#)); and along primary or minor arterial roads (as shown on the [Prince William County 2022 Comprehensive Plan Roadway Plan Map](#)).

G. (630.02.E) The applicant shall hold follow-up meetings with Department of Transportation staff periodically after the implementation of the recommended strategy to assess the effectiveness of the strategy. If the applicant does not achieve the trip reductions from the implemented strategy as originally expected, the applicant shall address what will be done to reinforce the strategy.

608.00. CONSTRUCTION STANDARDS

608.01. Street Construction

A. (604.01.A) The methods and materials used in the construction of all streets shall be in conformance with the requirements of the current VDOT road and bridge specifications, Virginia Erosion and Sediment Control Handbook, and this manual.

~~(604.01.B) All street construction, including sidewalks, shall be within the dedicated street right-of-way or the required easements. Grading may be done in adjoining easements.~~

B. (604.01.C) Street construction shall be for the full frontage of all lots.

C. (604.01.D) The required thickness of subbase, base course, and top or surface course shall be as shown in Detail 650.01 of this manual. Subbase and/or base thickness is based on subgrade CBR value of ten (10). The final pavement design shall be determined after CBR tests are performed at the developer's cost in accordance with sections 602.06. *Pavement Design* and 602.07. *Alternative Pavement Design* of this manual. CBR test results for ultimate pavement design shall be submitted in a form approved by the Director of Transportation.

D. (604.01.E) For streets under construction, which are not yet accepted into the State system, the developer shall be responsible for providing traffic controls in accordance with VDOT specifications.

E. (604.01.F) No occupancy permit will be issued to any structure(s) unless the frontage improvements and all roadways within the specific phase including the main entrance are paved. Full pavement depth, with the exception of the final top coat, is acceptable provided it is agreed to by the Department of Transportation.

F. (604.01.G) At the conclusion of street construction, all equipment, forms, barriers, excess material, and related items shall be removed from the site. Final approval of the construction shall include proper cleanup of the site.

- G. (604.01.H) Construction sites ~~shall be provided with~~ may be required to provide temporary signs acceptable to ~~Transportation~~ Prince William County referencing the requirements of Section 14-4(c) of the Prince William County's Noise Ordinance at the discretion of the Site Inspector. The signs shall be conspicuously posted ~~in all construction sites~~ and fully visible to all construction personnel. The signs should be bilingual (written in English and in Spanish). Adherence to this requirement shall be the responsibility of the developer(s) and/or contractor(s) and shall be monitored by ~~Department of Transportation~~ Prince William County. ~~Violation of this sign posting requirement is a class II misdemeanor.~~ The temporary warning signs (one in English and one in Spanish), no smaller than two (2) square feet, shall be installed by the developer and/or contractor at each construction entrance of a project prior to the commencement of land disturbing activities. The signs shall read:

WARNING

PRINCE WILLIAM COUNTY CODE PROHIBITS CONSTRUCTION WORK
MONDAY – FRIDAY: BEFORE 6:00 A.M. & AFTER 10:00 P.M.
WEEKENDS AND HOLIDAYS: BEFORE 9:00 A.M. & AFTER 10:00 P.M.

AVISA

LA LEY DEL CONDADO DE PRINCE WILLIAM PROHIBE EL TRABAJO DE CONSTRUCCION
LUNES A VIERNES: ANTES DE LAS 6:00 A.M. Y DESPUES DE LAS 10:00 P.M. SABADOS Y
DOMINGOS Y DIAS PERIADOS: ANTES DE LAS 9:00 A.M. Y DESPUES DE LAS 10:00 P.M.

- H. (604.01.H) The developer must maintain these signs in good condition during the active life of a project. These signs shall be removed at the recommendation of the Department of Transportation prior to final site acceptance and bond release inspection.
- I. (604.01.H) These signs shall be exempt from zoning approval or permit requirements.

608.02. Street Curb and Gutter/Sidewalks

- A. (604.02.A) The curb and gutter shall have uniform sections, approximately ten (10) feet in length, and no section shall be less than six (6) feet in length.
- B. (604.02.B) The aggregate material shall extend under the curb and gutter a minimum distance of ~~six (6)~~ twelve (12) inches beyond the back of the curb.
- C. (604.02.C) The aggregate thickness under the curb and gutter or curb shall be a minimum of four (4) inches.
- D. (604.02.D) The base and subbase material and subgrade for sidewalks and curb and gutter shall be compacted as per current VDOT road and bridge specifications.

608.03. Paved Ditches, Guardrails, and Retaining Walls and Noise Abatement Facilities

- A. (604.03.A) A joint inspection shall be held with the developer, representatives of the County, and VDOT to determine if and where paved ditches and/or guardrails shall be needed. The developer shall be responsible for providing paved ditches and guardrails as determined by the joint inspections. The guardrails shall be installed per VDOT standards prior to granting the first occupancy in each section, in which streets are constructed and the guardrails are determined necessary.

- B. (604.03.B) All retaining walls shall be required to comply with *Section 710.06 Permit for Retaining Walls*, the VUSBC, and the VDOT road and bridge specifications. A single retaining wall or a tiered retaining wall system that retains a total elevation difference greater than forty-eight (48) inches needs a vehicular barrier treatment when travelways or parking spaces are located within ten (10) feet of the face of wall. This barrier treatment is in addition to pedestrian fall protection devices such as railings or fences. Barrier treatment may include guardrail (strong post system), concrete traffic barriers, raising the height of the retaining wall a minimum of twenty-seven (27) inches (height of standard guardrail), or other means as approved by the Director of Transportation. If guardrail is used, there must be a minimum of three (3) feet between the face of wall and the guardrail post. Retaining walls shall be shown in plan and cross section view showing the retaining wall, barrier device, and appropriate dimensions.
- C. (604.03.C) When a residential development is proposed adjacent to an existing interstate roadway a noise impact assessment study is required. If it is determined that the traffic noise levels (based on ultimate roadway improvements) exceed VDOT's minimum standards, noise abatement facilities acceptable to VDOT and the County shall be provided.
- D. (604.03.D) When a residential development is proposed adjacent to a planned or existing principal arterial roadway a noise impact assessment study is required.
- E. (604.03.E) Site plans addressing noise abatement facilities must be designed separately and shall be submitted to the Department of Transportation and VDOT for approval, prior to their incorporation in the final development plans. The facilities shall be designed to reduce traffic noise levels using acceptable engineering criteria and methods such as the use of berms, wide buffers, masonry or sound walls, and/or grading.
- F. (604.03.F) Noise abatement facilities associated with residential developments shall be provided outside the right-of-way and contained in an easement. Maintenance, including removal of graffiti, shall be the responsibility of the homeowners association.
- G. (604.03.G) In lieu of noise abatement facilities, the developer may provide a five hundred (500) foot undisturbed buffer measured from the right-of-way line to the residential lot property line. This buffer shall be shown on the subdivision plat.

608.04. Street Signs

- A. (604.04.A) Streets that end in a temporary cul-de-sac, but are to be ultimately extended to provide access to adjacent development, shall be posted with signs indicating possible extension of the street. The sign shall read: "THIS STREET MAY BE EXTENDED IN THE FUTURE. FOR INFO, CALL Prince William County Department of Transportation at 703-792-6825." At least two signs shall be provided, one at the temporary cul-de-sac and another at the entrance to the street to be extended. These signs shall be installed prior to placement of the base asphalt.
- B. (604.04.B) Dead end streets with cul-de-sac lengths exceeding two hundred fifty (250) feet and streets on which cul-de-sacs are not visible from the intersection streets shall be posted with warning signs stating the following: "NO OUTLET" or "DEAD END." The design and construction of these warning signs shall conform to Detail 650.55 of this manual.
- C. (604.04.C) Street name signs shall not be installed until the street name is approved by the DoIT.
- D. (604.04.D) Street name and other signs may be purchased through the Prince William County sign shop and paid for by the developer.

- E. (604.04.E) Street name signs and stop signs shall be posted at all street intersections, and at all entrances to parking bays for residential development. Temporary street signs must be posted before the use of vehicular traffic, inclusive of construction vehicles. Permanent street signs and stop signs must be posted prior to the occupancy of any house or unit being served by the street.

608.05. Street Traffic Control Signs

- A. (604.05.A) Prior to acceptance of a street in the state secondary system, the developer shall be required to post the necessary traffic control signs, inclusive of pavement markings.
- B. (604.05.B) Prior to school opening, all necessary pavement markings, traffic control signs, traffic safety devices, and/or equipment required by VDOT and the County shall be provided or installed on roadway(s) adjacent to and within the school site.
- C. (604.05.C) Traffic control signs shall conform to the current edition of the [MUTCD and the Virginia Supplement to MUTCD](#).
- D. (604.05.D) Stop signs and other traffic control signs shall be posted at all intersections of streets or travelways that each carry greater than five hundred (500) VPD, including those intersections with state maintained streets and, if warranted, using the latest requirements in the [MUTCD](#) and the [Virginia Supplement to MUTCD](#).
- E. (604.05.E) Prior to the release of the performance bond, County inspectors may require safety features such as no parking regulation signs, speed limit signs, stop signs, pavement markings, and traffic barricades. These items shall be installed at the developer's expense.

608.06. Street Name Signs

- A. (604.06.A) Street name signs shall be installed at all street intersections in accordance with Details 650.52 and 650.53 of this manual.
- B. (604.06.B) Street name signs shall have a minimum height of nine (9) inches, a minimum width of twenty-four (24) inches, and a maximum width of forty-two (42) inches. Widths greater than forty-two (42) inches may be allowed in special cases upon approval of the Director of Transportation.
- C. (604.06.C) Spacing between letters within a street name should conform to the spacing dimension shown in the [Virginia Supplement to the MUTCD for Streets and Highways](#) unless this will result in a sign width greater than specified in *Section 608.06.B*. In such cases, the space between letters may be reduced proportionately to a minimum of one-half (0.5) inch at the closest point between two adjoining letters. If further reduction is required, series B letters may be used.
- D. (604.06.D) The normal spacing between words shall be the width of the letter "H" in the same series and height used in the words. If block names are used, they shall be the same letter series and height as the suffix and shall be placed directly above the suffix.
- E. (604.06.E) As a minimum, all street name signs shall be fabricated with high intensity reflectorized sign sheeting. Sign text and numerals shall be white and the background shall be green.
- F. (604.06.F) For streets constructed in accordance with Details 650.02 thru 650.05, 650.07, and 650.08, at least on street name sign assembly should be mounted at each intersections. Signs naming both streets should be erected at each location with their faces mounted parallel to the streets they name.

- G. (604.06.G) All street name signs shall have a blank space at least two and one-half (2.5) inches high and nine (9) inches wide provided in the lower right-hand corner of the sign to accommodate a decal, provided and installed by the developer once VDOT assigns the appropriate route number preceded by the letter "SR." Decals may be purchased from the Prince William County sign shop.
- H. (604.06.H) The shorter nameplate shall be mounted over the longer nameplate in assembly.
- I. (604.06.I) For ditch section streets, the street name sign shall be installed to that the longest nameplate is a minimum of two (2) feet behind the ditch line.
- J. (604.06.J) For curb and gutter streets, the street name sign shall be installed in the grass utility strip near its terminus at an intersection.
- K. (604.06.K) Street name signs that are to be installed on galvanized poles shall be provided in accordance with Detail 650.52 (SNS-1) of this manual.
- L. (604.06.L) Street name signs (SNS-2) (Detail 650.53) shall be installed on traffic signal poles of major intersections of streets designated to carry traffic volume exceeding seven thousand (7,000) VPD.
- M. (604.06.M) For privately maintained streets and travelways constructed in accordance with Detail 650.06, the street name shall be installed in accordance with Detail 650.52 of this manual.

608.07. Privately Maintained Travelways and Streets

- A. (604.07) The design specifications methods and materials used in the construction of all private streets and travelways not maintained by VDOT shall conform to the current VDOT *Road and Bridge Specifications*, *Virginia Erosion and Sediment Control Handbook*, and this manual.

608.08. Privately Maintained Travelway Signs

- A. (604.08.A) Any street or travelway within a development which is not incorporated into the state secondary system shall be identified with a sign attached to the street sign or address sign (for pipestem driveways), and shall state the following: "Private Street, Not Public Maintained." The sign shall be twelve (12) inches by eighteen (18) inches, and shall conform with Detail 650.56 of this manual.
- B. (604.08.B) Private maintenance designation signs and address range signs may be purchased by the developer through the Prince William County sign shop and installed in conformance with Details 650.56 and 650.60 of this manual.
- C. (604.08.C) On privately maintained streets and travelways, stop signs shall be provided and posted at all intersections of roads or travelways that each carry greater than five hundred (500) VPD, included those with state maintained streets and, if warranted, using the latest requirements in [MUTCD](#) and [Virginia Supplement to MUTCD for Streets and Highways](#).

608.09. Traffic Signal – VDOT and PWC Pre-Emption Systems

- A. (604.09) New traffic signals shall include pre-emption systems that are approved by both VDOT and PWC. Signal modifications shall also include VDOT and PWC approved traffic signal pre-emption equipment to be incorporated into existing traffic signals. This is to be coordinated with the Department of Fire and Rescue who will determine which approaches should have the equipment and will be a requirement for traffic signal plan approval.

609.00. TRANSPORTATION CONSTRUCTION AND INSPECTIONS

609.01. Comprehensive Inspection Program

- A. (640.01.A) In 1982 the Board of County Supervisors approved the adoption of the Comprehensive Inspection Program. The Program was developed to address the costs and the time delays associated with street inspection, testing, and acceptance of streets into the Secondary System of State Highways. The program allows Prince William County Department of Transportation Inspections to provide all inspections of public streets constructed by private development. This program is also referred to in the VDOT Subdivision Street Requirements (SSR) as Comprehensive Subdivision Construction Inspection and in the VDOT Secondary Street Acceptance Requirements, (SSAR) as "Comprehensive Street Construction Inspection." The year of plan approval should be used for document applicability.
- B. (640.01.B) All streets inspected and tested under the Comprehensive Inspection Program must be constructed using methods which meet all applicable VDOT requirements. All provisions and/or agreements related to the Comprehensive Inspection Program must result in a quality road and the related processes must be equivalent to or greater than the documentation requirements contained with the [VDOT Land Development Inspection Documentation Best Practices Manual](#).
- C. (640.01.C) The use of independent testing laboratories and technicians for the purpose of testing materials is acceptable but must be approved.
- D. (640.01.D) Laboratories and technicians must use VDOT approved methods and maintain VDOT approved certifications. Technicians, when testing onsite, must possess their certifications on their person at all times.
- E. (640.01.E) Transportation Inspections shall provide direct oversight of testing by independent material technicians and laboratories, verifying that all testing is being performed in accordance with VDOT requirements including, but not limited to, the [Materials Manual of Instruction](#), [Road and Bridge Specifications](#), and [Virginia Test Methods \(VTM\)](#).
- F. (640.01.F) Transportation Inspections shall require certifications of the quality of materials and verify that the manufacturers or producers of the materials are VDOT approved.

609.02. Pre-Construction

- A. (640.02.A) Prior to the release of a site development, early grading or any type of land disturbance permit, a Pre-Construction meeting must take place with the Department of Transportation Inspections and Department of Public Works ~~Watershed~~ Environmental Management Inspections.
- B. (640.02.B) A [Pre-Construction Package](#) ~~will be provided by the Department of Transportation Inspections~~ shall be reviewed by the developer at each Pre-Construction meeting. The representatives of the developer are responsible for compliance of all parts of the [Pre-Construction Package](#) pertinent to their development. ~~The development's representatives to the Pre-Construction meeting will sign for this document acknowledging receipt. This document and the approved plans will be kept onsite at all times.~~

609.03. Street Construction Inspection

- A. (640.03.A) All ~~public~~ streets within single family detached, single family attached, and condominium developments will be inspected and tested as per the requirements of the Comprehensive Inspection Program and the [VDOT Land Development Inspections Documentation Best Practices Manual](#).
- B. (640.03.B) Prior to placement of aggregate, the developer's representative will contact the Transportation Inspector to inspect the subgrade. The subgrade will be inspected by the review of all test results, string line, and proof rolled ~~if required by the Transportation inspector~~. Placement of aggregate cannot occur until the Transportation Inspector approves the subgrade.
- C. (640.03.C) Prior to placement of base asphalt, the developer's representative will contact the Transportation Inspector to schedule an inspection of the aggregate placed on the approved subgrade. The aggregate will be inspected by the review of test results ~~and proof rolled if required by the Transportation inspector~~ and string line inspection. Proof roll inspection of the aggregate may be required by the Transportation Inspector. Placement of base asphalt cannot occur until the Transportation Inspector approves the aggregate.
- D. (640.03.D) Prior to the placement of ~~base intermediate~~ and/or surface layers of asphalt, the developer's representative will contact the Transportation Inspector to schedule the inspections of the ~~asphalt placement and the testing by the technician~~ previously placed asphalt layer and review of test results. Prior to placement of the ~~surface intermediate~~ and/or surface layers of asphalt, the base asphalt must be approved by the Transportation Inspector.
- E. (640.03.E) Placement of asphalt will meet or exceed the approved design depths.
- F. (640.03.F) Open cut of asphalt for placement of utilities is prohibited without prior approval from the Director of Transportation.

609.04. Special Agreements

- A. (640.04.A) Any item placed within the proposed or existing right-of-way dedicated or to be dedicated to public use and accepted into the Secondary System of State Highways and does not meet a VDOT standard must be identified during the plan review and approval process. Once identified it must be determined acceptable by the Transportation Department and VDOT to be allowed in the ROW by Special Agreement.
- B. (640.04.B) Examples of non-standard items are landscaping, BMP and detention drainage structures, and retaining walls.
- C. (640.04.C) Major utility crossings of streets to be accepted into the Secondary System of State Highways such as electric transmissions lines and petrochemical transmission lines will require a Subordination of Rights Agreement executed for street acceptance.

609.05. Street Acceptance

- A. (640.05.A) All proposed streets dedicated to the County for public use must be accepted into the Secondary System of State Highways and maintained by VDOT.
- B. (640.05.B) Streets eligible for acceptance must be inspected and tested under the Comprehensive Inspection Program.

- C. (640.05.C) Prior to street acceptance, the Board of County Supervisors must request by resolution that VDOT accept the street into the Secondary System of State Highways for maintenance. Once the resolution has passed the street paperwork package is approved by VDOT, a joint inspection of the street by Transportation Inspectors and VDOT must occur. See the [Pre-Construction Package](#) for additional details on the street acceptance process.

TABLES

TABLE 6-1 TRIP GENERATION	
Dwelling Unit Type	Trip Generation (ADT)
Single-family Detached	10.1
Single-family Attached	8.7
Multifamily	6.4

TABLE 6-2 DESIGN SPEED FOR NEW STREETS
Removed May 2024
<i>Refer to Table 6-3 and Section 602.02. Design Speed</i>

TABLE 6-3 DESIGN SPEED FOR NEW AND EXISTING STREETS	
Posted Speed (mph)	Design Speed (mph)
15	15 20
20	20 25
25	25 30
30	30 35
35	35 40
40	40 45
45	45 50
50	55 60
55	60 70
60	65

TABLE 6-4 STOPPING SIGHT DISTANCE (SSD)						
Design Speed (mph)	Minimum Sight Distance (ft)	K Value for Crest Vertical Curve	K Value for Sag Vertical Curve	Desired Sight Distance (ft)	K Value for Crest Vertical Curve	K Value for Sag Vertical Curve
15	80	3	10			
20	115 125	7 8	17	125	8	17
25	155	12	26	155	20	30
30	200	19	37	200	30	40
35	250	29	49	250	50	50
40	305	44	64	325	80	70
45	360	61	79	400	120	90
50	425	84	96	475	170	110
55	495	114	115	550	230	130
60	570	151	136	650	320	160

Note: When the roadway is on a grade, the SSD should take into consideration the breaking distance and be adjusted or modified, as necessary, in accordance with AASHTO's and VDOT's latest guidelines. Height of eye = 3.5' and Height of object = 2.0'.

TABLE 6-5 INTERSECTION SIGHT DISTANCE (ISD)										
Design Speed (mph)	2-Lane Major Roadway (ft)				4-Lane Major Roadway (Undivided) and 4-Lane Divided at Crossovers (ft)			4-Lane Major Roadway (Divided - 18' Median) (ft)		
	Turn from Minor Road			Left Turn from Major Road	Turn from Minor Road		Left Turn from Major Road	Turn from Minor Road		Left Turn from Major Road
	SDL=SDR	SDL	SDR		SDL	SDR		SDL	SDR	
15		145	170	125						
20	225	195	225	165	240	250	180	240	275	200
25	280	240	280	205	295	315	225	295	340	250
30	335	290	335	245	355	375	265	355	410	300
35	390	335	390	285	415	440	310	415	480	350
40	445	385	445	325	475	500	355	475	545	400
45	500	430	500	365	530	565	400	530	615	450
50	555	480	555	405	590	625	445	590	680	500
55	610	530	610	445	650	690	490	650	750	550
60	665	575	665	490	710	750	530	710	820	600

Note: The sight distance should be adjusted or modified for steep grade and wide median, as necessary, in accordance with AASHTO's and VDOT's latest guidelines. Height of eye = 3.5' and Height of object = 3.5'.

SDL = Sight Distance Left (vehicle making a right)

SDR = Sight Distance Right (vehicle making a left turn)

Sight Distance for left turn from major road is used to check the left-turn maneuver across opposing traffic.

TABLE 6-6 CROSSOVER SPACING
Removed May 2024
Refer to VDOT RDM Appendix F: Access Management Design Standards for Entrances and Intersections.

TABLE 6-7 MINIMUM TURN LANE REQUIREMENTS			
Urban/Suburban			
Design Speed (mph)	Taper Length (ft)	Minimum Storage Length[∅] (ft)	Minimum Total Length (ft)
20	40*	50*	100*
25	65*	50*	115*
30	90*	50*	140*
35	120	50*	170*
40	155	50*	205
45	200	100	300
50	200	100	300
55	200	100	300
60	200	100	300
Rural			
Design Speed (mph)	Taper Length (ft)	Minimum Storage Length[∅] (ft)	Minimum Total Length (ft)
20	40*	100	150*
25	65*	100	165*
30	90*	100	190*
35	120*	100	220*
40	155*	100	255*
45	200	100	300
50	200	200	400
55	200	200	400
60	200	200	400

Note: Along roadways classified as collector or higher with a design speed of 45 mph or higher, left and right turn lanes shall be provided where warranted in accordance with the VDOT RDM or as required by the Director of Transportation due to safety concerns.
 *Lengths shown in this table differ from than those in VDOT RDM Appendix F and may require a design waiver.
 ∅Additional storage length shall be provided on Minor and Principal Arterial roadways when determined necessary by VDOT and the County. Urban length of storage to be determined by capacity analysis for Left and Right Turn Storage.

Table 6-7 Replaces old table

TABLE 6-7 MINIMUM TURN LANE REQUIREMENTS		
Design Speed mph	Minimum Length Turn Lane feet	Minimum Length of Taper feet
30	150	100
35	200	100
40	200	100
45	250	100
50	350	100
55	400	100
60	500	100

*Additional storage length shall be provided on Minor and Principal Arterial roadways when determined necessary by VDOT and the County.

HIGHLIGHTED AREAS ARE NEW OR HAVE BEEN MODIFIED

TABLE 6-8 MINIMUM PARKING REQUIREMENTS			
RESIDENTIAL			
USE	PARKING SPACES	LOADING SPACES	
Single Family Detached	2 (exclusive of garage)	None	
Single Family Attached*	2.75 (2 spaces per unit, plus 0.75 for every unit toward visitor parking; garage spaces may be counted*)		
Single Family Attached w/ 2+ car garage	2.4 for units with a driveway (2 spaces per unit, plus 0.4 for every unit toward visitor parking; garage spaces may be counted*) or;		
	2.75 for units without a driveway (2 spaces per unit, plus 0.75 for every unit toward visitor parking; garage spaces may be counted*)		
Duplex	2 (exclusive of garage)		
Mobile Home		2	
Multifamily*		1/ building**	
Efficiency/studio			1
One bedroom			1.5
Two or more bedroom units			2.2
Multifamily, high-rise (buildings greater than 50' in height)	1/10 units per building, plus:	2/ building	
Efficiency/studio			1
One bedroom			1.25
Two or more bedroom units			2
*Subject to restrictive covenants prohibiting conversion of garage space to living/storage area			
**This provision does not apply to two-over-two developments			
NON-RESIDENTIAL - NET FLOOR AREA = 75% OF GROSS FLOOR AREA			
USE	PARKING SPACES	LOADING SPACES	
Amusement or Theme Park	1/200 net SF of building area, and 1/20,000 net SF of land area open to the public, or an alternative standard, or number of spaces approved at the time of rezoning	As deemed operationally necessary at the time of site plan review	
Commercial Kennel	1/500 net SF; 5 minimum	1	
Cultural Arts Facilities, Except Theatres	1/400 SF	1 up to 75,000 SF, then 1 per 100,000 SF	
Daycare Facilities			
Adult - staff assistance facilities	1 per 5 adults up to 40, then 1 per 10 adults based upon licensed capacity	1	
Adult - senior citizen center	1 per 200 SF	1	
Child	1 per 5 children up to 40, then 1 per 10 children based upon licensed capacity	None; 1 bus turnaround area is to be provided	
Farmer's Market	1 per 400 SF of sales area	1 per 50,000 SF; 2 minimum	
Flea Market	1 per 200 SF of sales area	1 per 50,000 SF; 2 minimum	
Food Store	1/200 SF; 10 minimum	1 up to 10,000 SF, then 1 per 20,000 SF	
Fraternal Lodge/Civic Club	1 per 150 SF	1	
Garden Center/Greenhouse/Nursery	1/200 SF of indoor sales area, plus 1 per 1,000 SF of outdoor and greenhouse sales (100 maximum)	1 per 50,000 SF; 2 minimum	
Heliport/Helistop	No minimum requirement. Parking to be determined during site planning or rezoning.	None	
Home Improvement Center/Hardware Store	1/200 SF of indoor sales area, plus 1 per 2,000 SF outdoor sales and storage area	1, plus 1/30,000 SF including outside sales and storage	
Hospitals and Other Health Service Facilities			
Hospital - major surgical or short-term visits	1.25/bed	1 plus 1 per 75,000 SF	
Medical center, offices, and clinics	1/150 SF up to 15,000 SF, then 1/200 SF up to 30,000 SF, then 1/250 SF above 30,000 SF	1 up to 75,000 SF, then 2	
Nursing, convalescent, or personal care facility	1/2 beds, by licensed capacity	1 up to 75,000 SF, then 2	

Hotels and Motels (subject to additional loading and parking for ancillary uses)	1.2/room	1
Libraries	1/125 SF	1
Cemetery/Crematory	The lesser of 1/employee or 1/1,000 SF of floor area (On-site funeral homes shall be parked per the funeral home requirements.)	1
Funeral Home	1/4 seats in main chapel or parlor	1
Banquet/Reception Hall	8/1,000 SF of floor area	1
Maritime Uses		
Commercial or private marina	1/3 slips	1
Indoor storage facility	1/5 dry slips	1
Ramp or launching facility	10 car and trailer spaces	None
Ancillary uses:		
Retail, supplies, and consumer items	1/400 SF; 10 minimum	None
Restaurant	1/75 SF	1 minimum ; 2 if greater than 10,000 SF
Restaurant (snack bar, carryout, or other food service - not vending)	1/200 SF	1
Motor Vehicle and Related Uses		
Indoor display area and offices	1/400 SF	2 up to 75,000 SF, then 1 per 100,00 SF
Outdoor sales area	1/5,000 SF	
Service area (work bays and waiting area)	3/work or service bays	
Retail parts and accessories sales area	1/300 SF	
Heavy equipment sales and services		
Indoor display area and offices	1/500 SF; 5 minimum	1/25,000 SF
Outdoor sales area	1/5,000 SF	
Service area (work bays and waiting area)	2/work bay	
Retail parts and accessories sales area	1/300 SF	
Additional buildings	1/1,000 SF	
Recreational Vehicle Sales and Services		
Indoor display area and offices	1/400 SF	1/25,000 SF
Outdoor sales area	1/2,500 SF	
Service area (work bays and waiting area)	2/work bay	
Retail parts and accessories sales area	1/300 SF	
Retail Fuel Sales		
Fuel only		5
Fuel with service	1/200 SF of office/retail area, plus 3/ work bay; 10 minimum	1
Fuel with convenience retail	5 plus 1/150 SF of building area; 10 minimum	
Office/Financial Institutions	1/250 SF of building area; 10 minimum	None for buildings less than 20,000 SF, then 1 for each additional 20,000 SF; 5 maximum/building
Office with Ancillary Retail or Service Uses	1/250 SF of building area, plus 5%	1/20,000 SF up to 100,000 SF, then 1 per 50,000 SF
Quick Service Food Store	1/150 SF plus 2 up to 5,000 SF, plus 4 if greater than 5,000 SF	1
Racetrack		
Equestrian	1/2 seats plus 1/10 SF of designated standing area, or as established by SUP	4, or as established by SUP
Motorized vehicles	1/2 seats plus 1/10 SF of designated standing area, plus 1 trailer space/work or service bay; 10 minimum	4

Arcade	1/150 SF	None
Billiard Parlor	1/150 SF	1, if sales facility is on premise
Bowling Alley		1, if sales facility or restaurant is on premise
Alleys	4/lane	
Retail Area	1/300 SF	
Restaurant	1/400 SF of restaurant area	
Court Sports Facility (single use)	4/court plus 0.33/seat on stands (1 per 3 seats)	None
Fairgrounds/Carnival/Circus	1/400 SF	4
Golf Course and Service Facilities (single use)	3/hole	None
Miniature Golf/Driving Range (single use)	2/tee for the first 36 tees, then 1/tee	
Petting Farms	1/20,000 SF of the area open to the public	
Pony Rides/Kiddie Parks	1/20,000 SF of the area open to the public	
Private Recreational Facility or Club	1/150 SF	1 if over 30,000 SF
Restaurant, ancillary	1/200 SF	1
Retail, ancillary	1/300 SF	None
Active recreational uses (not courts or golf courses)	3/acre	
Hard or soft courts	4/court plus 0.33/seat on stands (1 per 3 seats)	
Regulation sports fields (softball, baseball, soccer, football, lacrosse, etc.)	30/field	
Swimming pools	1/150 SF of water surface area	
Public Recreational Facility or Club	1/150 SF	1 if over 30,000 SF
Active recreational uses (not courts or golf courses)	3/acre	None
Hard or soft courts	4/court	
Regulation sports fields (softball, baseball, soccer, football, lacrosse, etc.)	30/field	
Indoor uses (not pools or courts)	1/250 SF	
Passive recreation	3/acre up to 10 acres, then 1 per 10 acres; 10 minimum	
Retail, ancillary	1/300 SF	1 if over 30,000 SF
Swimming pools	1/150 SF of water surface area	1
Religious Institutions (schools and offices - separate calculation)	0.33/seat (1 per 3 seats or equivalent)	None
Restaurants		
Freestanding	1/100 SF	1 up to 10,000 SF, then 2 up to 30,000 SF, then 3
Freestanding drive-in, drive-up, drive-through, or carryout	1/75 SF, 5 minimum	1 up to 10,000 SF, then 2
In-line (attached)	1/100 SF	None up to 10,000 SF, 1 up to 30,000 SF, then 1 per 50,000 SF
Retail Sales and Service (and similar uses not specifically addressed, including shopping centers)	1/200 SF (up to 50,000 SF); then 1/225 SF (50,000 to 300,000 SF); then 1/250 SF (300,000+ SF)	None up to 10,000 SF, then 1 (10,000 SF up to 30,000 SF), then 2 (30,000 SF up to 50,000 SF) 3 (50,000 SF to 100,000 SF), then 4 (100,000+ SF)
School of Special Instruction, Business, or Trade Schools, Public and Private	1/200 SF	None
Learning Center	1/seat	1
Elementary or Middle Schools	1/ every 20 classroom seats, plus 1/every 5 seats in an auditorium or multipurpose room	2
High Schools	1/every 5 students, plus 1/ faculty member, plus 10 visitor spaces, plus 1/every 4 seats in an auditorium or multipurpose room	
Junior Colleges, Colleges, and Universities	1/every 5 classroom seats, plus 20 visitor spaces, plus 1/every 3 seats in an auditorium or multipurpose room	

Self-storage Center	3.2/1000 SF of office plus 1/employee and 2 spaces for the resident manager	None
Theatre and Other Similar Establishments	1/3.1 seats, by rated capacity	1
Veterinarian Office, Clinic, or Hospital		1
Suburban/urban facility	1/200 SF	
Rural facility	1/400 SF	
INDUSTRIAL - NET FLOOR AREA = 75% OF GROSS FLOOR AREA		
USE	PARKING SPACES	LOADING SPACES
Automobile Graveyard	1/200 SF, plus 4/work bay; 20 minimum	1 loading space per each 50,000 SF of floor area; maximum of 5 loading spaces
General Manufacturing	1/1,000 SF	
Heavy Industrial	1/1,000 SF	
Maritime Uses	1/500 SF of office area, plus 10	
Medical or Dental Laboratory	1/300 SF up to 10,000 SF, then 1/500 SF	
Research and Development	1/300 SF up to 10,000 SF, then 1/500 SF	
Warehouse and Wholesaling	1/employee, plus 5 spaces	
If office space exceeds 50% of net floor area	1/300 SF up to 100,000 SF, then as provided above	1 loading space per each 100,000 SF of floor area; maximum of 5 loading spaces or maximum of 3 loading spaces within Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center
Data Center/Server Farm	1/employee	1 loading space per each 100,000 SF of floor area; maximum of 5 loading spaces
Utilities	No minimum requirement. Parking to be determined during site planning or rezoning.	None
Solar power Facility		
Utility Facility, Heavy		
Utility Facility, Light Wireless Facility		

TABLE 6-9 PUMP ISLAND SETBACK	
Angle of Pump Island to ROW (degrees)	Setback (ft)
Parallel	12*
1 to 45	20
45 to 90	30

*The setback shall be twenty-two (22) feet if refueling area is provided on the side of the pump island closest to the ROW

TABLE 6-10 MINIMUM OFF-STREET PARKING AREA DIMENSIONS					
Angle of Parking (degrees)	Width of Stall (ft)	Depth of Stall Perpendicular to Aisle (ft)	Width of Aisle (ft)	Width of Aisle Plus Two Stalls (ft)	Width of Stall Parallel to Aisle (ft)
Universal Car Space					
45	9.0	19.1	*15.5	53.7	12.7
60	9.0	20.0	*17.0	57.0	10.4
90	9.0	18.0	**22.0	58.0	9.0
Compact Car Space					
90	8.0	16.0	22.0	54.0	8.0

*One-way
**Two-way (angled parking less than 90° is not permitted with two-way travelway)

TABLE 6-11 PARALLEL PARKING AND AISLE DIMENSIONS			
Direction of Traffic	Width of Stall (ft)	Depth of Stall (ft)	Width of Aisle (ft)
One-way aisle (one-side parking)	9.0*	22.0	12.0
One-way aisle (two-side parking)	9.0*	22.0	15.0
Two-way aisle (two-side parking)	9.0*	22.0	22.0

*On-street parallel parking stall width may be reduced to 8.0' for Urban Center Streets.

TABLE 6-12	
TRAFFIC IMPACT STUDY GUIDELINES FOR STUDY DESIGN YEAR HORIZONS	
Development Characteristic	Suggested Horizons
1. Single-phase development (< 500 peak hour trips)	1. Anticipated opening year, assuming full build-out and occupancy.
2. Single-phase development (500 - 1,000 peak hour trips)	1. Anticipated opening year, assuming full build-out and occupancy. 2. Five Six years after opening date.
3. Single-phase development ($> 1,000$ peak hour trips)	1. Anticipated opening year, assuming full build-out and occupancy. 2. Five Six years after opening date. 3. Adopted transportation plan horizon year if the development is significantly larger than that included in the adopted Comprehensive Plan or travel forecasts for the area.
4. Multiple-phase development (when ultimate road improvements are proposed to be phased)	1. Anticipated opening years of each major phase, assuming build-out and full occupancy of each phase. 2. Anticipated year of complete build-out and occupancy. 3. Adopted transportation plan horizon year if the development is significantly larger than that included in the adopted Comprehensive Plan or travel forecasts for the area. 4. Five Six years after opening date if completed by then and there is no significant trip generation increase from Comprehensive Plan or area transportation forecasts (e.g., at least 15%)
<p>Note: Peak-hour trips based on Trip generation estimates for a proposed development shall be prepared using the latest edition of the ITE Trip Generation Manual.</p>	

TABLES 6-13 TO 6-16 ARE NEW TABLES OR HAVE SUBSTANTIALLY CHANGED

TABLE 6-13 MINIMUM BICYCLE PARKING REQUIREMENTS			
Land Use	Development Area Classification	Short-Term Bicycle Parking	Long-Term Bicycle Parking
Single Family Attached	No Classification	5% of required visitor/shared vehicle parking spaces; minimum 4	None required
	TOD <u>outside</u> of Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	10% of required visitor/shared vehicle parking spaces; minimum 8	
	Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	15% of required visitor/shared vehicle parking spaces; minimum 10	
Multifamily Residential	No Classification	10% of required vehicle parking spaces; minimum 5	10% of required vehicle parking spaces; minimum 20% of long-term bicycle parking spaces <u>or</u> 5 bicycle spaces shall be in common area
	TOD <u>outside</u> of Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	15% of required vehicle parking spaces; minimum 10	15% of required vehicle parking spaces; minimum 20% of long-term bicycle parking spaces <u>or</u> 5 bicycle spaces shall be in common area
	Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	20% of required vehicle parking spaces; minimum 20	20% of required vehicle parking spaces; minimum 20% of long-term bicycle parking spaces <u>or</u> 5 bicycle spaces shall be in common area
Commercial (Retail/Sales, Hotel or Motel, Restaurants, Public Club, Recreation, Libraries Schools, Medical Facilities, and Religious Institutions)	No Classification	10% of required vehicle parking spaces; minimum 2	
	TOD <u>outside</u> of Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	15% of required vehicle parking spaces; minimum 4	
	Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	20% of required vehicle parking spaces; minimum 8	
Commercial (Park, Playground, or Athletic Facilities)	No Classification	5% of required vehicle parking spaces; minimum 2	
	TOD <u>outside</u> of Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	10% of required vehicle parking spaces; minimum 4	
	Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	15% of required vehicle parking spaces; minimum 8	
Commercial (All other uses)	No Classification	2 spaces	None required
	TOD <u>outside</u> of Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	4 spaces	
	Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	8 spaces	
Office	No Classification	10% of required vehicle parking spaces; minimum 2	
	TOD <u>outside</u> of Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	15% of required vehicle parking spaces; minimum 4	
	Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	20% of required vehicle parking spaces; minimum 8	
Industrial	No Classification	2 spaces	
	TOD <u>outside</u> of Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	4 spaces	
	Small Area Plan, Activity Center, MultiModal Hub, and Transit District or Center (as shown on the Future Transit Alternative Map)	8 spaces	

Table 6-14 Low Volume Unpaved Street Minimum Centerline Radius								
Design Speed (mph)	Side Friction Factor (Fs)							
	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
	Minimum Centerline Radius* (ft)							
10	50	50	50	50	50	50	50	50
15	300	150	100	75	60	50	50	50
20	535	270	180	135	110	90	80	70
25	835	420	280	210	170	140	120	105
30	1200	600	400	300	240	200	175	150
35	1635	820	545	410	330	275	235	205
40	2135	1070	715	535	430	360	305	270
45	2700	1350	900	675	540	450	390	340
Table 6-14a Side Friction Factors (Fs) for Various Surfaces								
Material	Dry		Wet		Other			
Packed and Oiled Gravel	0.25 - 0.42		0.20 - 0.40					
Loose Gravel	0.20 - 0.35		0.18 - 0.37					
Crushed Rock	0.27 - 0.37		0.27 - 0.37					
Earth**	0.27 - 0.32		0.20 - 0.25					
Dry-packed snow					0.10 - 0.27			
Loosely Packed Snow					0.05-0.30			
Lightly Sanded Snow					0.14-0.15			
Lightly Sanded Snow (with					0.17			
<p>*For curves with no superelevation</p> <p>**Reduce earth values by 50% for wet clays.</p> <p>Notes:</p> <ul style="list-style-type: none"> •First select an applicable side friction factor (Fs) from Table 6-14a then utilize Table 6-14 to determine the minimum centerline radius. •The Fs presented in Table 6-14.1 are reduced and provide a reasonable margin of safety for the average driver. It is not always necessary to select an Fs for inclement weather conditions because the average driver reduces speed under these conditions. Inclement weather Fs should be selected when the street is specifically intended for use during inclement weather conditions or when there is a high proportion of traffic during those conditions. <p>Refer to US Forest Service Handbook FSH 7709.56 for additional information</p>								

Table 6-15 Low Volume Unpaved Street Minimum Sight Distance						
Design Speed (mph)	0 - 100 ADT		100 - 250 ADT			
	All Locations	K Value	Lower Risk Locations*	K Value	Higher Risk Locations**	K Value
10	50	2	50	2	50	2
15	65	2	65	2	65	2
20	90	4	90	4	95	5
25	115	7	115	7	125	8
30	135	8	135	8	165	13
35	170	14	170	14	205	20
40	215	22	215	22	250	29
45	260	32	260	32	300	42

*Away from intersections, narrow bridges, railroad-highway grade crossings, sharp curves, and steep downgrades
**Near intersections, narrow bridges, or railroad-highway grade crossings, or in advance of sharp curves or steep downgrades

Table 6-16 Off-Street Parking Reductions		
Development Area Classification	Use	Reduction
No Classification	All uses	No adjustment factor
In Small Area Plans and within Transects 5-6* OR Within 2,000 feet of a Virginia Railway Express (VRE) Station or VDOT Commuter Lot**	Single Family Detached, Duplex, and Mobile Home	No adjustment factor
	Single Family Attached, Single Family Attached with 2+ car garage	2.2 spaces/ unit, of which 0.3 spaces/ unit towards visitor or shared parking
	Multifamily Residential	8% by-right reduction
	Nonresidential (i.e. commercial, office)	12% by-right reduction
	Mixed-use (residential and non-residential use)	10% by-right reduction

* As defined in the Prince William County Land Use Plan

**Limited to VDOT Commuter Lots with a minimum of 500 spaces

TABLE II PAVEMENT STRUCTURE DESIGN

CATEGORY	SUBBASE	BASE	SURFACE TYPE SM-9.5A
I UP TO 250 VPD	1. N/A 2. 4 inches (Select Material Type I, II or III)	6 inches Agg. Base Material 4 inches Agg. Base Material	2 inches Asph. Conc 2 inches Asph. Conc
II 251 TO 400 VPD	1. N/A 2. 6 inches Agg. Subbase or Base Material	8 inches Agg. Base Material 3 inches Asph. Conc Type BM-25.0A	2 inches Asph. Conc 2 inches Asph. Conc
III 401 TO 1,000 VPD	1. 8 inches Agg. Subbase or Base Material 2. 6 inches Cement Treated Aggregate 3. 8 inches Agg. Subbase or Base Material	3 inches Asph. Conc Type BM-25.0A 3 inches Asph. Conc Type BM-25.0A 4 inches Asph. Conc Type BM-25.0A	1-1/2 inches Asph. Conc 2 inches Asph. Conc 2 inches Asph. Conc
IV 1,001 TO 2,000 VPD	1. 6 inches Cement Treated Aggregate 2. 8 inches Agg. Subbase or Base Material 3. 8 inches Agg. Subbase or Base Material	6 inches Agg. Base Material 4 inches Asph. Conc Type BM-25.0A 6 inches Asph. Conc Type BM-25.0A	2 inches Asph. Conc 2 inches Asph. Conc 1-1/2 inches Asph. Conc
V 2,001 TO 4,000 VPD	1. 6 inches Cement Treated Aggregate & 5 inches Agg. Subbase or Base Material 2. 8 inches Agg. Subbase or Base Material 3. 8 inches Agg. Subbase or Base Material	3 inches Asph. Conc Type BM-25.0A 5 inches Asph. Conc Type BM-25.0A 6 inches Asph. Conc Type BM-25.0A	1-1/2 inches Asph. Conc 1-1/2 inches Asph. Conc 2 inches Asph. Conc
VI 4,001 TO 7,000 VPD	1. 8 inches Agg. Subbase or Base Material 2. 8 inches Agg. Subbase or Base Material 3. 6 inches Cement Treated Aggregate	7 inches Asph. Conc Type BM-25.0A 8 inches Asph. Conc Type BM-25.0A 5 inches Asph. Conc Type BM-25.0	2 inches Asph. Conc 2 inches Asph. Conc 2 inches Asph. Conc
VII* 7,001 TO 15,000 VPD	1. 6 inches Cement Treated Aggregate 2. 8 inches Agg. Subbase or Base Material	4 inches Asph. Conc Type BM-25.0A and 2 inches Asph. Conc. Type IM-19.0A 9 inches Asph. Conc Type BM-25.0A	1-1/2 inches A.C. (SM-9.5D) 1-1/2 inches Asph. Conc
VIII 15,001 (PLUS) VPD	1. 8 inches Cement Treated Aggregate 2. 8 inches Agg. Subbase or Base Material	6 inches Asph. Conc Type BM-25.0A and 2 inches Asph. Conc. Type IM-19.0A 9 inches Asph. Conc Type BM-25.0A	1-1/2 inches A.C. (SM-9.5D) 1-1/2 inches Asph. Conc

*For traffic volumes over 10,000 vehicles per day, use SM-9.5D for surface course.

Detail No.	SPD-1		COUNTY OF PRINCE WILLIAM VIRGINIA	Added category STANDARD PAVEMENT DESIGN (SHEET 1 OF 3)	Date
650.01					6/10/24

GENERAL NOTES:

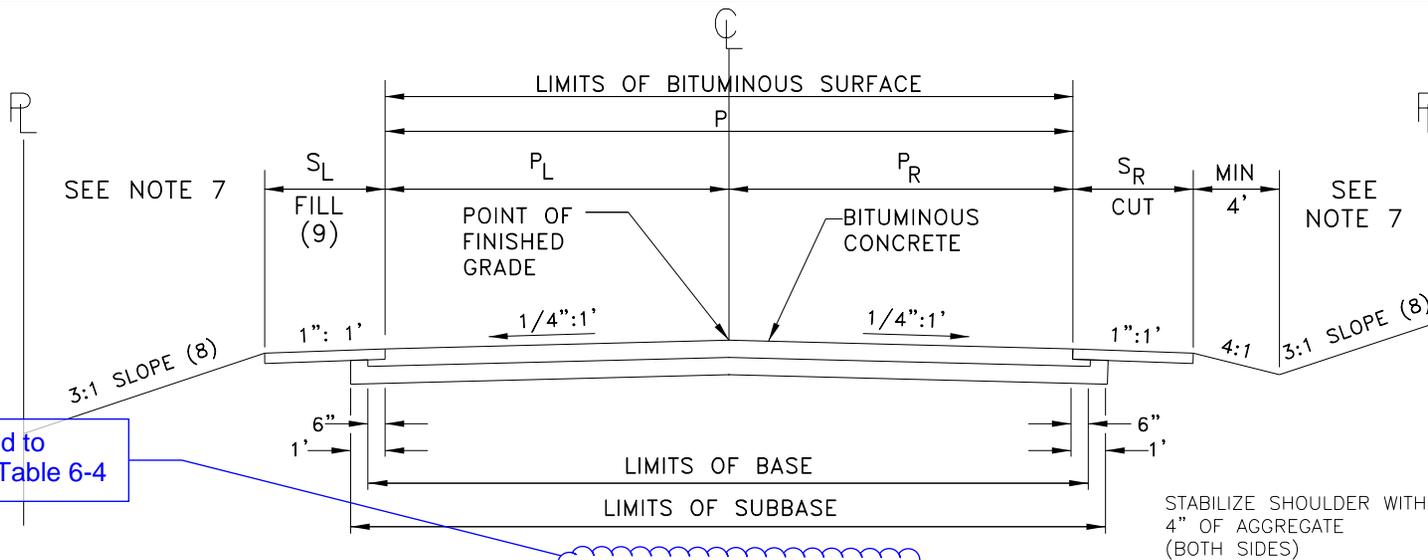
1. When the projected traffic requires a four lane facility, 80% of the projected traffic shall be the basis for determining the applicable class for the pavement structure design.
2. Subgrade support soils, immediately under the pavement, with CBR values of less than ten will require an additional six (6) inches of subbase or base. In lieu of this, the CBR value may be improved by any other acceptable means. In any case, the subbase aggregate shall not exceed twelve (12) inches.
3. Sufficient engineer certified CBR tests must be run to determine the soil support value (SSV) of the various soils in the subgrade. Details to the VDOT approved method may be obtained through any VDOT District or Residency Office or its Central Office.
4. Pavement design in accordance with "Pavement Design Guide of Subdivision and Secondary Roads in Virginia" of VDOT is acceptable an alternate to any of the above.
5. Each street should have continuity of design throughout. Therefore, multiple and/or variable base design will only occur at the intersections.
6. Designs within a specific traffic category may not be structurally equal because of differences in the materials' flexural strengths and practical construction consideration.
7. Cement Treated Aggregate (CTA) or full depth Bituminous Concrete can be substituted for any aggregate, subgrade stabilization, or select material on a basis of one (1) inch of CTA or Bituminous Concrete for two (2) inches of the other materials. Neither CTA nor Bituminous Concrete should be placed directly on a resilient soil unless the soil is stabilized with cement or other stabilizing agent. CTA should have a minimum of four (4) inches of aggregate material under it when less than four (4) inches of bituminous concrete is used on top of the CTA.
8. UD-1's must be used with high water tables. UD-2's must be used for all pavement sections with grassed medians.
9. Subsurface and pavement drainage problems must be corrected in accordance with current VDOT standards.
10. The pavement designs in the tables are based on an assumed CBR value of 10 and are recommended as a guide. The actual designs shall be based upon the traffic volume and CBR values for specific projects.
11. Categories IV thru VIII or any street intended to carry a design traffic volume exceeding 1,000 VPD shall utilize 21B aggregate as subbase or base material. Pavement drainage, such as the use of underdrains, should be provided in the pavement design when 21B aggregate is used.

Detail No.	SPD-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD PAVEMENT DESIGN (SHEET 2 OF 3)	
650.01					Date 6/10/24

GENERAL NOTES (continued):

12. The maximum combined thickness of subbase and base layers of aggregate materials shall be twelve (12) inches. Any thickness index that requires an aggregate layer over twelve (12) inches should be developed through appropriate treatment of subgrade or through the use of thicker asphalt concrete layers.
13. Plain aggregate should be primed with liquid asphalt material in accordance with VDOT specifications whenever Four (4) inches or less of asphalt is to be placed on a plain or cement stabilized aggregate.
14. Paved shoulders, where required, should be designed in accordance with VDOT standards and specifications.
15. Superpave mixes when required by Department of Transportation and VDOT, shall be designed in accordance with the minimum requirements of VDOT and this manual. Pavement layers thickness design, material requirements, mix design criteria, job mix formula and specifications shall be in accordance Section 211 of VDOT Road and Bridge Specifications Manual and current Special Provisions.

Detail No.	SPD-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD PAVEMENT DESIGN (SHEET 3 OF 3)	
650.01					Date 6/10/24



Updated to match Table 6-4

Added category

CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN. C.L. RADIUS (ft.) (10)	MIN. SIGHT DISTANCE (ft.) (13)			S _L (ft)	P _L (ft)	P (ft)	P _R (ft)	S _R (ft)	TYPE I SUBBASE AGG. BASE	BASE (BM-25.0A)	SURFACE (SM-9.5A)
						SSD	SDL	SDR								
I (4)	UP TO 250	42	20	10%	120	115	195	225	2	9	18	9	2	6 in		2 in
II	251 TO 400	44	20	10%	120	115	195	225	2	9	18	9	2	8 in		2 in
III	401 TO 1,000	56	25	10%	200	155	240	280	3	11	22	11	3	8 in	4 in	2 in
IV	1,001 TO 2,000	56	25	10%	200	155	240	280	3	11	22	11	3	8 in	6 in	1.5 in

GENERAL NOTES:

1. This typical cross section shall be used in all subdivisions considered as rural or transitional, (subdivisions where average lot size is one (1) acre or greater.)
2. Standard landings required at intersections.
3. Pavement section is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
4. Forty foot (40 ft.) right-of-way allowed in certain circumstances where all slopes and drainage structures can be included and the average lot size is five (5) acres or more and approved by the Director of Transportation and VDOT.
5. Off street parking shall be required in accordance with Section 603.03 of this manual.
6. Travelways or roadways serving large lot subdivisions shall be designed conforming to VDOT and/or County requirements whichever is more stringent.
7. Additional right-of-way shall be required if streetscapes and shared use paths are required.
8. 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where special stabilization in accordance with Erosion Control ordinance is provided.
9. Wider shoulder shall be required where guardrails are provided in accordance with Section 602.14 and VDOT standards.
10. Minimum radius applies to level and rolling terrains.
11. Changes in categories, where permitted, shall be at intersections only and to the next lower or higher category only.
12. Sidewalk or shared use path is required per VDOT SSAR and may be required along both sides of the street.
13. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Updated to match Comp Plan terminology

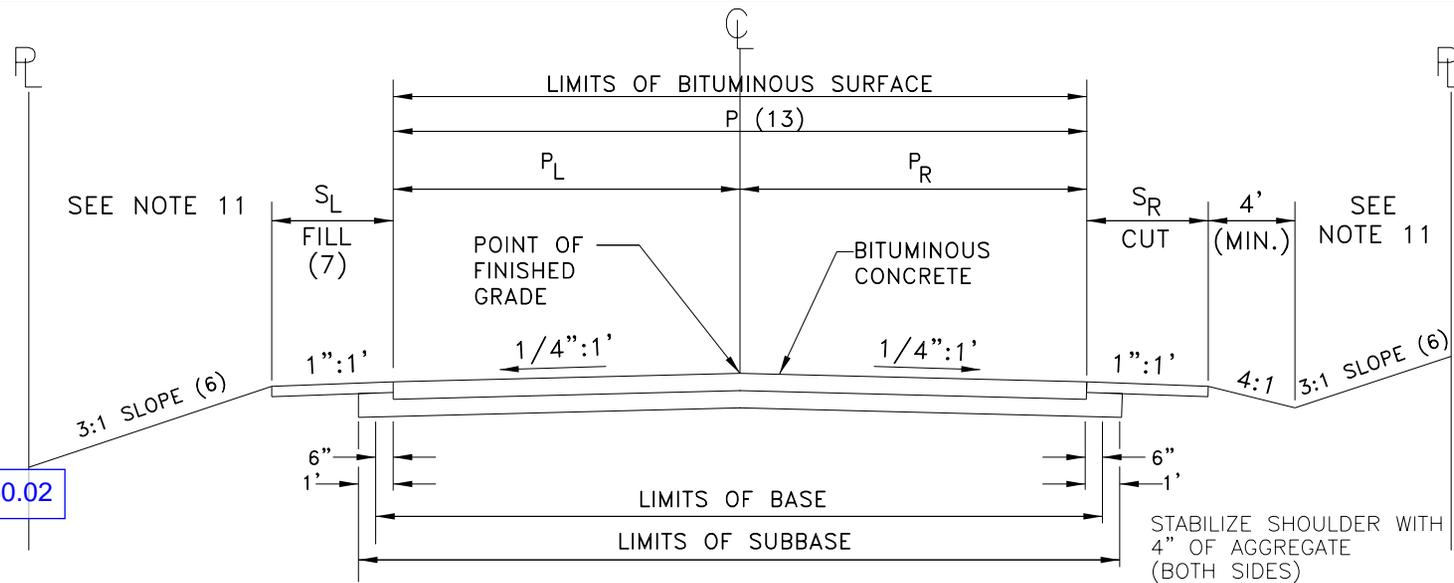
Updated reference

Added reference

Added note

Added note

Detail No.	RL-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR RESIDENTIAL LOCAL STREETS WITHOUT CURB AND GUTTER (FIXED TRAFFIC)	Date
650.02					9/25/2024



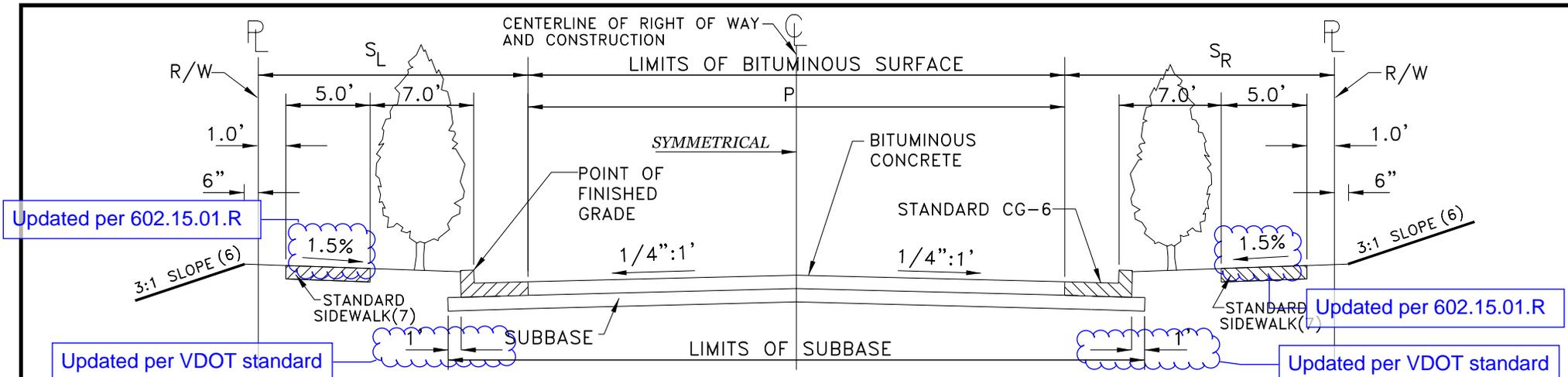
Moved Cat. 4 to 650.02

CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (14)			S_L (ft)	P_L (ft)	P (ft)	P_R (ft)	S_R (ft)	TYPE I SUBBASE AGG. BASE (21-B)	BASE (BM-25.0A)	SURFACE (SM-9.5A)
						SSD	SDL	SDR								
V	2,001 TO 4,000	60	30	10%	335	200	290	335	6	12	24	12	6	8 in	6 in	2 in
VI	4,001 TO 7,000	62	40	9%	762	305	385	445	6	12	24	12	6	8 in	8 in	2 in

GENERAL NOTES:

1. This typical cross section shall be used in all subdivisions considered as rural or transitional (subdivisions where average lot size is one (1) acre or greater).
2. Standard landings required at intersections.
3. No parking or direct residential access permitted on Category VI streets.
4. Pavement section is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
5. Superelvation shall be provided only for Category VI streets. Consider superelvation rate of 2.08%.
6. 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where special stabilization in accordance with the Erosion Control ordinance is provided.
7. Wider shoulder shall be required where guardrails are provided in accordance with Section 602.14 and VDOT standards.
8. Six (6) foot ditch is only applicable to Category VI streets.
9. Channelized intersections will be required at all intersections of existing or future Category VI streets.
10. Off street parking shall be required in accordance with Section 603.03 of this manual.
11. Additional right-of-way may be required if streetscape and shared use paths are required. Added note
12. Sidewalk or shared use path is required per VDOT SSAR and may be required along both sides of the street.
13. "P" width of 24' consists of two 12' lanes. 11' lanes may be used with VDOT and County approval.
14. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Detail No.	RM-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR RESIDENTIAL COLLECTOR STREETS WITHOUT CURB AND GUTTER	Date
650.03					9/25/2024

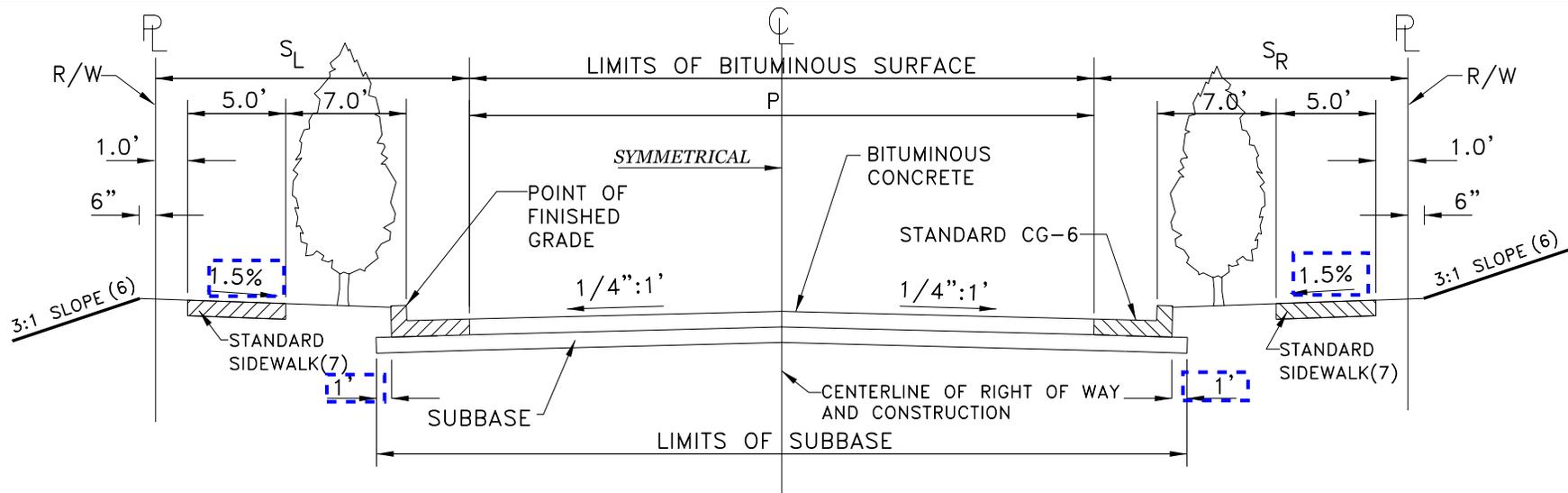


CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (13)			S _L (ft)	P (ft)	S _R (ft)	TYPE I SUBBASE AGG. BASE (21-A)	BASE (BM-25.0A)	SURFACE (SM-9.5A)
						SSD	SDL	SDR						
I	UP TO 250	54	20	10%	120	115	195	225	15	24	15	6 in		2 in
II	251 TO 400	54	20	10%	120	115	195	225	15	24	15	8 in		2 in
III	401 TO 1,000	62	25	10%	200	155	240	280	15	32	15	8 in	4 in	2 in
IV	1,001 TO 2,000	62	25	10%	200	155	240	280	15	32	15	8 in	6 in	1.5 in

GENERAL NOTES:

- This typical cross section shall be used in all subdivisions considered as urban/suburban (subdivisions where average lot size is less than one (1) acre).
- Standard landings required at intersections.
- Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The stone thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.) whichever is greater.
- Category I applies to permanent cul-de-sacs only.
- Changes in categories, where permitted, shall occur at intersections only and to the next lower or higher category only.
- 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where stabilization is provided in accordance with the Erosion Control ordinance.
- Sidewalks/shared use paths shall be provided in accordance with Section 602.15. Sidewalk/shared use path cross slope shall not exceed 2%.
- Pavement section is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
- No superelevation is required.
- Category I and II streets shall require an additional two feet (2 ft.) of pavement and right-of-way when total roadway length is one-half (0.5) mile or more.
- If optional street tree plantings are not provided per Section 802.46, the right-of-way may be reduced by 5 feet.
- ~~Advisory speed limit signs may be required through the speed study process prior to VDOT Street Acceptance for Category I and II streets.~~
- Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Detail No.	RL-2		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR RESIDENTIAL LOCAL STREETS WITH CURB AND GUTTER (FIXED TRAFFIC)	Date
650.04					6/10/24

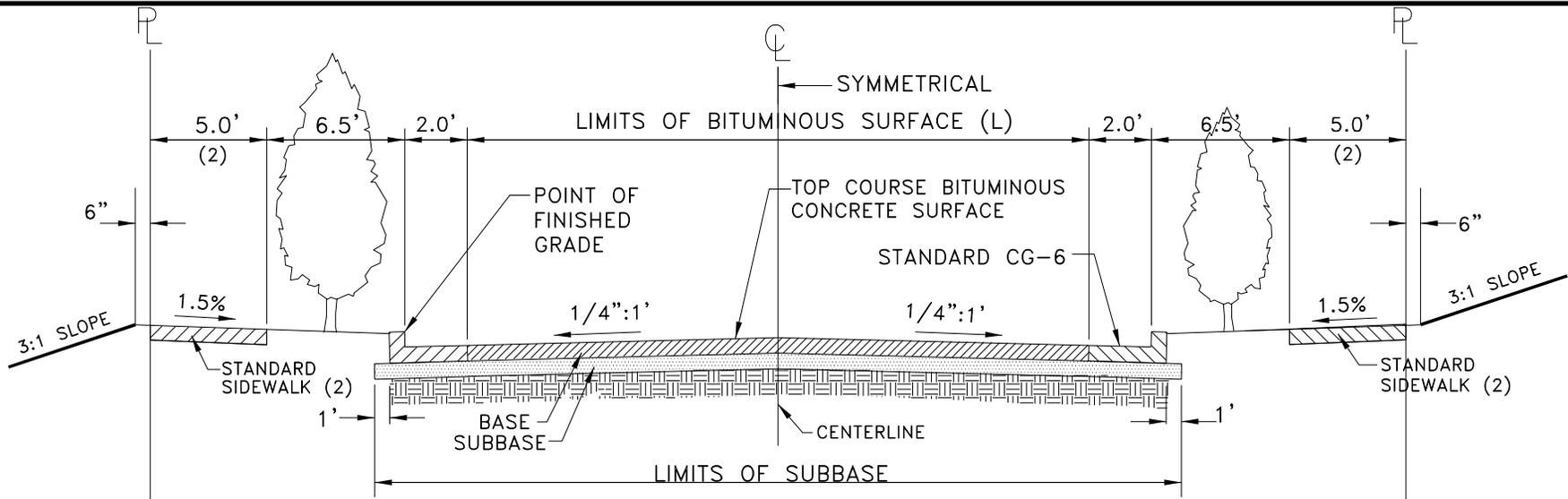


CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (13)			S _L (ft)	P (ft)	S _R (ft)	TYPE I SUBBASE AGG. BASE (21-B) (21-B)	BASE (BM-25.0A)	SURFACE (SM-9.5A)
						SSD	SDL	SDR						
V	2,001 TO 4,000	66	30	10%	335	200	290	335	15	36	15	8 in	6 in	2 in
VI	4,001 TO 7,000	66	40	9%	762 (9)	305	385	445	15	36	15	8 in	8 in	2 in

GENERAL NOTES:

1. This typical cross section shall be used in all subdivisions considered as urban/suburban (subdivisions where average lot size is less than one (1) acre).
2. Standard landings required at intersections.
3. Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The stone thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.) whichever is greater.
4. Reduction in categories, where permitted, shall occur at intersections only and to the next lower or higher category only.
5. No parking or direct residential access permitted on Category VI.
6. 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where special stabilization is provided in accordance with the Erosion Control ordinance.
7. Sidewalks/shared use paths shall be provided in accordance with Section 602.15. Sidewalk/shared use path cross slope shall not exceed 2%.
8. Pavement section is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
9. Superelevation shall be provided for only Category VI streets. Consider superelevation rate of 2.08%.
10. Channelized intersections will be required at all intersections of existing and future Category VI streets.
11. Off street parking shall be required in accordance with Section 603.03. Updated reference
12. If optional street tree plantings are not provided per Section 802.46, the right-of-way may be reduced by 5 feet.
13. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Detail No.	RM-2		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR RESIDENTIAL MINOR COLLECTOR STREETS WITH CURB AND GUTTER	Date
650.05					6/10/24



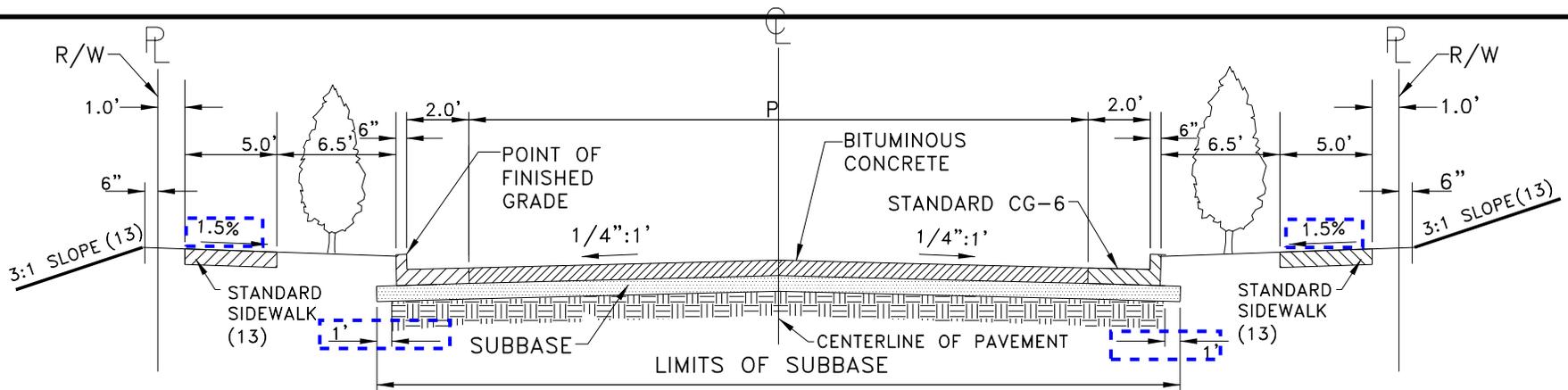
TRAFFIC VOLUME (VPD)	PARKING	L	PAVEMENT SECTION
0 TO 250	No Parking Allowed	22 ft	CATEGORY I
0 TO 250	Parallel (one side)	30 ft	CATEGORY I
0 TO 250	Parallel (both sides)	36 ft	CATEGORY I
0 TO 250	Perpendicular	22 ft (1)	CATEGORY I
251 TO 400	Perpendicular (both sides)	24 ft (1)	CATEGORY II
251 TO 400	No Parking Allowed	22 ft	CATEGORY II
401 TO 600	Parallel (one side)	30 ft	CATEGORY III
401 TO 600	Perpendicular	24 ft (1)	CATEGORY III
601 TO 1000	No Parking Allowed	24 ft	CATEGORY III
601 TO 1000	Parallel (one side)	32 ft	CATEGORY III

Added

GENERAL NOTES:

1. These dimensions are for travelways only, exclusive of parking spaces.
2. Sidewalk location to be determined during final site plan review. Sidewalk slope shall not exceed 2%.
3. Stone material shall be extended under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The aggregate thickness under the curb and gutter shall be in excess of the depth of the gutter face or a minimum of four inches (4 in.), whichever is greater.
4. Refer to Detail 650.01 for alternative pavement sections.
5. Maximum grade eight percent (8%).
6. Design of this type of roadway shall conform to current VDOT requirements.
7. If optional street tree plantings are not provided per Section 802.46, the right-of-way may be reduced by 5 feet.

Detail No.	TS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	TRAVELWAY STANDARDS FOR INDUSTRIAL, INSTITUTIONAL, OFFICE, COMMERCIAL, SINGLE FAMILY ATTACHED, AND MULTIFAMILY DEVELOPMENTS	Date
650.06					6/10/24



CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (15)			P (ft)	TYPE I SUBBASE AGG. BASE	BASE (BM-25.0A)	SURFACE (SM-9.5A)
						SSD	SDL	SDR				
I	UP TO 250	50	20	10%	120	115	195	225	20	6 in		2 in
II	251 TO 400	50	20	10%	120	115	195	225	20	8 in		2 in
III	401 TO 1,000	56	25	10%	200	155	240	280	26	8 in	4 in	2 in
IV	1,001 TO 2,000	56	25	10%	200	155	240	280	26	8 in	6 in	1.5 in
V	2,001 TO 4,000	56	30	10%	335	200	290	335	26	8 in	6 in	2 in

GENERAL NOTES:

Reduced from 30 mph

1. This typical cross section shall be used only for multifamily developments (not for mixed use developments).
2. No residential frontage permitted.
3. No parking permitted. "No Parking" signs shall be installed.
4. Stone material shall extend under the curb and gutter, a minimum of twelve inches (12 in.) beyond the back of curb. The stone thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.), whichever is greater.
5. A barrier or barricade must be installed between adjoining parking bays and the dedicated right-of-way to prevent parked vehicles from overhanging the right-of-way.
6. Distinct cul-de-sacs must be constructed where streets end and travelways or parking bays begin.
7. Changes in categories, where permitted, shall occur at intersections only and to the next lower or higher category only.
8. Standard landings required at intersections.
9. Pavement section is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
10. Category I and II streets shall require an additional two (2 ft.) of pavement and right-of-way when the total street length is one half (0.5) mi. or more.
11. No superelevation is required.
12. 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where stabilization is provided in accordance with the Erosion Control ordinance.
13. Sidewalks/shared use paths shall be provided in accordance with Section 602.15. Sidewalk/shared use path cross slope shall not exceed 2%.
14. If optional street tree plantings are not provided per Section 802.46, the right-of-way may be reduced by 5 feet.
15. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Detail No.

650.07

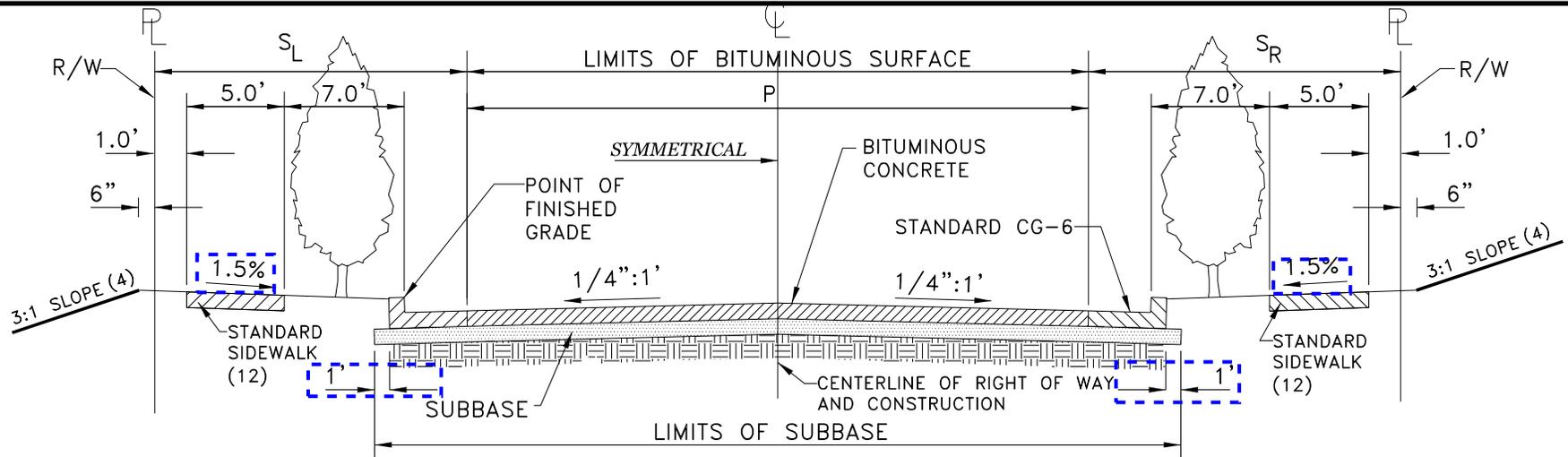
MF-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

STANDARD TYPICAL SECTION FOR
CONDOMINIUM, MOBILE HOME,
AND APARTMENT STREETS
WITH NO RESIDENTIAL FRONTAGE

Date
6/10/24

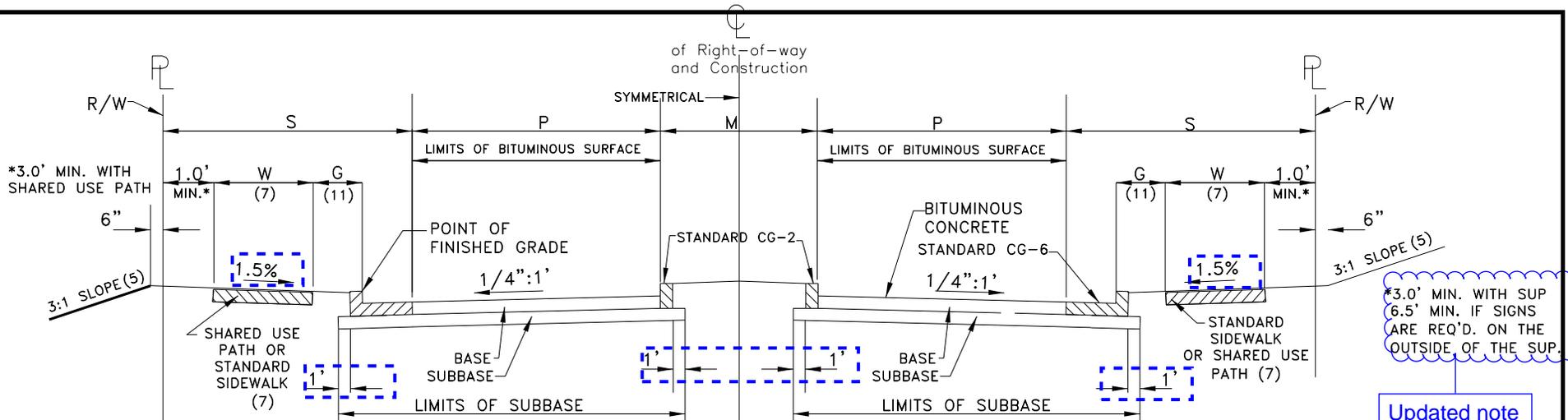


CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (13)			S _L (ft)	P (ft)	S _R (ft)	TYPE I SUBBASE AGG. BASE	BASE (BM-25.0A)	SURFACE (SM-9.5A)
						SSD	SDL	SDR						
IV	0 TO 1,500	62	30	9%	335	200	290	335	15	32	15	8 in	6 in	1.5 in
V	1,501 TO 4,000	66	30	9%	335	200	290	335	15	36	15	8 in	6 in	2 in
VI (7)	4,001 TO 7,000	74(10)	40	8%	762	305	385	445	15	44 (10)	15	8 in	8 in	2 in

GENERAL NOTES:

1. This typical cross section shall be used only for all streets within commercial and industrial areas.
2. No parking allowed along curb.
3. Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The stone thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.) whichever is greater.
4. 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where stabilization is provided in accordance with the Erosion Control ordinance.
5. Standard landings required at intersections.
6. Minimum cul-de-sac radius is 50 ft. to face of curb.
7. Major intersections may require channelization on Category VI streets.
8. Pavement section is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
9. Superelevation shall be provided for Category VI street in accordance with the current VDOT Road and Bridge Standards for Urban Low-Speed Roadways.
10. ROW and P values may be reduced to seventy feet (70 ft.) and forty feet (40 ft.), respectively, if the proposed street is a permanent cul-de-sac or loop.
11. If optional street tree plantings are not provided per Section 802.46, the right-of-way may be reduced by 5 feet.
12. Sidewalks/shared use paths shall be provided in accordance with Section 602.15. Sidewalk/shared use path cross slope shall not exceed 2%.
13. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Detail No.	CI-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR COMMERCIAL AND INDUSTRIAL STREETS WITH CURB AND GUTTER	Date
650.08					6/10/24



*3.0' MIN. WITH SUP
6.5' MIN. IF SIGNS
ARE REQ'D. ON THE
OUTSIDE OF THE SUP.

Updated note

CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.)			M (ft)	P (ft)	S (ft)	G (ft)	W (ft)	TYPE I SUBBASE AGG. BASE (21-B)	BASE (BM-25.0A)	SURFACE (SM-9.5A)	
						SSD	SDL	SDR									
VII	7,001 TO 15,000 W/ RAISED MEDIAN	104 (MIN.) (7)	45 (16)	7%	795 (10)	360	530	615	16	25 (15)	SIDEWALK	15	7	5	8 in	8 in	2 in
											SHARED USE PATH	23	8	10			

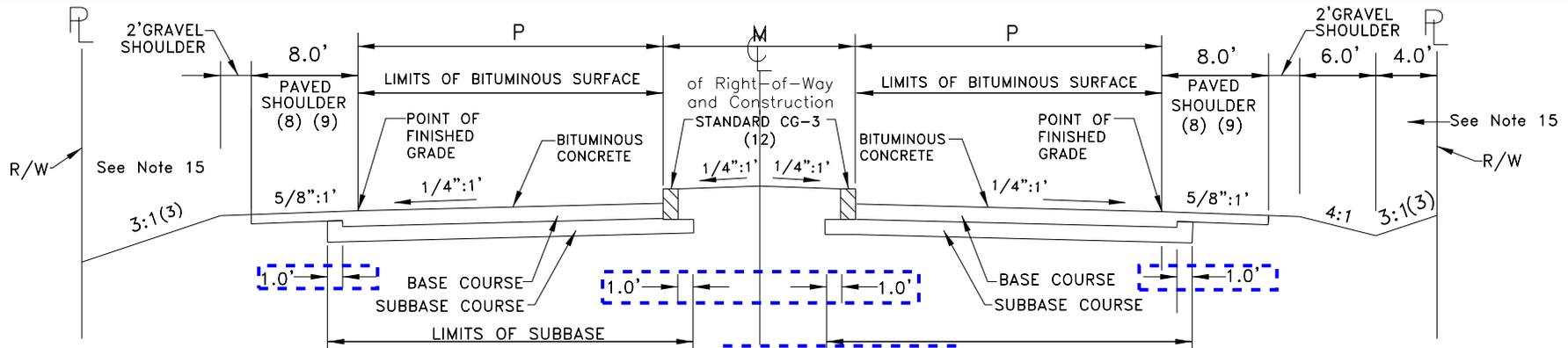
GENERAL NOTES:

- This typical section shall be used when the traffic volume exceed 7,000 VPD, but not greater than 15,000 VPD, or when roads are designated as collectors in the Comprehensive Plan.
- Individual residential lots shall not front on this street.
- No parking permitted.
- Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The aggregate thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.), whichever is greater.
- 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where special stabilization is provided in accordance with the Erosion Control ordinance.
- Additional right-of-way may be required to accommodate channelization (right/left turn lanes) at major intersections.
- Sidewalks/shared use paths shall be provided in accordance with Section 602.15 and the Comprehensive Plan. Minimum right-of-way dimension shown includes one sidewalk and one shared use path. Sidewalk/shared use path cross slope shall not exceed 2%.
- Standard landings required at intersections.
- Pavement section shown is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
- Superelevation shall be provided for Category VI street in accordance with the current VDOT Road and Bridge Standards for Urban Roadways. A minimum C.L. radius of 713' can be used with a 4% superelevation.
- The width of G and W shall vary depending upon the sidewalk/shared use path and planting requirements. This may require additional right-of-way or easement.
- Medians shall be designed in accordance with VDOT standards MS-1, MS-1A or MS-2 as appropriate.
- Underdrains shall be provided.
- Right-of-way to accommodate all required components of the typical section including, but not limited to turn lanes, sidewalks, shared use paths, buffer areas, street plantings in accordance with Section 802.46 of this manual, and signs.
- "P" width of 25' consists of two 12' lanes and a 1' shy distance to the CG-2 curb. 11' lanes may be used with VDOT and County approval.
- Design speed may vary with VDOT and PWC approval.
- Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Updated note

Added note

Detail No.	MC-1		<p>COUNTY OF PRINCE WILLIAM VIRGINIA</p>	<p>STANDARD TYPICAL SECTION FOR COLLECTOR STREETS AS DESIGNATED BY THE COMPREHENSIVE PLAN (4 LANE DIVIDED WITH CURB AND GUTTER</p>	Date
650.09					6/10/24

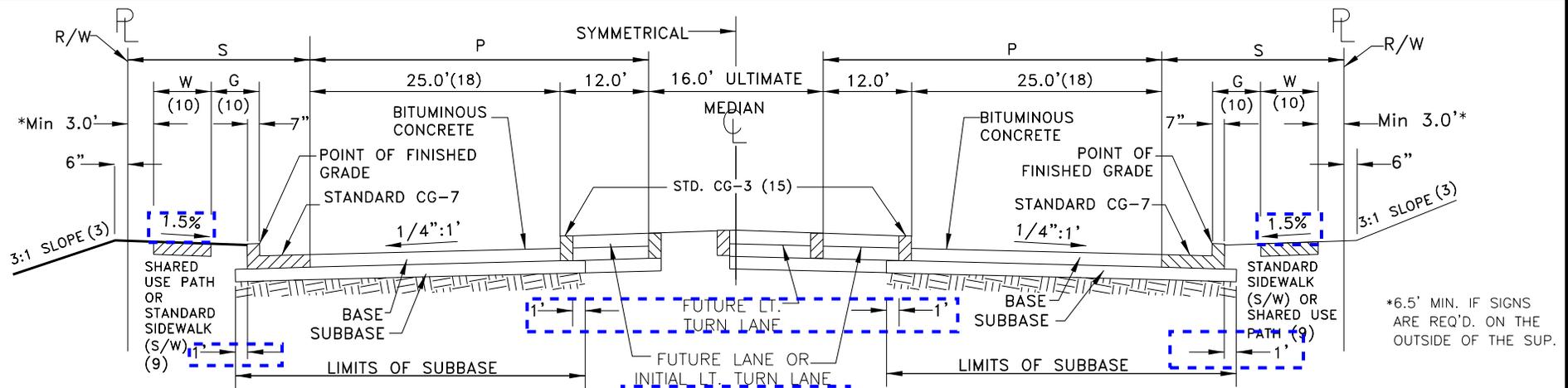


CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN. C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (18)			M (ft)	P (ft)	TYPE I SUBBASE AGG. BASE (21-B)	BASE (BM-25.0A)	SURFACE (SM-9.5A UP TO 10,000 VPD OR 9.5D OVER 10,000 VPD)
						SSD	SDL	SDR					
VII (MC-2) (10)	7,001 TO 15,000 W/ RAISED MEDIAN	106	45 (17)	7%	716	360	530	615	16	25 (16)	8 in	8 in	2 in
VIII (MA-2) (11)	15,000 TO 25,000 W/ RAISED MEDIAN	106	50 (17)	5%	955 (6)	425	590	680	16	25 (16)	8 in	9 in	1.5 in

GENERAL NOTES:

- Individual residential lots shall not front on these category streets.
- No parking permitted.
- 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where a special stabilization is provided in accordance with the Erosion Control ordinance.
- Additional right-of-way may be required to accommodate channelization (additional right/left turn lanes) at major intersections.
- Standard landings required at intersections.
- Superelevation shall be provided for Category VI or VII streets in accordance with the current VDOT Road and Bridge Standards for Rural Roadways. A minimum C.L. radius of 929' can be used with a 4% superelevation rate.
- Pavement section shown is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
- Paved shoulders shall conform to VDOT requirements of ITM-LD-158 201 and shall be stabilized with six (6) inches of aggregate base material and two (2) inches of SM-12.5A asphalt concrete. These are the minimum required thicknesses and pavement designs should be verified using 5% to 10% traffic counts from the main travel lane.
- Wider shoulders shall be required where guardrails are provided in accordance with Section 602.14 and VDOT standards.
- This street section shall be used when the traffic volume exceeds 7,000 VPD but not greater than 15,000 VPD, or when the roads are designated as collectors in the Comprehensive Plan.
- This street section shall be used when traffic volume exceeds 15,000 VPD, but not greater than 25,000 VPD, or when the roads are designated as rural minor arterial in the Comprehensive Plan.
- When design speeds are greater than 40 mph, the median curb is to be shaped in accordance with VDOT Standard CG-3.
- Median shall conform to VDOT Standard MS-1A or MS-2 as appropriate.
- Underdrains shall be provided.
- Right-of-way to accommodate all required components of the typical section including, but not limited to turn lanes, sidewalks, shared use paths, buffer areas, street plantings in accordance with Section 802.46 of this manual, and signs.
- "P" width of 25' consists of two 12' lanes and a 1' shy distance to the CG-3 curb. 11' lanes may be used with VDOT and County approval.
- Design speed may vary with VDOT and PWC approval.
- Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Detail No.	MC-2		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR COLLECTOR STREETS AND MINOR ARTERIAL STREETS AS DESIGNATED BY THE COMPREHENSIVE PLAN (4 LANE DIVIDED WITHOUT CURB AND GUTTER)	
650.10	MA-2				Date 6/10/24

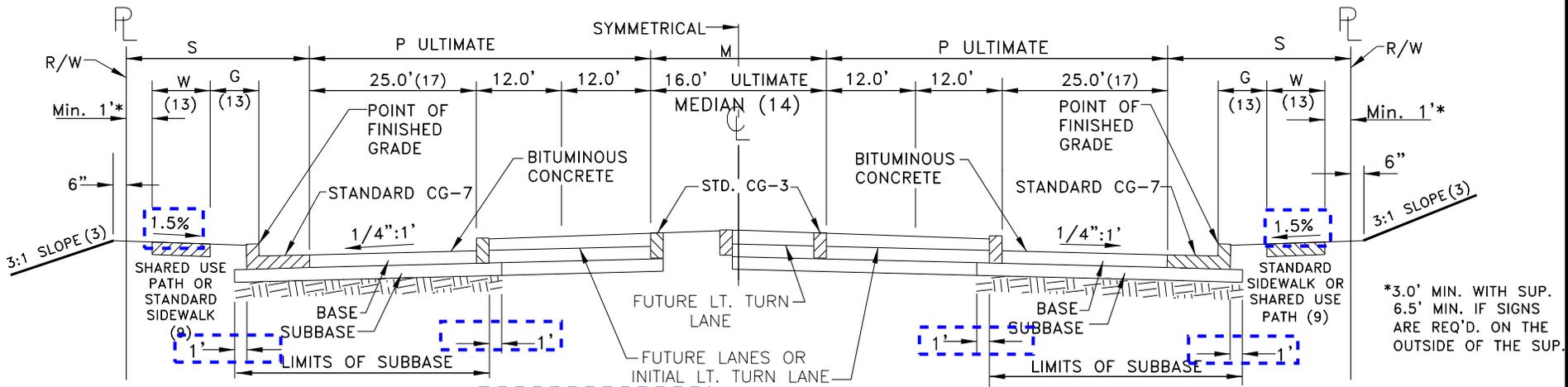


CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN. C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (19)			P (ft)	S (ft)	G (ft)	W (ft)	TYPE I SUBBASE AGG. BASE (21-B)	BASE (BM-25.0A)	SURFACE (SM-9.5D)	
						SSD	SDL	SDR								
VIII	OVER 15,000 W/ RAISED MEDIAN	128 (MIN.) (9)	50 (12)	5%	955 (11)	425	480	675	37 (18)	SIDEWALK	15	5	5	8 in	8 in	2 in
										SHARED USE PATH	23	8	10			

GENERAL NOTES:

- This street section shall be used when the traffic volume exceeds 15,000 VPD or when the roads are designated minor arterial by the Comprehensive Plan.
- Slope easements not included in right-of-way.
- 2:1 slopes will be allowed when soil type supported by soil report is acceptable and when special stabilization is provided in accordance with the Erosion Control ordinance.
- Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The aggregate thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four (4) inches, whichever is greater.
- Individual parcels/lots shall not have direct access on this street.
- Additional right-of-way may be required to accommodate channelization (right/left turn lanes) at major intersections.
- No parking permitted.
- Standard landings required at intersections.
- Sidewalks/shared use paths shall be provided in accordance with Section 602.15 and the Comprehensive Plan. Minimum right-of-way dimension shown includes one sidewalk and one shared use path. Sidewalk/shared use path cross slope shall not exceed 2%.
- The width of G and W shall vary depending upon the sidewalk/shared use path and planting requirements. This may require additional right-of-way or easement.
- Superelevation shall be provided for Category VII street in accordance with the current VDOT Road and Bridge Standards for Urban Roadways. A minimum C.L. radius of 929' can be used with a 4% superelevation.
- Design speed may vary from the prescribed speed with PWC and VDOT approval.
- Pavement section shown is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
- Over 25,000 VPD will require the construction of the 6 Lane Section.
- Median shall conform to VDOT standards MS-1, MS-1A or MS-2 as appropriate.
- Underdrains shall be provided.
- Right-of-way to accommodate all required components of the typical section including, but not limited to turn lanes, sidewalks, shared use paths, buffer areas, street plantings in accordance with Section 802.46 of this manual, and signs.
- P width of 37' consists of three 12' lanes and a 3' shy distance to the CG-3 curb. 11' lanes may be used with VDOT and County approval.
- Use latest VDOT or AASHTO standards, whichever is more stringent. Intersection sight distance should be based on the ultimate plan and computed in accordance with Chapter 9 of the AASHTO Green Book.

Detail No.	MA-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR URBAN MINOR ARTERIAL STREETS AS DESIGNATED BY THE COMPREHENSIVE PLAN (6 LANE DIVIDED WITH CURB AND GUTTER)	Date 6/10/24
650.11					



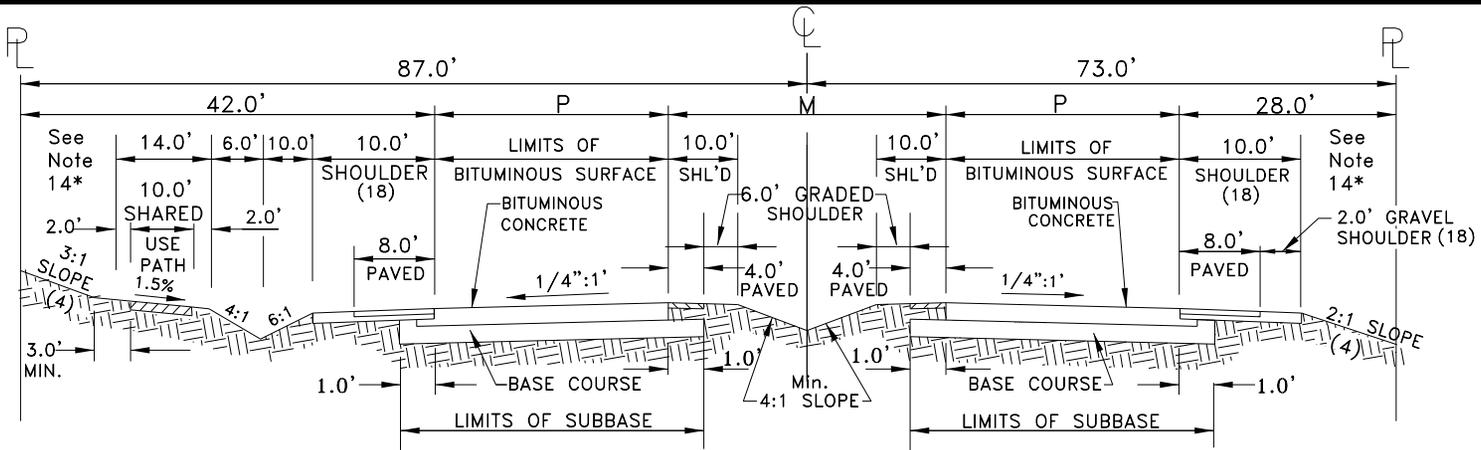
*3.0' MIN. WITH SUP.
6.5' MIN. IF SIGNS
ARE REQ'D. ON THE
OUTSIDE OF THE SUP.

CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN. C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (18)			P (ft)	M (ft)	S (ft)	G (ft)	W (ft)	TYPE I SUBBASE AGG. BASE (21-B)	BASE (BM-25.0A)	INTER. MIX (IM 19.0A)	SURFACE (SM-9.5D)
						SSD	SDL	SDR									
VIII	OVER 15,000 W/ RAISED MEDIAN	152 (MIN.) (9)	50 (11)	5%	955	425	480	715	49 (17)	16	15	7	5	8 in	8 in	2 in	2 in
			60 (11)	4%	1,273	570	575	855									

GENERAL NOTES:

- This street shall be used when roads are designated as principal arterial or parkways by the Comprehensive Plan.
- Slope easements not included in right-of-way,
- 2:1 slopes will be allowed when soil type supported by soil report is acceptable and when special stabilization is provided in accordance with the Erosion Control ordinance.
- Stone material shall extend under the curb and gutter a minimum of **twelve inches (12 in.)** beyond the back of curb. The aggregate thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four (4) inches, whichever is greater.
- Individual parcels/lots shall not have direct access on this street.
- Additional right-of-way may be required to accommodate channelization (right/left turn lanes) at major intersections.
- No parking permitted.
- Standard landings required at intersections.
- Sidewalks/shared use paths shall be provided in accordance with Section 602.15** and the Comprehensive Plan. Minimum right-of-way dimension includes one sidewalk and one shared use path. Sidewalk/shared use path cross slope shall not exceed 2%.
- Superelevation shall be provided for Category VII street in accordance with the current VDOT Road and Bridge Standards for Urban Roadways. Additional right-of-way may be needed to accommodate the superelevation.
- Design speed may vary from the prescribed speed with VDOT and PWC approval.
- Pavement section shown is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
- The width of G and W shall vary depending upon the sidewalk/shared use path and planting requirements. This may require additional right-of-way or easement.
- Median shall conform to VDOT standards MS-1, MS-1A or MS-2 as appropriate.
- Underdrains shall be provided.
- Right-of-way to accommodate all required components of the typical section including, but not limited to turn lanes, sidewalks, shared use paths, buffer areas, street plantings in accordance with Section 802.46 of this manual, and signs.
- "P" width of 49' consists of four 12' lanes and a 1' shy distance to the CG-3 curb. 11' lanes may be used with VDOT and County approval.
- Use latest VDOT or ASSHTO standards, whichever is more stringent. Intersection sight distance should be based on the ultimate plan and computed in accordance with Chapter 9 of the AASHTO Green Book.

Detail No.	PA-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR URBAN PRINCIPAL ARTERIAL/PARKWAYS AS DESIGNATED BY THE COMPREHENSIVE PLAN (ULTIMATE 6 LANE DIVIDED WITH CURB AND GUTTER)	Date 6/10/24
650.12					

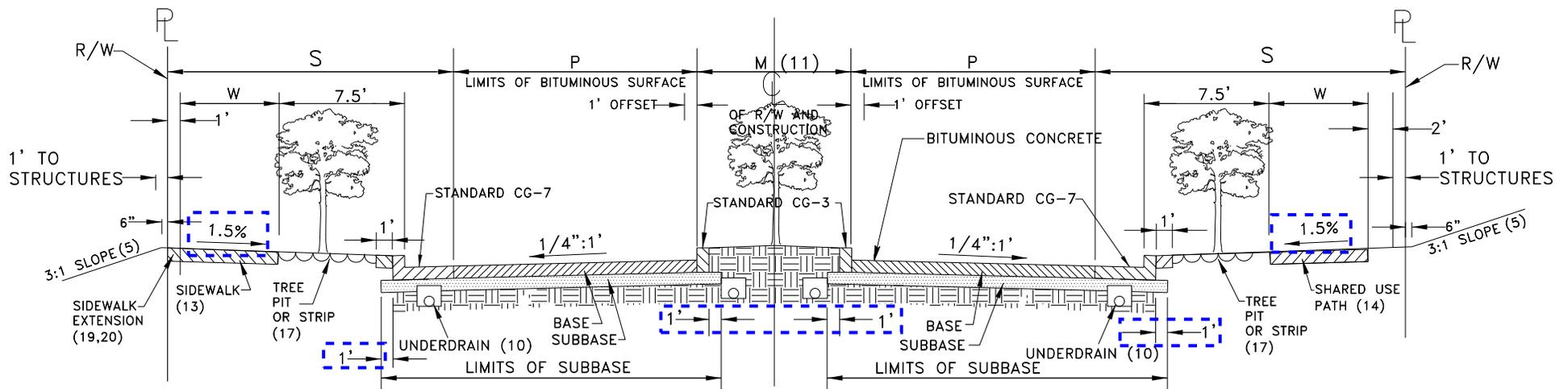


CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (19)			M (ft)	P (ft)	TYPE I SUBBASE AGG. BASE (21-B)	BASE (BM-25.0A)	INTER. MIX (19.0A)	SURFACE (SM-9.5D)
						SSD	SDL	SDR						
VIII	15,000 TO 25,000	160 (16)	60 (19)	4%	1273	570	710	820	42	24 (17)	8 in	8 in	2 in	2 in

GENERAL NOTES:

1. This street shall be used when roads are designated as principal arterial or parkways by the Comprehensive Plan.
2. Slope easements not included in right-of-way,
3. Use a 1:20 slope for all shoulders.
4. 2:1 slopes will be allowed when soil type supported by soil report is acceptable and when special stabilization is provided in accordance with the Erosion Control ordinance.
5. Individual parcels/lots shall not have direct access on this street.
6. Additional right-of-way may be required to accommodate channelization (right/left turn lanes) at major intersections.
7. No parking permitted.
8. Standard landings required at intersections.
9. Superelevation shall be provided for Category VII street in accordance with the current VDOT Road and Bridge Standards for Rural Roadways. Additional right-of-way may be needed to accommodate the superelevation.
10. Design speed may vary from the prescribed speed with PWC and VDOT approval.
11. Pavement section shown is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
12. Over 25,000 VPD shall require construction of 6-lane curb and gutter section with raised median (PA-1).
13. Underdrains shall be provided. additional right-of-way may be required.
14. Right-of-way to accommodate all required components of the typical section including, but not limited to turn lanes, shared use paths, buffer areas, street plantings in accordance with Section 802.46 of this manual and VDOT's guidelines for planting VA's roadways, and signs.
15. Sidewalk or shared use path may be required along both sides of the street. Added comment
16. Pavement shoulder shall conform to VDOT requirements. Shoulders should be stabilized with six (6) inches of aggregate base material and two (2) inches of SM-12.5A asphalt. The minimum required thickness and design should be verified using 5% and 10% traffic counts from the main travel lane.
17. Additional right-of-way may be required for adopted intra-county parkways.
18. "P" width of 24' consists of two 12' lanes. 11' lanes may be used with VDOT and County approval.
19. 14' shoulder (including 8' paved shoulder and 6' graded shoulder) shall be used if guardrail is required in accordance with Section 602.14 and VDOT standards.
20. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Detail No.	PA-2		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR PRINCIPAL ARTERIAL/PARKWAYS AS DESIGNATED BY THE COMPREHENSIVE PLAN (4 LANE DIVIDED INITIALLY)	Date 9/25/2024
650.13					



CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (MPH)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (22)			M (ft)	P (ft)	S (ft)	W (ft)	TYPE I SUBBASE AGG. BASE (21-B)	BASE (BM-25.0A)	SURFACE (SM-9.5A)	
						SSD	SDL	SDR								
VI	7,001 TO 15,000 W/ RAISED MEDIAN	101	45	7%	795	360	530	615	16	23	SIDEWALK	15	5	8 in	8 in	2 in
						SHARED USE PATH	23	10								

GENERAL NOTES:

- This typical section shall be used in urban centers as defined in Sections 601.01 and 601.02 of the DCSM or as otherwise approved by the Director of Transportation.
- Individual residential lots shall not front on this street.
- No on-street parking permitted.
- Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The aggregate thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.), whichever is greater.
- 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where special stabilization is provided in accordance with the Erosion Control ordinance.
- Additional right-of-way may be required to accommodate channelization (right/left turn lanes) and/or signalization at major intersections.
- Standard landings required at intersections.
- Pavement section shown is standard requirement. Refer to Detail 650.01 for alternative pavement sections. Streets with volumes exceeding 10,000 vpd require surface course SM-9.5D.
- Superelevation shall be provided in accordance with VDOT Road and Bridge Standards.
- Underdrains shall be required. A modified UD-4 shall be used on each side of the median.
- The required raised landscape median shall be designed in accordance with VDOT standards as appropriate and must be a minimum of 16'.
- Pulloffs for transit must be provided unless waived by the Director of Transportation.
- A sidewalk no less than 5' must be located on the side of the street that serves the most pedestrian destinations. Cross slope to be 2% maximum.
- A shared use path no less than 10' wide must be located on at least one side of the street. Cross slope to be 2% maximum.
- Trees shall be planted in median and lining both sides of the Through Boulevard, but shall not obstruct the sight distance.

Updated reference

Detail No.

650.14

UTB-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

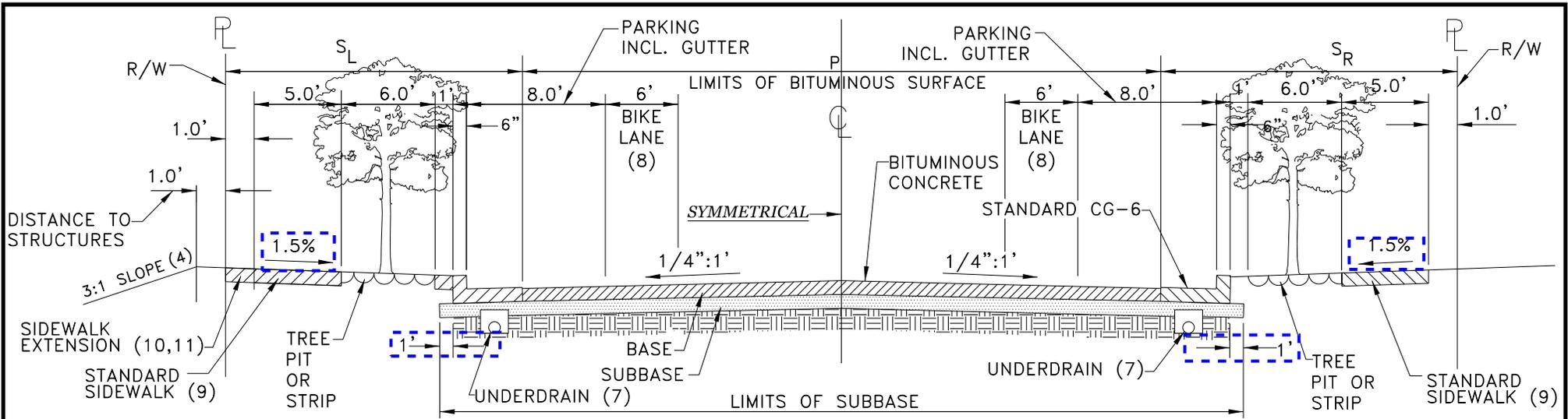
STANDARD TYPICAL SECTION FOR
THROUGH BOULEVARD IN URBAN CENTERS
(SHEET 1 OF 2)

Date
6/10/24

GENERAL NOTES (CONT'D):

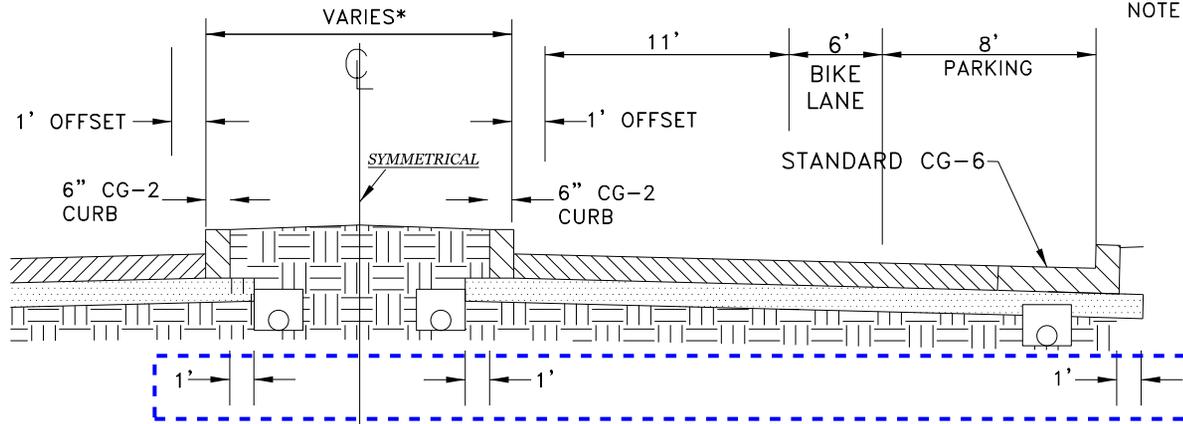
16. A separate plan for landscaping and irrigation inside the right-of-way should be submitted to VDOT for review and approval.
17. Tree pits and strips will be a minimum of 6' wide and must be located adjacent to the sidewalk or shared use path, behind the back of curbs on both sides of the street. Tree pits should be a minimum of 8' long. See Detail 650.19.
18. Street trees shall be placed a minimum of 30' from the face of curb of the intersecting street or entrance and outside the line of sight on all sides of the intersection.
19. VDOT will maintain up to the standard sidewalk width within the right-of-way or as approved. A longitudinal joint should separate the VDOT sidewalk from the private sidewalk extension.
20. A one foot (1') wide sidewalk maintenance easement is required behind the edge of the sidewalk where the sidewalk extends past the right-of-way line.
21. Street/pedestrian lights, gardens, and stair railings should be located behind the right-of-way within private property.
22. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.16.06, Table 6-4, and Table 6-5.
23. Right-of-way to accommodate all required components of the typical section including, but not limited to turn lanes, sidewalks, shared use paths, buffer areas, street plantings in accordance with Section 802.46 of this manual, and signs.

Detail No.	UTB-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR THROUGH BOULEVARD IN URBAN CENTERS (SHEET 2 OF 2)	
650.14					Date 6/10/24



CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (18)			S _L (ft)	P (ft)	S _R (ft)	TYPE I SUBBASE AGG. BASE (21-B) (5)	BASE (BM-25.0A) (5)	SURFACE (SM-9.5A) (5)
						SSD	SDL	SDR						
VI	4,001 TO 7,000	77	30	10%	300	200	335	290	15.5	46	15.5	8 in.	6 in.	2 in.

OPTIONAL MEDIAN: (19)



* - RANGES FROM 16'-36' (SEE NOTE #12)

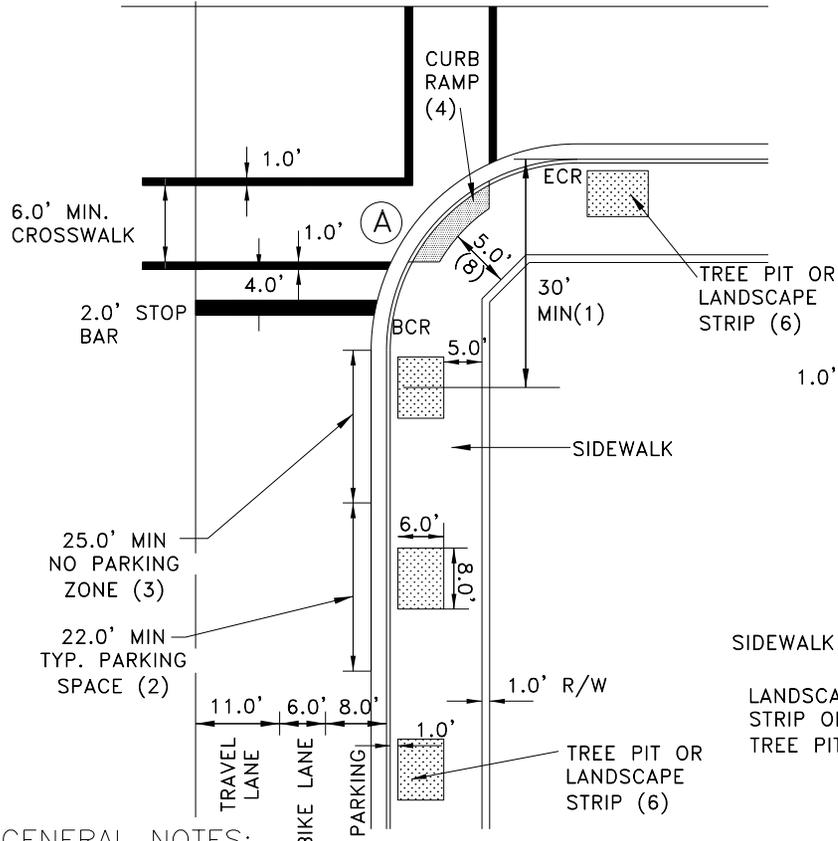
Detail No.	UB-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR BOULEVARD IN URBAN CENTERS (SHEET 1 OF 3)	Date
650.15					6/10/24

GENERAL NOTES:

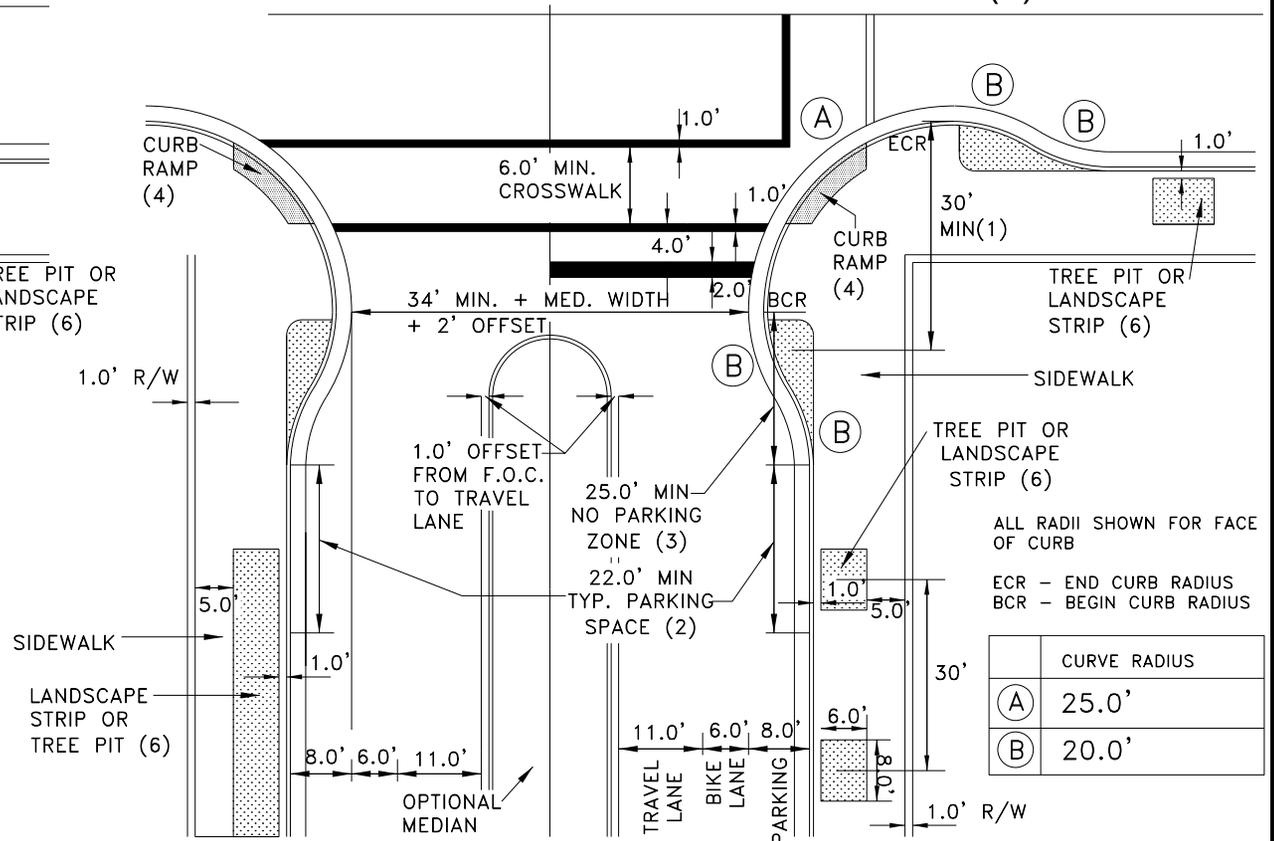
1. This typical cross section shall be used in urban centers as defined in Section 601.01 and 601.02 of the DCSM or as otherwise approved by the Director of Transportation.
2. Standard landings required at intersections.
3. Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The stone thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.) whichever is greater.
4. 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where stabilization is provided in accordance with the Erosion Control ordinance.
5. Pavement section shown is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
6. Superelevation shall be provided in accordance with VDOT Road and Bridge Standards. Added 5' w/ 1' buffer language
7. Underdrains shall be required. A modified UD-4 shall be used on each side of the optional median.
8. Dedicated bicycle lanes must be a minimum of 6' wide. A 5' wide bicycle lane may be provided with a 1' striped buffer between the edge of the bicycle lane and the adjacent parking lane to reduce the likelihood of drivers opening a door into the path of a cyclist.
9. Sidewalks no less than 5' wide must be located on both sides of the Boulevard. A 10' wide shared use path will be allowed on one side instead of the sidewalk with the approval of the Director of Transportation. Cross slope to be 2% maximum. If connectivity for bicycles is provided through the use of the shared use path, both on-street bicycle lanes may be eliminated with the approval of the Director of Transportation.
10. VDOT will maintain up to the standard sidewalk width within the right-of-way or as approved. A longitudinal joint should separate the VDOT sidewalk from the private sidewalk extension.
11. A one foot (1') wide sidewalk maintenance easement is required behind the edge of sidewalk where the sidewalk extends past the right-of-way line.
12. An optional raised landscape median shall be designed in accordance with VDOT standards as appropriate and must be between 16' and 36' (with a 1' offset) to accommodate a single left-turn lane at intersections.
13. If transit is provided where on-street parking is allowed, the on-street parking lane must clearly terminate in advance of the nearest intersection to provide adequate space for transit pull-offs.
14. Pedestrian lights, gardens, and stair-railings should be located behind the public right-of-way within private property.
15. A separate plan for landscaping and irrigation inside the right-of-way should be submitted to VDOT for review and approval.
16. Additional right-of-way may be required to accommodate channelization (right/left turn lanes) and/or signalization at intersections.
17. Right-of-way to accommodate all required components of the typical section including, but not limited to turn lanes, sidewalks, shared use paths, buffer areas, street plantings in accordance with Section 802.46 of this manual, and signs.
18. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.
19. Sight Distance Left (SDL) and Sight Distance Right (SDR) shall be evaluated including the median width and provided in accordance with AASHTO "Policy on Geometric Design of Highways and Streets" Chapter 9.5 Intersection Sight Distance.

Detail No.	UB-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR BOULEVARD IN URBAN CENTERS (SHEET 2 OF 3)	Date 6/10/24
650.15					

OPTION WITHOUT CURB EXTENSION



OPTION WITH CURB EXTENSION (5)



ALL RADII SHOWN FOR FACE OF CURB

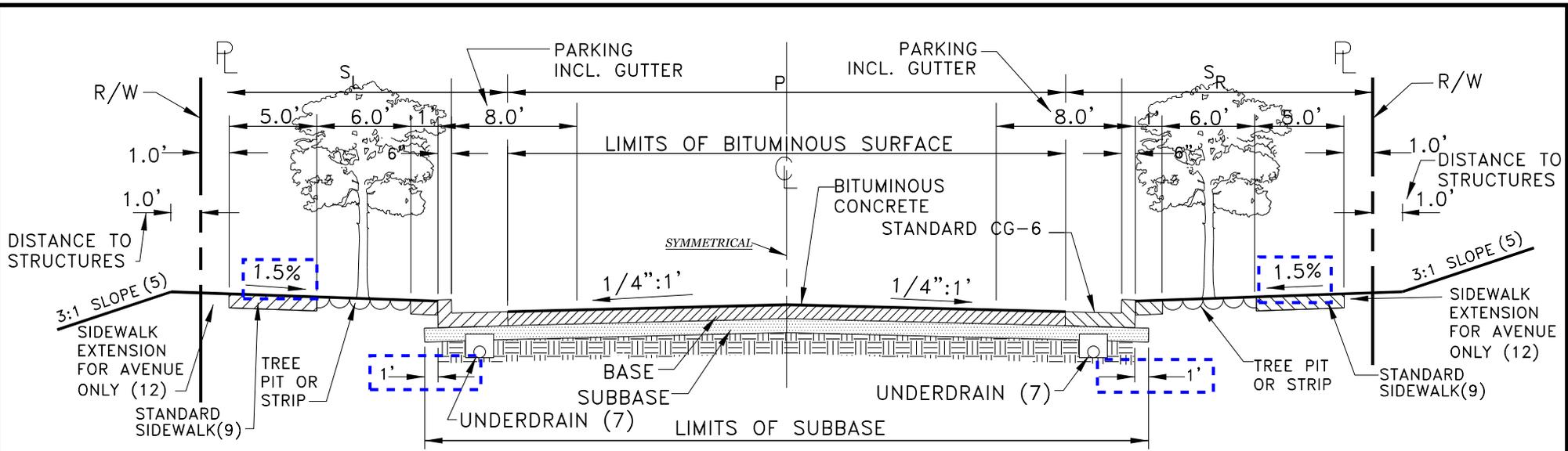
ECR - END CURB RADIUS
BCR - BEGIN CURB RADIUS

	CURVE RADIUS
(A)	25.0'
(B)	20.0'

GENERAL NOTES:

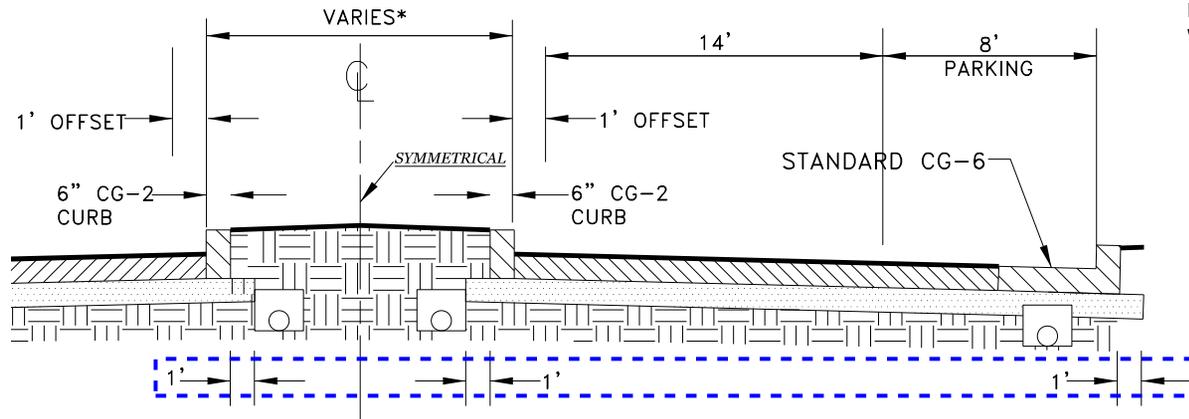
1. Street trees shall be placed a minimum of 30' from the face of curb of the intersecting street or entrance and outside the line of sight on all sides of the intersection.
2. Parallel Parking spaces are 22' long and 8' wide.
3. "No Parking Zone" is measured from the end or beginning of curb radius for a minimum distance of 25' or longer to accommodate intersection sight distance, transit, and turning movements.
4. Refer to current VDOT CG-12 standards for design of curb ramps and other available curb ramp options.
5. An optional curb extension to the edge of parking at intersection corners is permitted. The turning characteristics of a 45' long bus must be adequately demonstrated.
6. Street trees must be planted centered within a tree pit or in a landscape strip. Tree pits shall be located between sidewalk and the back of curb and shall be no less than 6' wide and 8' long. See Detail 650.19.
7. A 10' wide shared use path will be allowed on one side instead of the sidewalk with the approval of the Director of Transportation.
8. Sidewalk width at corners must be maintained by truncating property boundary if necessary.
9. A separate plan for landscaping and irrigation inside the right-of-way should be submitted to VDOT for review and approval.

Detail No.	UB-1		COUNTY OF PRINCE WILLIAM VIRGINIA	LAYOUT DESIGN FOR BOULEVARD IN URBAN CENTERS (SHEET 3 OF 3)	Date
650.15					6/10/24



CATEGORY	TRAFFIC VOLUME (VPD)	R.O.W. WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN. C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (15)			S _L (ft)	P (ft)	S _R (ft)	TYPE I SUBBASE AGG. BASE (21-B) (5)	BASE (BM-25.0A) (5)	SURFACE (SM-9.5A) (5)
						SSD	SDL	SDR						
STREET	0 TO 2,000	65	25	10%	200	155	280	240	15.5	34	15.5	8 in.	6 in.	1.5 in.
AVENUE	2,001 TO 4,000	71	25	10%	200	155	280	240	15.5	40	15.5	8 in.	6 in.	2 in.

OPTIONAL MEDIAN (FOR AVENUE):



* - RANGES FROM 16'-36'
MAY BE REDUCED TO 10' MIN.
WITH A WAIVER (SEE #14)

Detail No.	UAS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR AVENUE AND STREET IN URBAN CENTERS (SHEET 1 OF 4)	Date
650.16					7/15/14

GENERAL NOTES:

1. This typical cross section shall be used in urban centers as defined in Sections 601.01 and 601.02 of the DCSM or as otherwise approved by the Director of Transportation.
2. Standard landings required at intersections.
3. Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The stone thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.) whichever is greater.
4. No superelevation is required.
5. 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where stabilization is provided in accordance with the Erosion Control ordinance.
6. Pavement section is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
7. Underdrains shall be required where traffic volumes exceed 1,000 vpd.
8. If transit is provided where on-street parking is allowed, the on-street parking lane must clearly terminate in advance of the nearest intersection to provide adequate space for transit pull-offs.
9. Sidewalks no less than 5' wide shall be provided on both sides of the Avenue or Street. A 10' wide shared use path will be allowed on one side instead of the sidewalk with the approval of the Director of Transportation. Cross slope to be 2% maximum.
10. VDOT will maintain up to the standard sidewalk width within the right-of-way or as approved. A longitudinal joint should separate the VDOT sidewalk from the private sidewalk extension.
11. A one foot (1') wide sidewalk maintenance easement is required behind the edge of sidewalk where the sidewalk extends past the right-of-way line.
12. For Avenue, sidewalk materials must extend to property line.
13. Street/pedestrian lights, gardens, and stair railings should be located behind the public right-of-way within private property.
14. Right-of-way to accommodate all required components of the typical section including, but not limited to turn lanes, sidewalks, shared use paths, buffer areas, street plantings in accordance with Section 802.46 of this manual, and signs.
15. Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

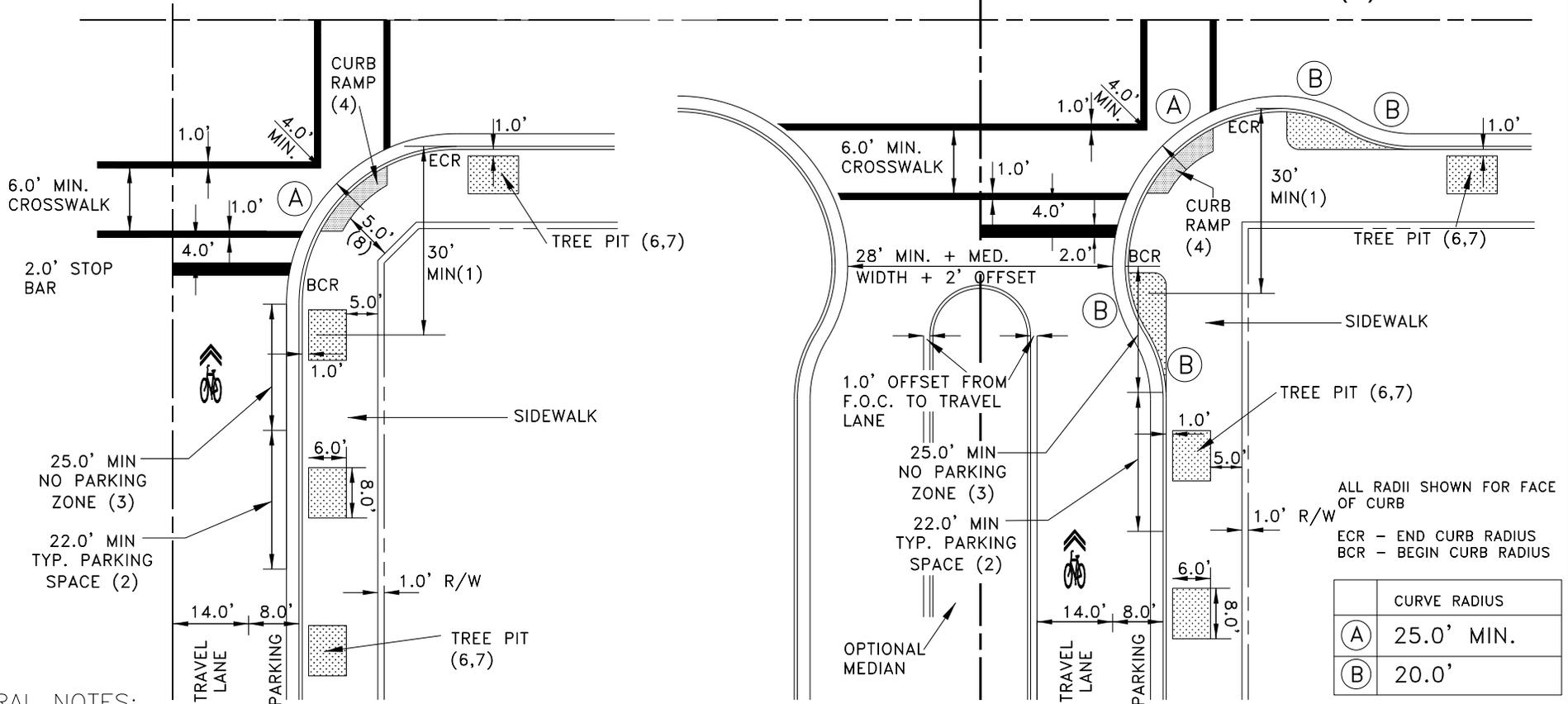
NOTES THAT APPLY TO AVENUE ONLY

16. An optional raised landscape median shall be between 16' and 36' wide (with a 1' offset) and will accommodate single left-turn lanes at intersections.
17. Two (2) 14' wide travel lanes, one (1) in each direction are REQUIRED. These shared-use facilities can accommodate transit, trucks, personal vehicles, and on-road bicycle traffic. Lanes can be reduced to 11' wide at the discretion of the Director of Transportation if it can be shown that bicycle lanes can be provided on a parallel facility.
18. Sight Distance Left (SDL) and Sight Distance Right (SDR) shall be evaluated including the median width and provided in accordance with AASHTO "Policy on Geometric Design of Highways and Streets" Chapter 9.5 Intersection Sight Distance.

Detail No.	UAS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR AVENUE AND STREET IN URBAN CENTERS (SHEET 2 OF 4)	
650.16					Date 7/15/14

OPTION WITHOUT CURB EXTENSION

OPTION WITH CURB EXTENSION (5)



GENERAL NOTES:

- Street trees shall be placed a minimum of 30' from the face of curb of the intersecting street or entrance and outside the line of sight on all sides of the intersection.
- Parallel parking spaces are 22' long and 8' wide.
- "No Parking Zone" is measured from the end or beginning of curb radius for a minimum distance of 25' or longer to accommodate intersection sight distance, transit, and turning movements.
- Refer to current VDOT CG-12 standards for design of curb ramps and other available curb ramp options.
- An optional curb extension to the edge of parking at intersection corners is permitted. The turning characteristics of a 45' long bus must be adequately demonstrated.
- Street trees must be planted centered within a tree pit. See Detail 650.19.
- Tree pits shall be located between sidewalk and the back of curb and shall be no less than 6' wide and 8' long.
- Sidewalk width at corners must be maintained by truncating property boundary if necessary.
- Extra right-of-way may be needed at signalized intersections.
- A separate plan for landscaping and irrigation inside the right-of-way should be submitted to VDOT for review and approval.
- Shared bicycle lane markings should be placed in accordance with [Section 602.16.02](#) and the Manual of Uniform Traffic Control Devices (MUTCD).

Detail No.

650.16

UAS-1

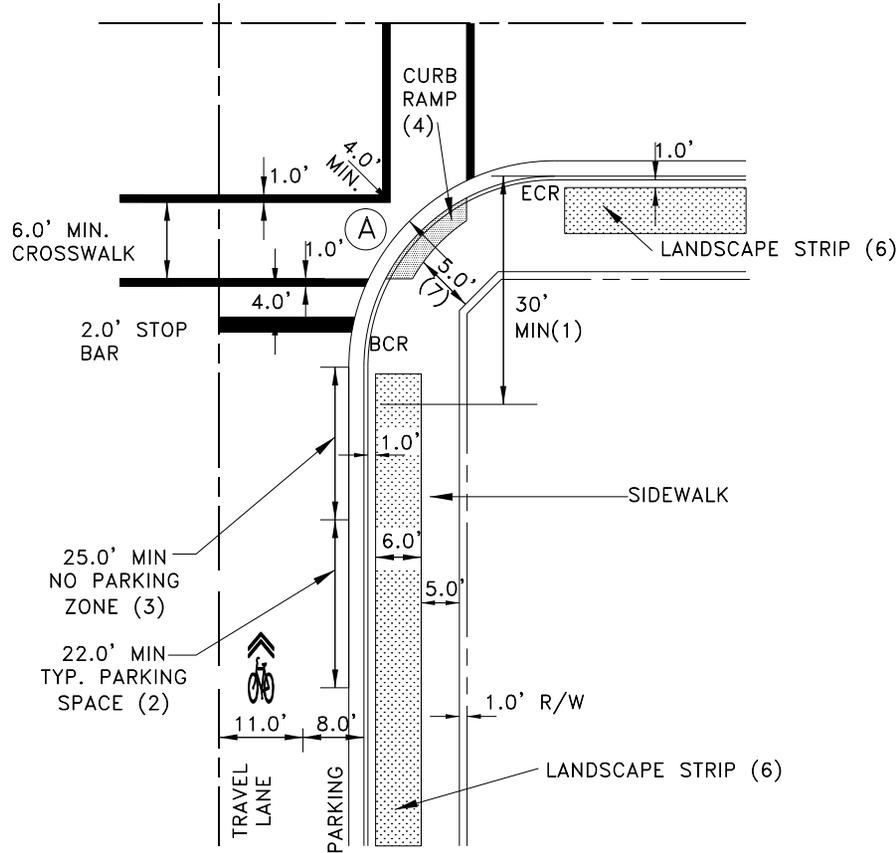


COUNTY OF
PRINCE WILLIAM
VIRGINIA

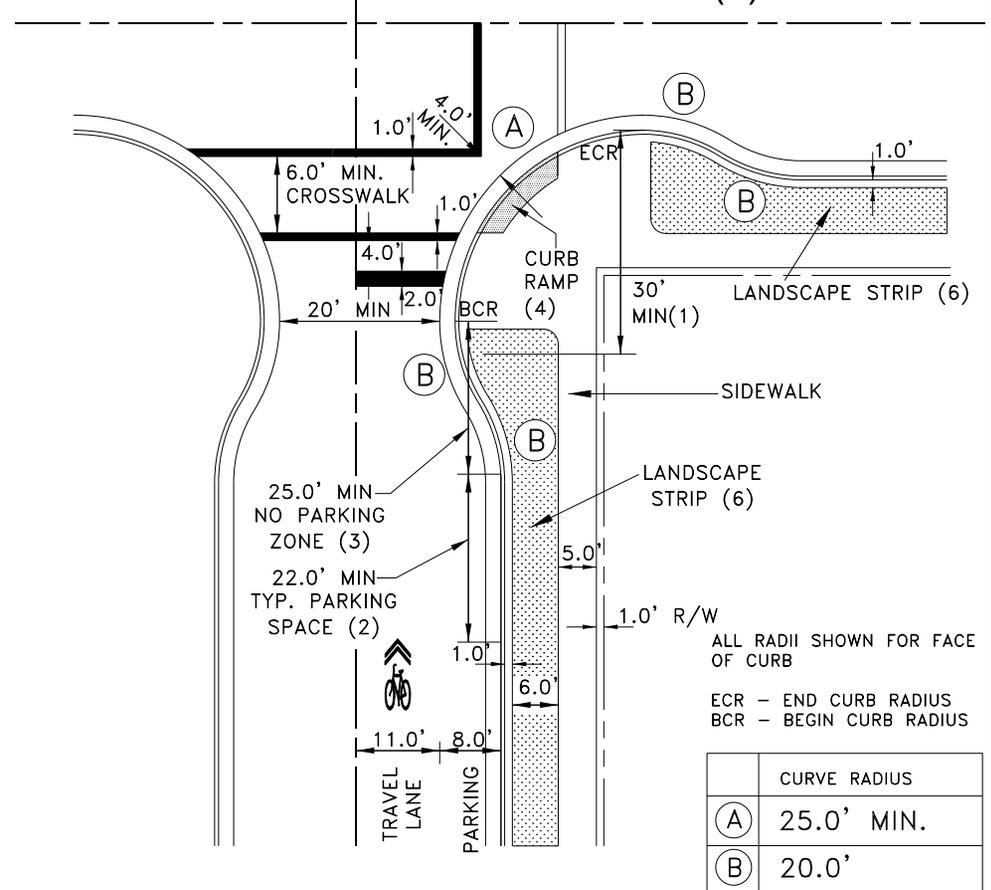
LAYOUT DESIGN FOR AVENUE
IN URBAN CENTERS
(SHEET 3 OF 4)

Date
7/15/14

OPTION WITHOUT CURB EXTENSION



OPTION WITH CURB EXTENSION (5)



GENERAL NOTES:

- Street trees shall be placed a minimum of 30' from the face of curb of the intersecting street or entrance and outside the line of sight on all sides of the intersection.
- Parallel parking spaces are 22' long and 8' wide.
- "No Parking Zone" is measured from the end or beginning of curb return radius for a minimum distance of 25' or longer to accommodate intersection sight distance, transit, and turning movements.
- Refer to current VDOT CG-12 standards for design of curb ramps and other available curb ramp options.
- An optional curb extension to the edge of parking at intersection corners is permitted.
- Street Trees must be planted in landscape strips no less than 6' wide that are adjacent to the sidewalk and behind the back of curb.
- Sidewalk width at corners must be maintained by truncating property boundary if necessary.
- Extra right-of-way may be needed at signalized intersection.
- A separate plan for landscaping and irrigation inside the right-of-way should be submitted to VDOT for review and approval.
- Shared bicycle lane markings should be placed in accordance with [Section 602.16.02](#) and the Manual of Uniform Traffic Control Devices (MUTCD).

Detail No.

650.16

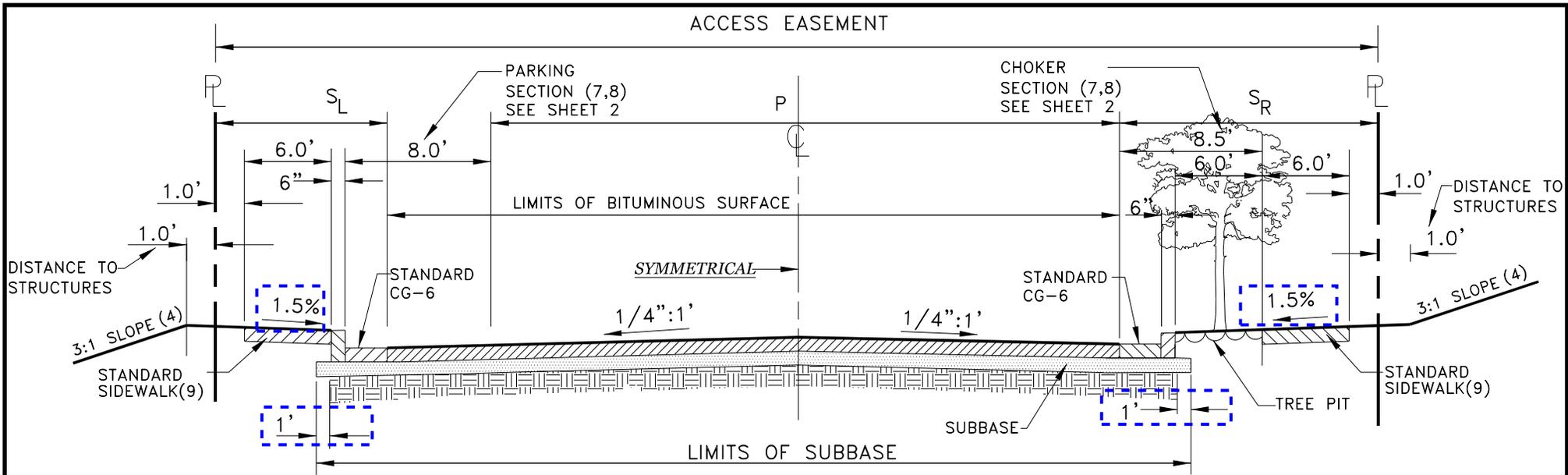
UAS-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

LAYOUT DESIGN FOR STREET
IN URBAN CENTERS
(SHEET 4 OF 4)

Date
7/15/14

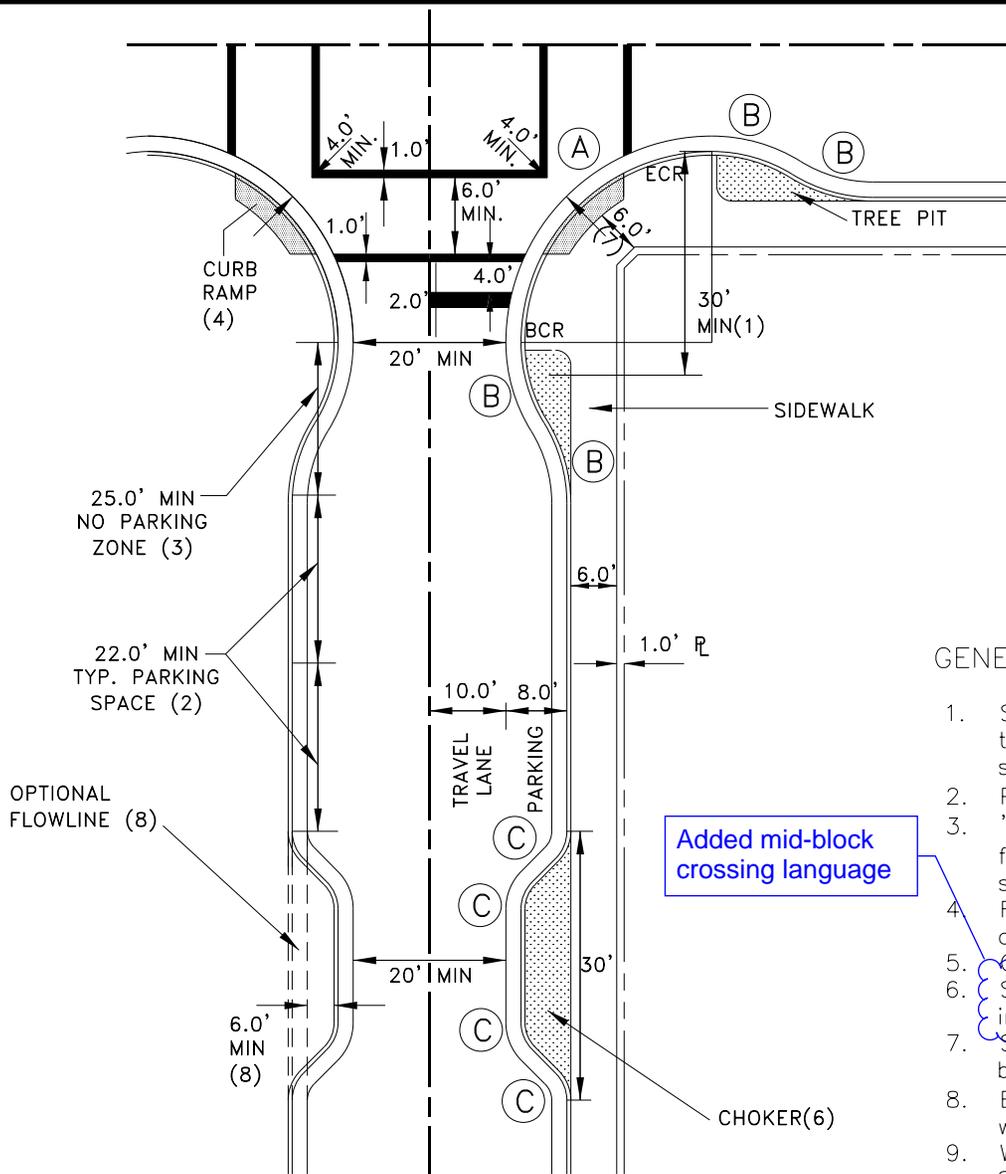


CATEGORY	TRAFFIC VOLUME (VPD)	ACCESS EASEMENT WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.) (11)			S _L (ft)	P (ft)	S _R (ft)	TYPE I SUBBASE AGG. BASE (21-A) (5)	BASE (BM-25.0A) (5)	SURFACE (SM-9.5A) (5)
						SSD	SDL	SDR						
I	0 TO 250	51	20	10%	120	155	225	195	9.5 MIN.	20 MIN.	9.5 MIN.	6 in.		2 in.
II	251 TO 400	51	20	10%	120	155	225	195	9.5 MIN.	20 MIN.	9.5 MIN.	8 in.		2 in.

GENERAL NOTES:

- This typical cross section shall be used in urban centers as defined in Sections 601.01 and 601.02 of the DCSM or as otherwise approved by the Director of Transportation.
- Standard landings required at intersections.
- Stone material shall extend under the curb and gutter a minimum of twelve inches (12 in.) beyond the back of curb. The stone thickness under the curb and gutter shall be that in excess of the depth of the gutter face or a minimum of four inches (4 in.) whichever is greater.
- 2:1 slopes will be allowed when soil type supported by soil report is acceptable and where stabilization is provided in accordance with the Erosion Control ordinance.
- Pavement section shown is standard requirement. Refer to Detail 650.01 for alternative pavement sections.
- No superelevation is required.
- Chokers are 6' wide and 30' long at the widest point and spaced a minimum of two parking spaces apart and a maximum of four parking spaces apart. Chokers shall be placed within the 8' wide on street parking lanes on both sides of the street.
- When choker is provided, it shall be provided on both sides of the street. Street sections shall be symmetrical.
- Sidewalks no less than 6' wide shall be provided on both sides of the street. Cross slope to be 2% maximum.
- Utilities should be located within the travel lane so that manholes and valve covers are not within the typical wheel path area.
- Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with Section 602.12.06, Table 6-4, and Table 6-5.

Detail No.	UPS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPICAL SECTION FOR PRIVATE RESIDENTIAL SIDE STREET IN URBAN CENTERS (SHEET 1 OF 2)	Date 7/15/14
650.17					



ALL RADII SHOWN FOR FACE OF CURB

ECR - END CURB RADIUS
BCR - BEGIN CURB RADIUS

	CURVE RADIUS
(A)	25.0' MIN.
(B)	20.0'
(C)	5.0'

GENERAL NOTES:

- Street trees shall be placed a minimum of 30' from the face of curb of the intersecting street or entrance and outside the sight distance on all sides of the intersection.
- Parallel parking spaces are 22' long and 8' wide.
- "No Parking Zone" is measured from the end or beginning of curb radius for a minimum distance of 25' or longer to accommodate intersection sight distance, transit, and turning movements.
- Refer to current VDOT CG-12 standards for design of curb ramps and other available curb ramp options.
- Curb must be extended to edge of parking at intersection corners.
- Street trees must be placed in each choker. Curb ramps may be placed in a choker to provide mid-block crossings.
- Sidewalk width at corners must be maintained by truncating property boundary if necessary.
- Extra access easement width may be needed to maintain the 6' minimum width for tree pits in chokers with the alternative flowline option.
- When choker is provided, it shall be provided on both sides of the street. Street Sections shall be symmetrical.
- Low Impact Design (LID) practices may be considered in choker areas.

Detail No.

650.17

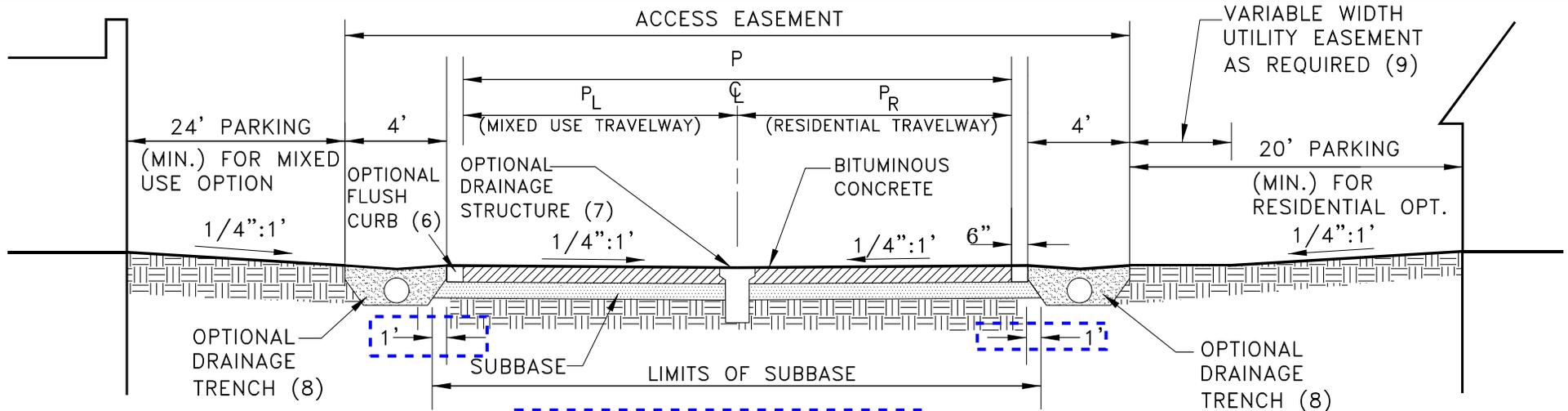
UPS-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

PRIVATE SIDE STREET CURB AND
CHOKER LAYOUT DESIGN IN URBAN
CENTERS
(SHEET 2 OF 2)

Date
7/15/14

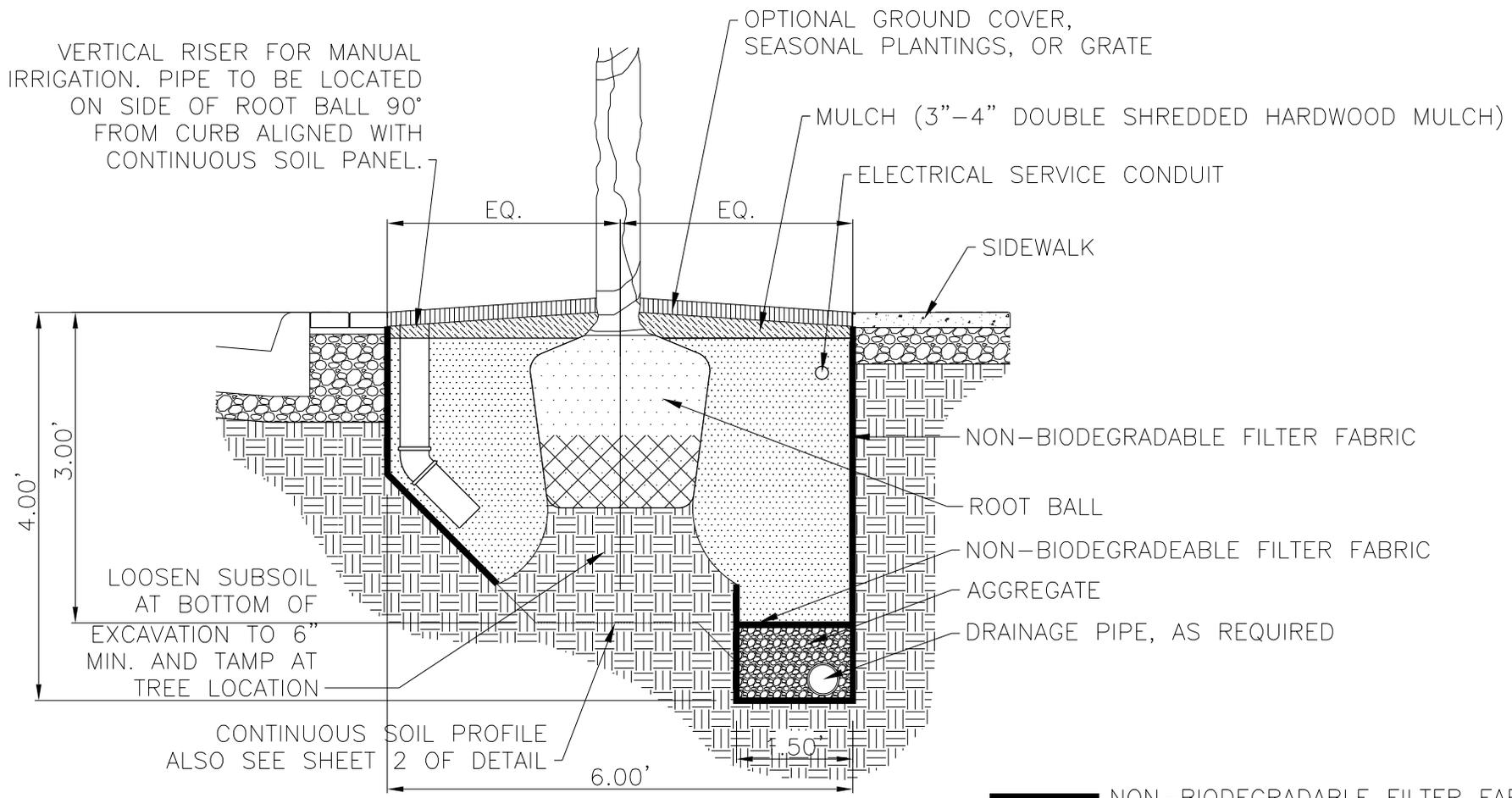


CATEGORY	TRAFFIC VOLUME (VPD)	ACCESS EASEMENT WIDTH (ft.)	DESIGN SPEED (mph)	MAX GRADE	MIN C.L. RADIUS (ft.)	MIN. SIGHT DISTANCE (ft.)		P _L (ft)	P (ft)	P _R (ft)	TYPE I SUBBASE AGG. BASE (3)	BASE (BM-25.0A) (3)	SURFACE (SM-9.5A) (3)
						STOP	INTX						
I	UP TO 250	20 MIN.	5	10%	120	25	(12)	10	20	10	6 in.		2 in.
			10	10%	120	50							
II	251 TO 400	20 MIN.	5	10%	120	25	(12)	10	20	10	8 in.		2 in.
			10	10%	120	50							

GENERAL NOTES:

- This typical cross section shall be used as a 5–10 mph vehicular driveway located to the rear of properties, providing access to parking, services areas, rear uses such as secondary units, as well as an easement for utilities in urban centers as defined by Sections 601.01 and 601.02 of the DCSM or as otherwise approved by the Director of Transportation.
- Standard landings required at intersections.
- Pavement section is standard requirement. Refer to Detail 650.01 for alternative pavement sections. Alternative materials such as pervious pavement, cobblestone, etc. may be allowed subject to approval by the Director of Transportation.
- Private loading and parking access, at least 20' deep, must be located on both sides of the alleyway. (20' for residential uses, 24' for mixed uses)
- Building edges must meet the easement where vehicular access is not necessary.
- Curbs must be flush with street surface.
- Drainage may flow to center inlet. Alley cross slopes may be modified to eliminate center inlet provided that the drainage design shall ensure positive drainage.
- An optional 4' wide trench with grass surface can be located on one or both sides of the alleyway. Trench would require driveway crossovers, surface water flow to be revised, and an addition of 4' or 8' to the access easement.
- An optional alley easement for dry utilities (i.e. cable, gas, telephone, and electric) could be located on one side of the alley as an alternative to utility placement under the alley. Variable width utility easement shall be provided only as required.
- Alley entrances shall conform to VDOT CG-11 standards and VDOT Road Design Manual Appendix B(1), Section B(1)-6.
- Utilities should be located within the travel lane so that manholes and valve covers are not within the typical wheel path area.
- Stopping Sight Distance (SSD), Sight Distance Left (SDL), and Sight Distance Right (SDR) to be provided in accordance with AASHTO "Policy on Geometric Design of Highways and Streets" Chapter 3.2.2.3 and Chapter 9.5.

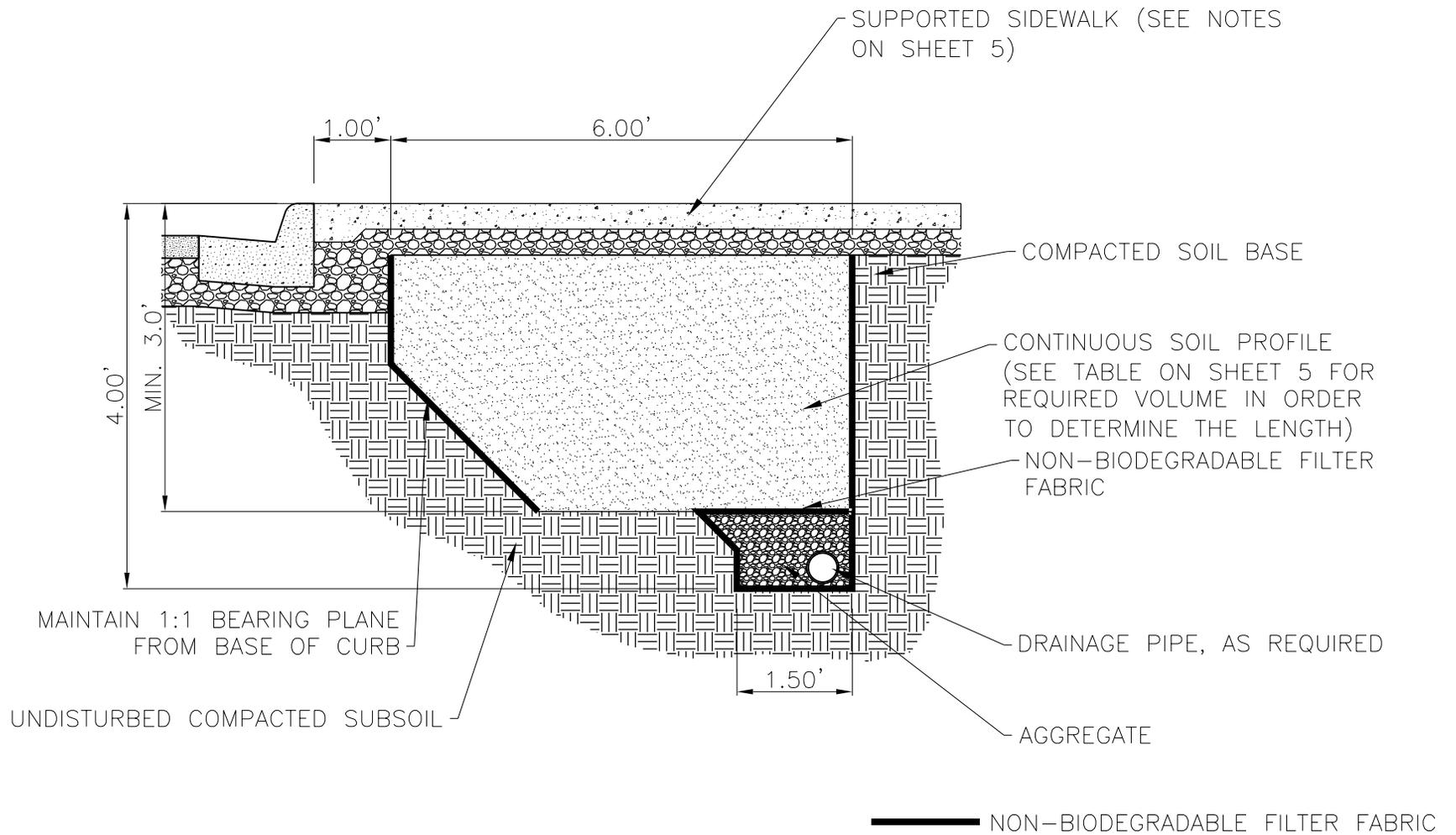
Detail No.	UA-1		<p align="center">COUNTY OF PRINCE WILLIAM VIRGINIA</p>	<p align="center">STANDARD TYPICAL SECTION FOR PRIVATE ALLEY IN URBAN CENTERS</p>	Date
650.18					6/10/24



GENERAL NOTES

1. At planting prune only crossing limbs, co-dominant leaders, broken or dead branches, and any branches that pose a hazard to pedestrians.
2. Water thoroughly twice within the first 48 hours after planting.
3. Remove burlap and basket from top 1/3 of of root ball and remove from site.
4. Sidewalk shall be constructed in accordance with the approved construction plans.
5. Tree stabilization stakes or guys are to be installed as per manufacturers recommendations.

Detail No.	UST-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD STREET TREE PLANTING DETAIL FOR URBAN CENTERS SHEET 1 OF 5	
650.19					Date 7/15/14



Detail No.
650.19

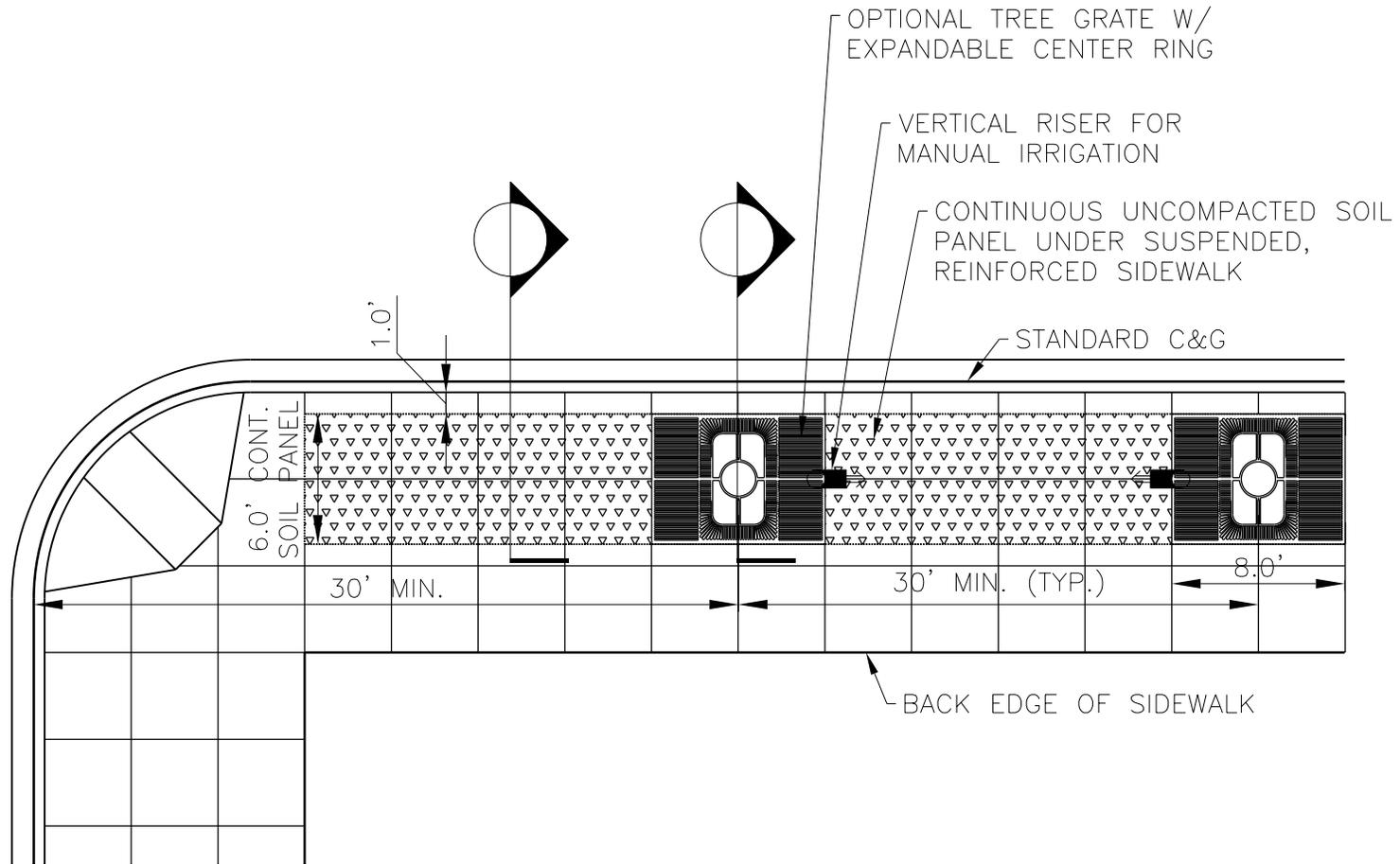
UST-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

STANDARD STREET TREE PLANTING DETAIL
FOR URBAN CENTERS
SHEET 2 OF 5

Date
7/15/14



Detail No.

650.19

UST-1

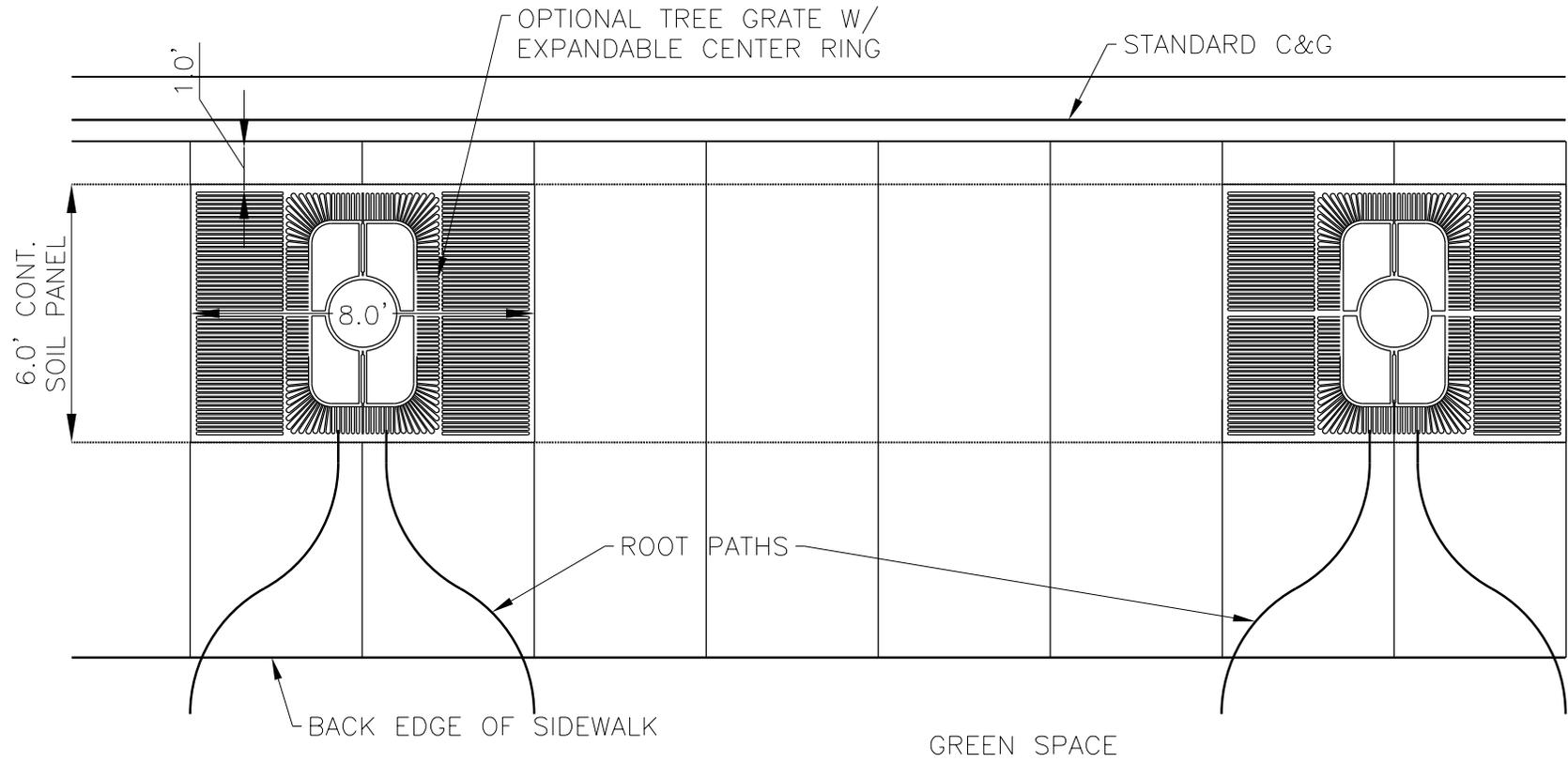


COUNTY OF
PRINCE WILLIAM
VIRGINIA

STANDARD STREET TREE PLANTING DETAIL FOR URBAN
CENTERS
SHEET 3 OF 5

Date
7/15/14

ROOT PATHS ONLY TO BE INSTALLED
IN INSTANCES WHERE SIDEWALK
ABUTS OPEN SPACE.



Detail No.
650.19

UST-1



**COUNTY OF
PRINCE WILLIAM
VIRGINIA**

STANDARD STREET TREE PLANTING DETAIL FOR URBAN
CENTERS
SHEET 4 OF 5

Date
7/15/14

Street Type	Street Tree Size*
Through Boulevard	Large
Boulevard	Large
Avenue	Medium
Street	Medium
Private Residential Side Street	Small
Private Side Street	Small
Private Alley	N/A

NOTE: Variation from these tables may be permitted subject to approval by the Prince William County Department of Transportation and Department of Public Works.

*See DCSM Section 800 Table I-2-T.

Tree Size	Minimum Volume**
Large Street Tree	970 cf
Medium Street Tree	750 cf
Small Street Tree	500 cf

**Minimum Volume Based on Table 8-8 of DCSM.

GENERAL NOTES

1. When tree pits and/or landscape strips are used for urban road sections, a continuous soil profile shall be provided for each street tree based on the required soil volume noted above.
2. Sidewalk over the continuous soil profile must be structurally supported by means that will allow the tree to root within the soil profile. Options for structural support include but are not limited to structural soil, silva cells, and cantilevered sidewalks. The method of support must be approved by the Prince William County Department of Transportation and the the Department of Public Works prior to construction.
3. The method of support for the sidewalk must provide adequate protection to the tree root zone from compaction that may occur above the tree root zone.
4. Within the VDOT ROW the sidewalk will be maintained by VDOT. However, VDOT nor Prince William County maintain the street trees located within the ROW. Maintenance must be provided by others as a condition of plan approval.
5. Trees spaced 30' apart may share volume in one continuous soil profile.
6. Storm sewer structures (inlets, manholes, etc.) should not be placed within tree pits. The top of storm sewer pipes shall be under the continuous soil profile.
7. Refer to current VDOT CG-12 standards for design of curb ramps and other available curb ramp options.

Added comment

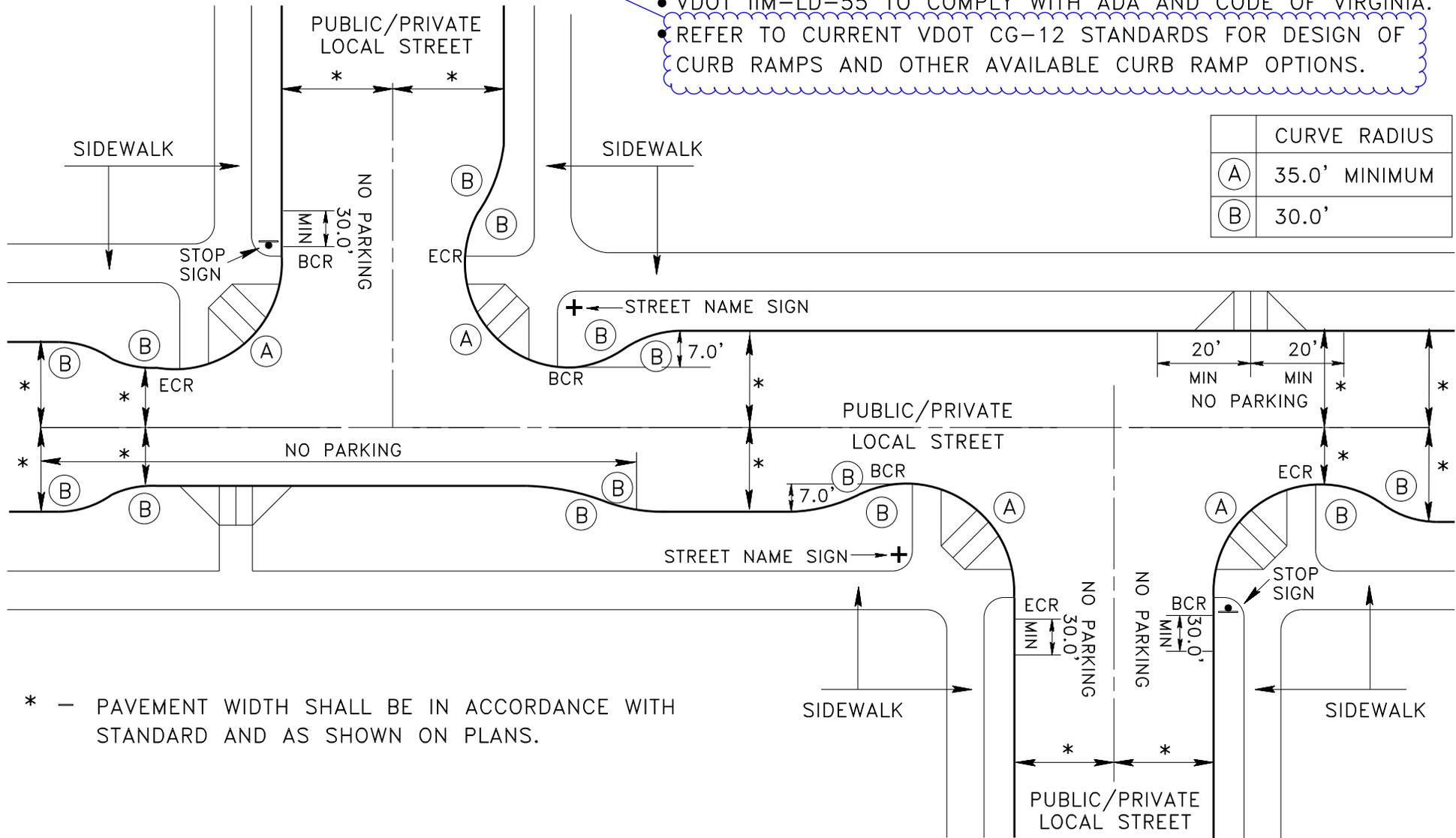
Detail No.	UST-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD STREET TREE PLANTING DETAIL FOR URBAN CENTERS SHEET 5 OF 5	Date
650.19					9/25/2024

NOTE:

- STREET DRAINAGE FLOW SHALL FOLLOW THE CURB AND GUTTER.
- VDOT IIM-LD-55 TO COMPLY WITH ADA AND CODE OF VIRGINIA.
- REFER TO CURRENT VDOT CG-12 STANDARDS FOR DESIGN OF CURB RAMPS AND OTHER AVAILABLE CURB RAMP OPTIONS.

Added comment

	CURVE RADIUS
(A)	35.0' MINIMUM
(B)	30.0'



Detail No.	CSL-1		COUNTY OF PRINCE WILLIAM VIRGINIA	CURB EXTENSION LAYOUT DESIGN	Date
650.20					9/25/2024

RESERVED FOR FUTURE USE

Removed detail because references to service drives have been removed from Section 600

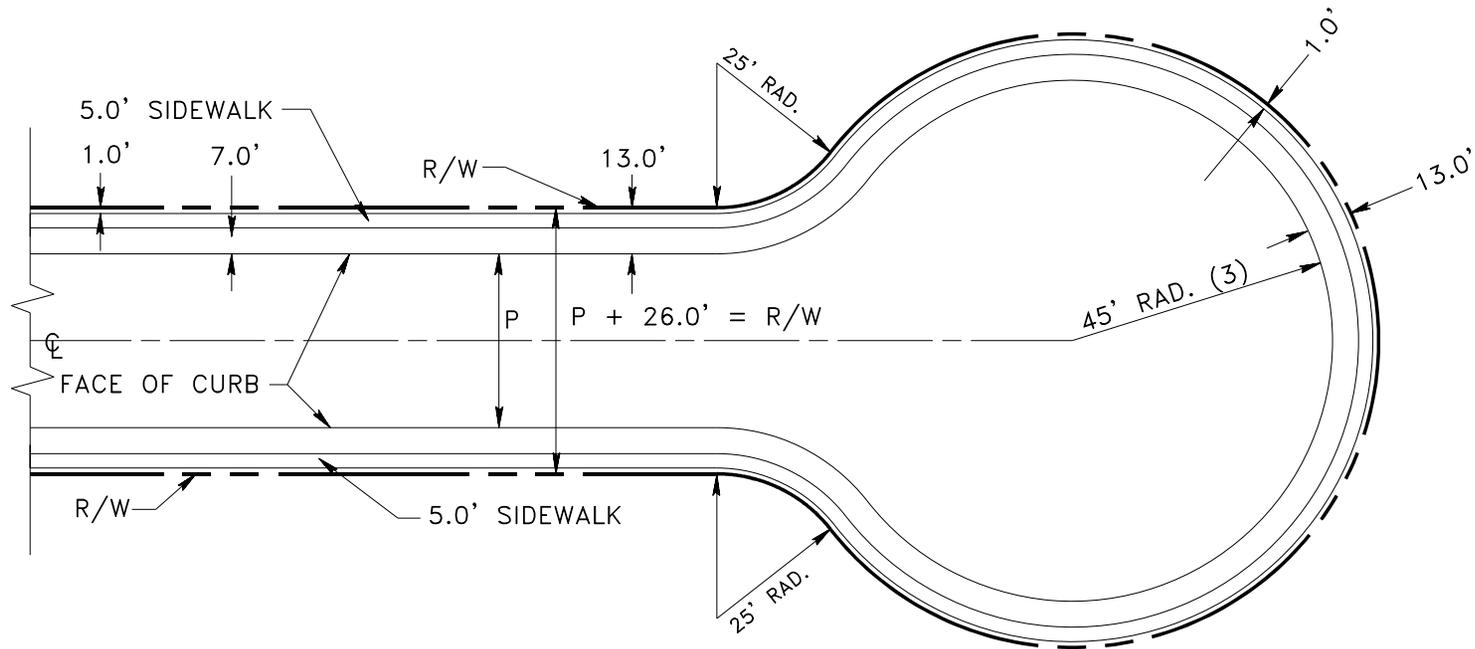
Detail No.

650.21



COUNTY OF
PRINCE WILLIAM
VIRGINIA

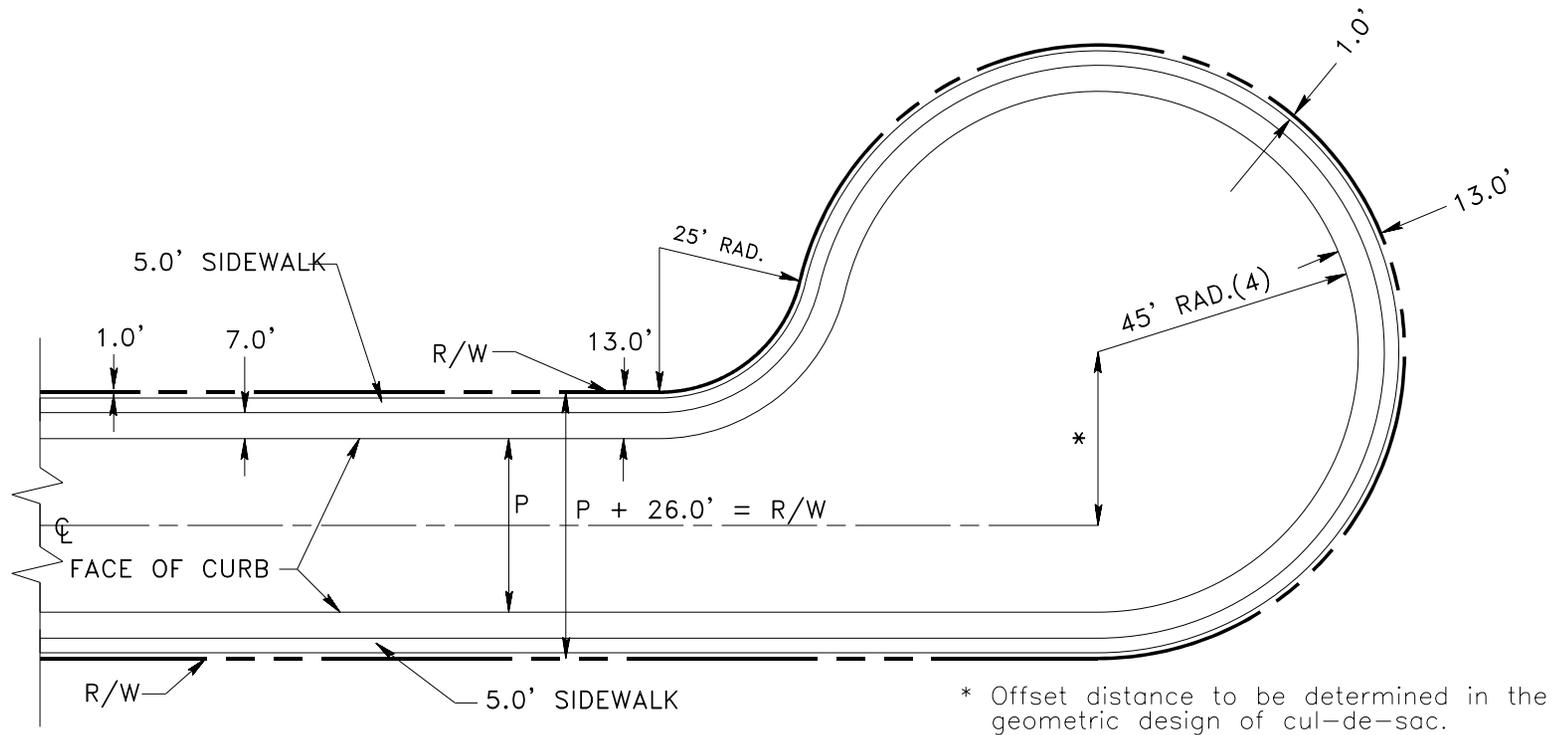
Date
6/10/24



GENERAL NOTES:

- 1) If the cul-de-sac is determined by the County to be subject to regular bus or other large vehicle traffic, a larger pavement radius is required.
- 2) Minimum length of cul-de-sac is one lot width between the intersecting street and the beginning of the circular turn-around.
- 3) On category I residential streets, a minimum 30.0' radius may be acceptable. However, prior approval from Department of Fire & Rescue, School Board, Transportation, and VDOT shall be required. Parking along the cul-de-sac bulb shall not be allowed and appropriate traffic control signs shall be provided.
- 4) Cul-de-sac length to be in accordance with Section 602.10.01.D. Added reference

Detail No.	CS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD CUL-DE-SAC WITH CURB, GUTTER, AND SIDEWALK	
650.22					Date 6/10/24

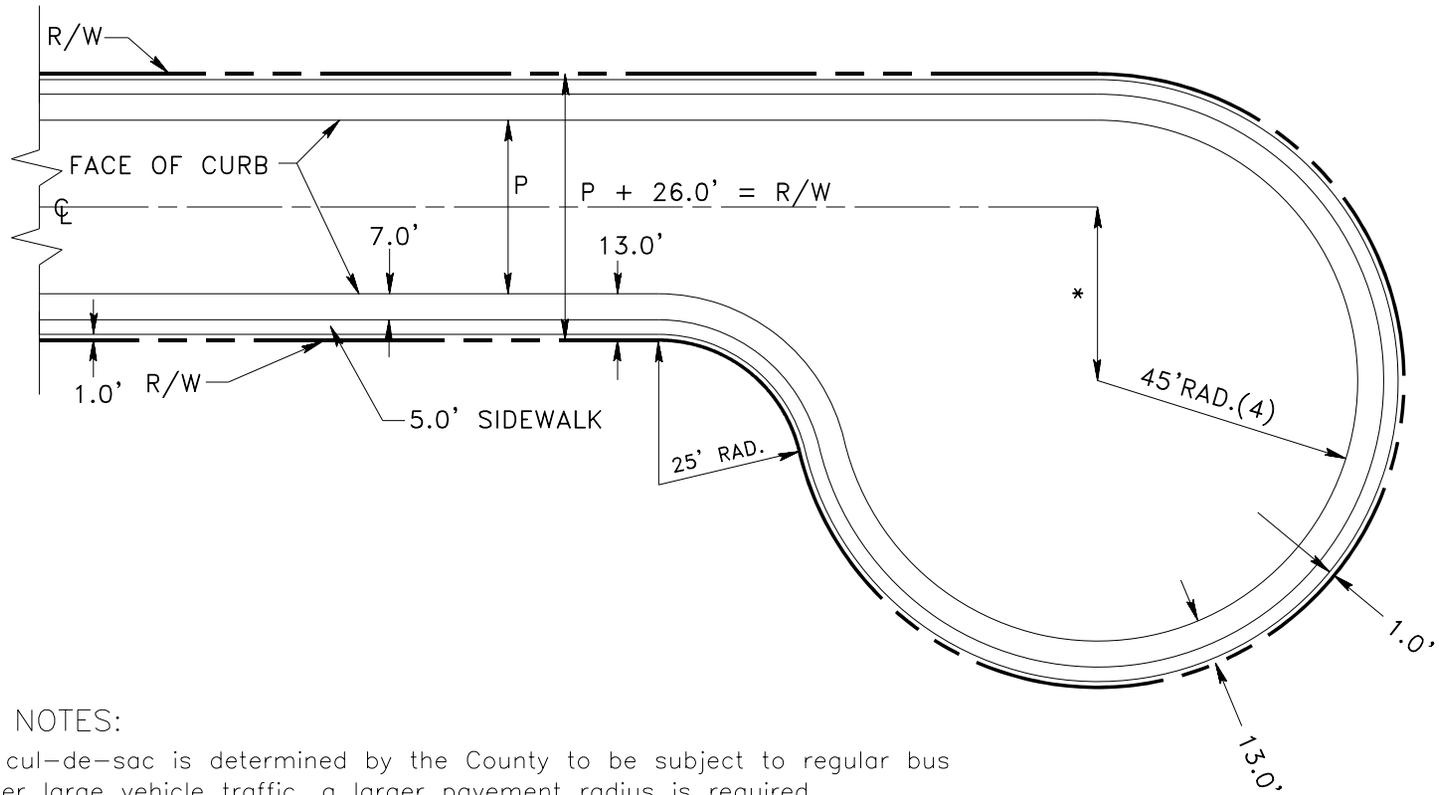


GENERAL NOTES:

- 1) If the cul-de-sac is determined by the County to be subject to regular bus or other large vehicle traffic, a larger pavement radius is required.
- 2) Minimum length of cul-de-sac is one lot width between the intersecting street and the beginning of the circular turn-around.
- 3) This type of offset cul-de-sac shall be used where the turnaround is subject to bus or other large vehicle traffic. Parking will not be permitted.
- 4) On category I residential streets, a minimum 30.0' radius may be acceptable. However, prior approval from Department of Fire & Rescue, School Board, Transportation, and VDOT shall be required. Parking along the cul-de-sac bulb shall not be allowed and appropriate traffic control signs shall be provided.
- 5) Cul-de-sac length to be in accordance with Section 602.10.01.D

Added reference

Detail No.	CS-2		<p>COUNTY OF PRINCE WILLIAM VIRGINIA</p>	<p>OFFSET (LEFT) CUL-DE-SAC WITH CURB, GUTTER, AND SIDEWALK</p>	Date
650.23					6/10/24



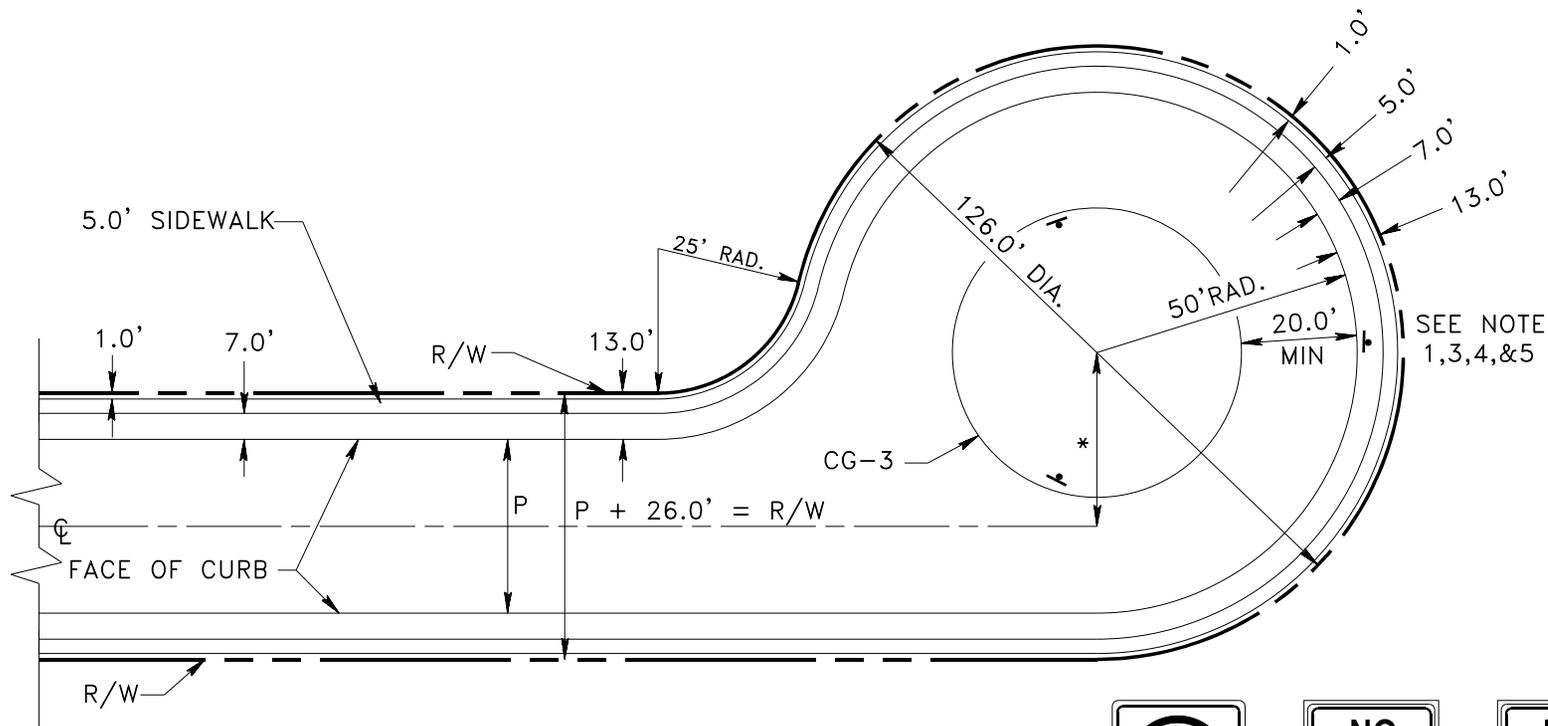
GENERAL NOTES:

- 1) If the cul-de-sac is determined by the County to be subject to regular bus or other large vehicle traffic, a larger pavement radius is required.
- 2) Minimum length of cul-de-sac is one lot width between the intersecting street and the beginning of the circular turn-around.
- 3) Design of cul-de-sac should consider counter-clockwise movement on the entry into the offset segment.
- 4) On category I residential streets, a minimum 30.0' radius may be acceptable. However, prior approval from Department of Fire & Rescue, School Board, Transportation, and VDOT shall be required. Parking along the cul-de-sac bulb shall not be allowed and appropriate traffic control signs shall be provided.
- 5) Cul-de-sac length to be in accordance with Section 602.10.01.D.

* Offset to be determined in the geometric design of cul-de-sac.

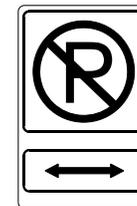
Added reference

Detail No.	CS-3		<p>COUNTY OF PRINCE WILLIAM VIRGINIA</p>	<p>OFFSET (RIGHT) CUL-DE-SAC WITH CURB, GUTTER, AND SIDEWALK</p>	Date
650.24					6/10/24



GENERAL NOTES:

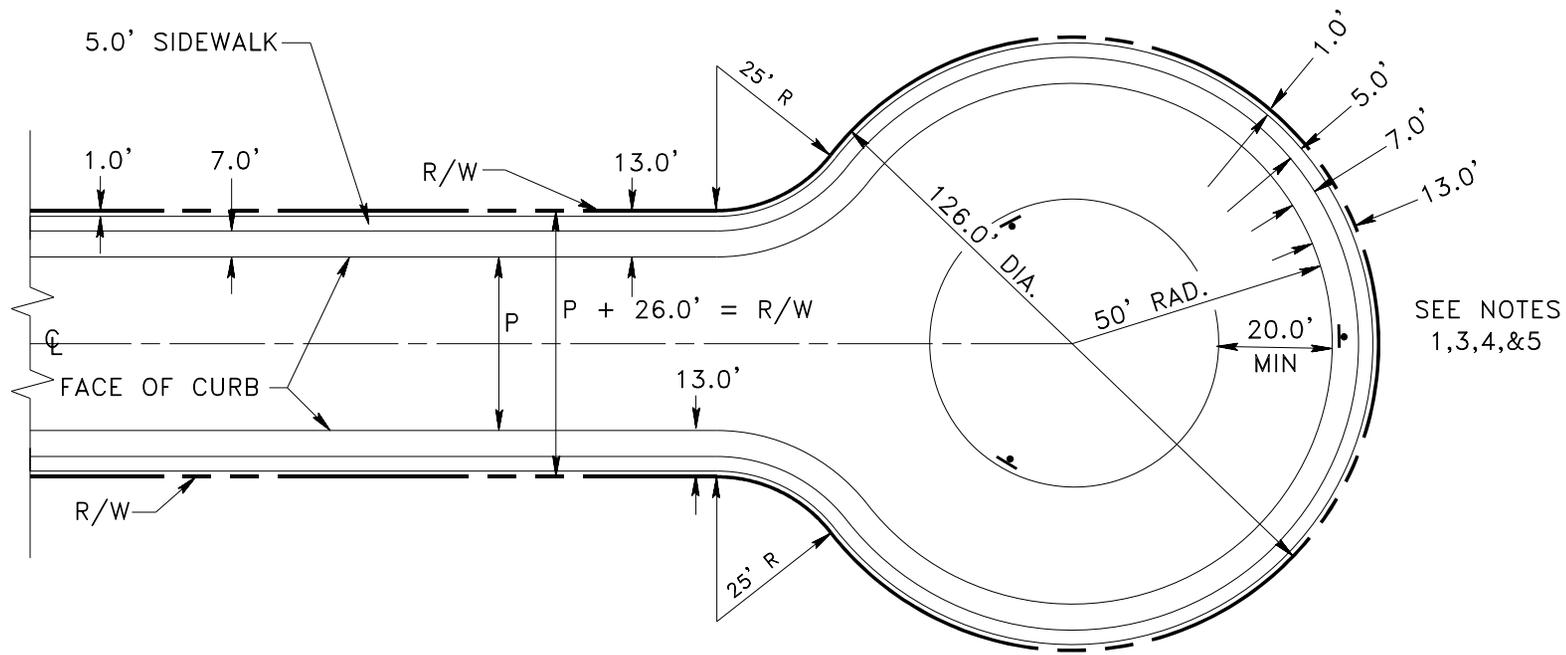
- 1) If the cul-de-sac is determined by the County to be subject to regular bus or other large vehicle traffic, a larger pavement radius is required.
- 2) Minimum length of cul-de-sac is one lot width between the intersecting street and the beginning of the circular turn-around.
- 3) Design of cul-de-sac should consider counter-clockwise movement on the entry into the offset segment.
- 4) Parking along the cul-de-sac shall not be allowed. Appropriate traffic control (no parking, one-way, and do not enter) signs shall be installed prior to occupancy of any unit.
- 5) Lots along the cul-de-sac bulb shall be provided with three (3) off-street parking spaces exclusive of the garage or similar car shelter.
- 6) Cul-de-sac length to be in accordance with Section 602.10.01.D.
- 7) Landscaping may be provided in center island in accordance with Section 602.10.01.E.



* Offset to be determined in the geometric design of cul-de-sac.

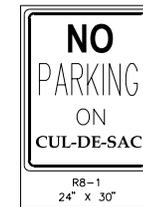
Added reference

Detail No.	CCI-1		COUNTY OF PRINCE WILLIAM VIRGINIA	OFFSET CUL-DE-SAC WITH CURB, GUTTER, AND SIDEWALK (WITH CENTER ISLAND)	Date
650.25					6/10/24



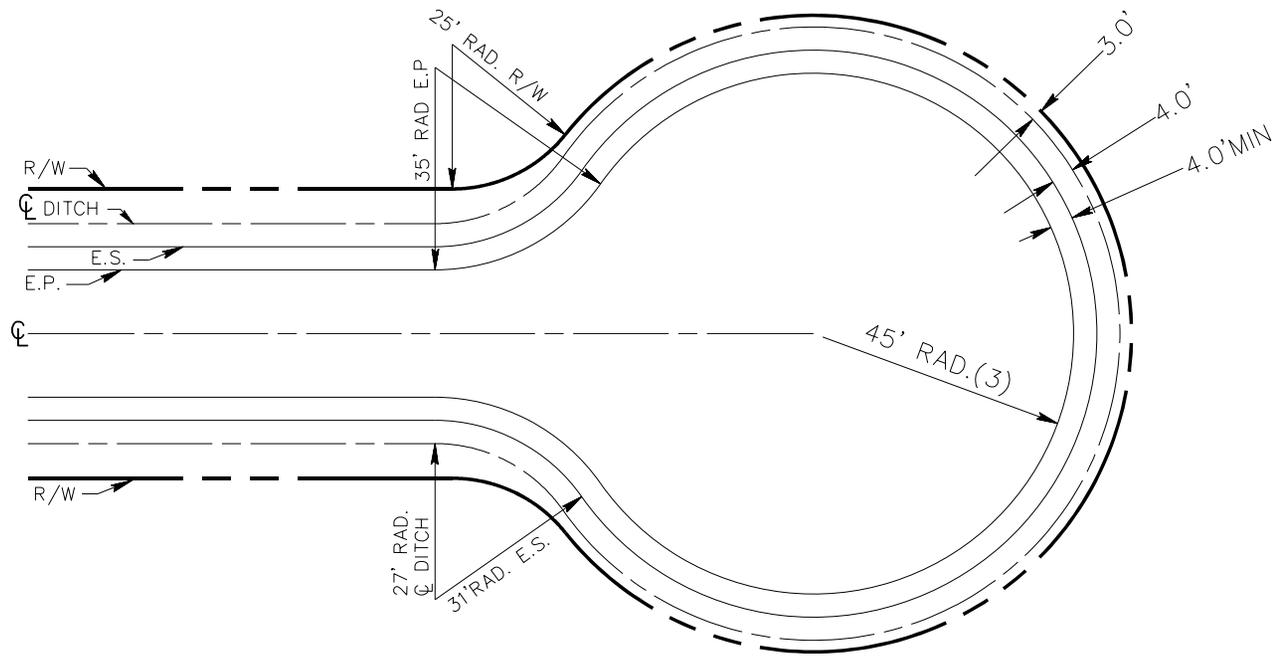
GENERAL NOTES:

- 1) If the cul-de-sac is determined by the County to be subject to regular bus or other large vehicle traffic, a larger pavement radius is required.
- 2) Minimum length of cul-de-sac is one lot width between the intersecting street and the beginning of the circular turn-around.
- 3) For industrial cul-de-sacs, the radius of pavement shall be fifty feet (50 ft.).
- 4) Parking along the cul-de-sac shall not be allowed. Appropriate traffic control (no parking, one-way, and do not enter) signs shall be installed prior to occupancy of any unit.
- 5) Lots along the cul-de-sac bulb shall be provided with three (3) off-street parking spaces exclusive of the garage or similar car shelter.
- 6) Cul-de-sac length to be in accordance with Section 602.10.01.D.
- 7) Landscaping may be provided in center island in accordance with Section 602.10.01.E.



Added reference

Detail No.	CCI-2		<p>COUNTY OF PRINCE WILLIAM VIRGINIA</p>	<p>STANDARD CUL-DE-SAC WITH CURB, GUTTER, AND SIDEWALK (WITH CENTER ISLAND)</p>	Date
650.26					6/10/24

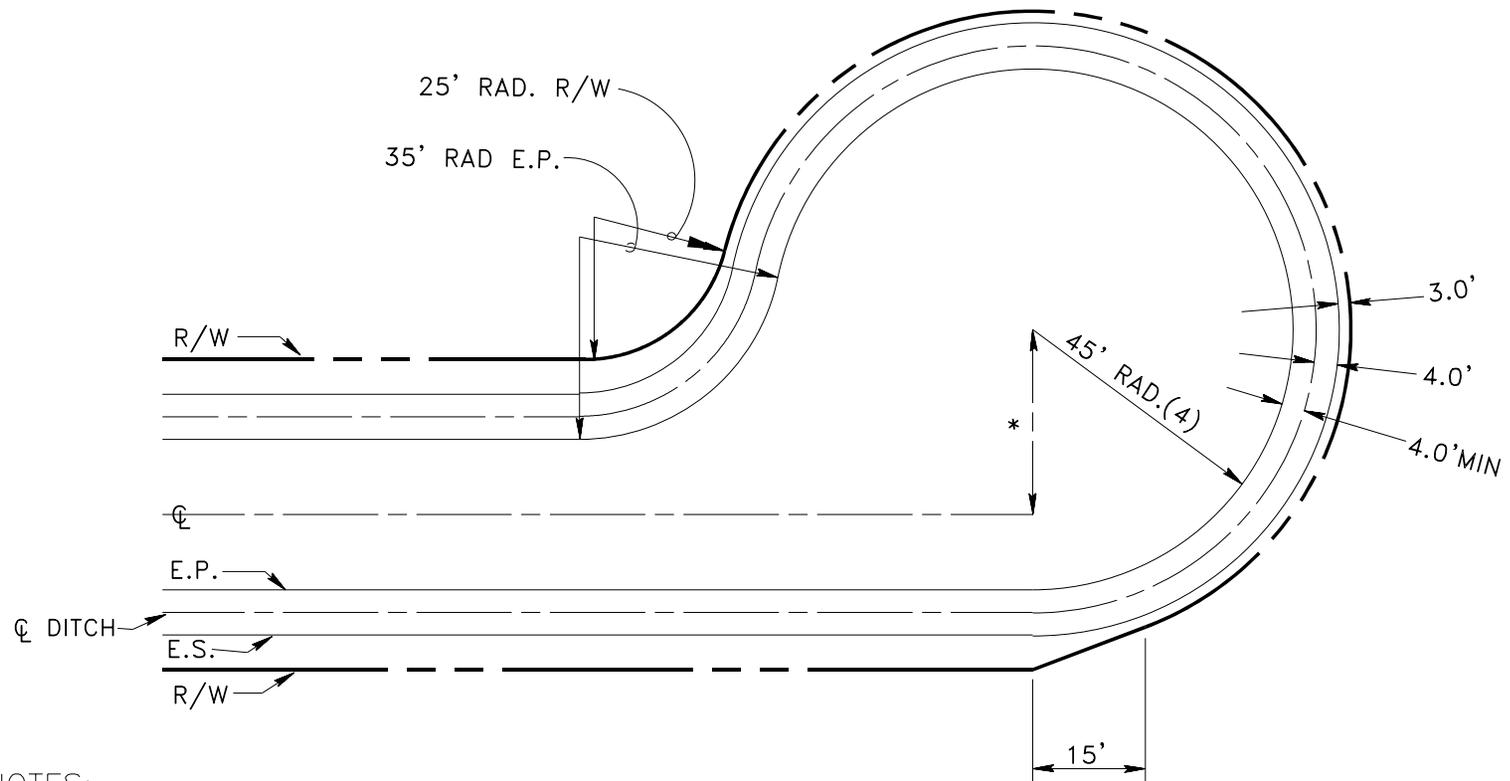


GENERAL NOTES:

- 1) If the cul-de-sac is determined by the County to be subject to regular bus or other large vehicle traffic, a larger pavement radius is required.
- 2) Minimum length of cul-de-sac is one lot width between the intersecting street and the beginning of the circular turn-around.
- 3) On category I residential streets, the minimum 30.0' radius may be acceptable. However, prior approval from Department of Fire & Rescue, School Board, Transportation and VDOT shall be required. Parking along the cul-de-sac bulb shall not be allowed and appropriate traffic control signs shall be provided.
- 4) Cul-de-sac length to be in accordance with Section 602.10.01.D.

Added reference

Detail No.	DS-1		<p>COUNTY OF PRINCE WILLIAM VIRGINIA</p>	<p>STANDARD CUL-DE-SAC ON DITCH SECTION STREET</p>	Date
650.27					6/10/24



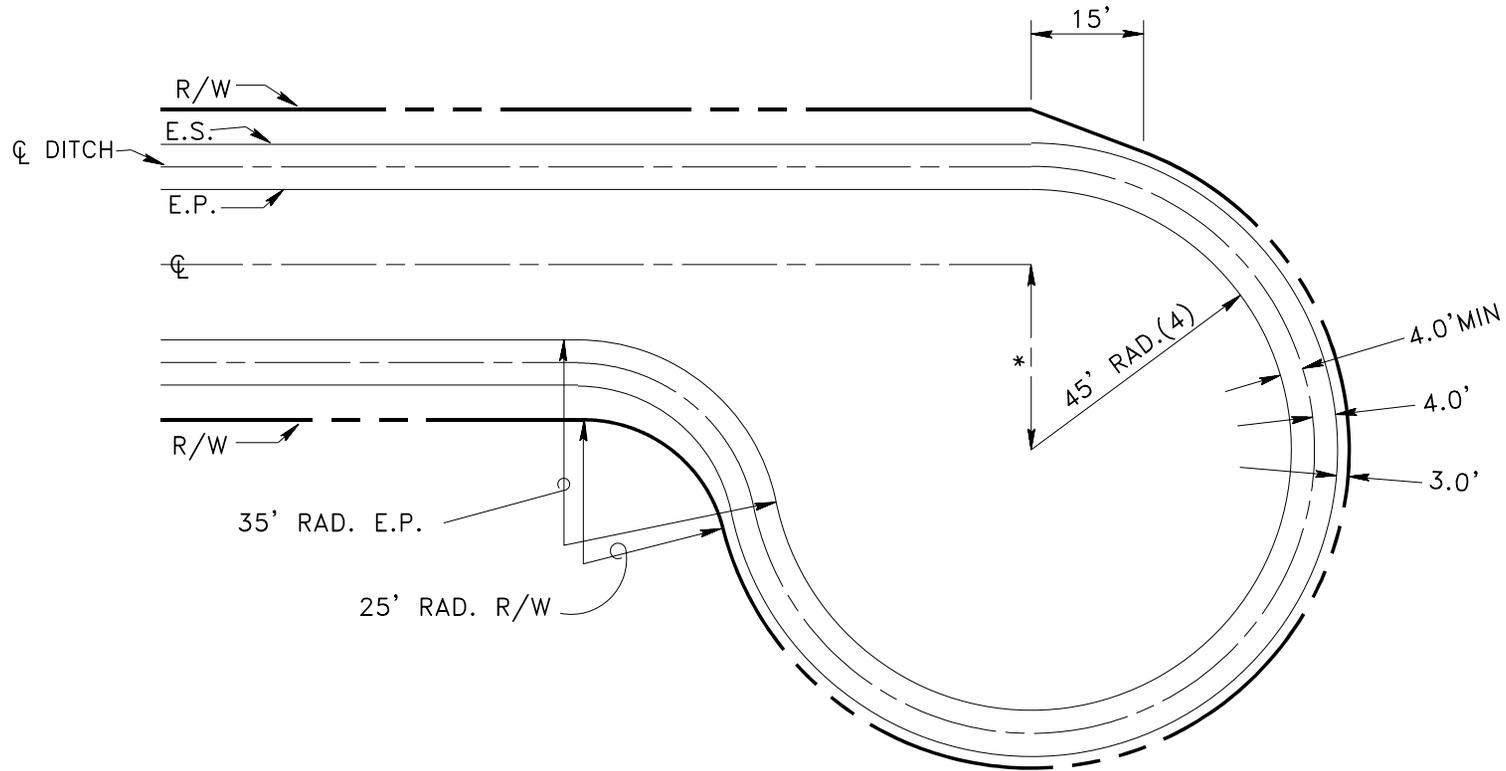
GENERAL NOTES:

- 1) If the cul-de-sac is determined by the County to be subject to regular bus or other large vehicle traffic, a larger pavement radius is required.
- 2) Minimum length of cul-de-sac is one lot width between the intersecting street and the beginning of the circular turn-around.
- 3) This type of offset cul-de-sac shall be used where the turnaround is subject to bus or other large vehicle traffic. Parking will not be permitted.
- 4) On category I residential streets, a minimum 30.0 radius may be acceptable. However, prior approval from Department of Fire & Rescue, School Board, Transportation and VDOT shall be required. Parking along the cul-de-sac bulb shall not be allowed and appropriate traffic control signs shall be provided.
- 5) Cul-de-sac length to be in accordance with Section 602.10.01.D.

* Offset distance to be determined in the geometric design of cul-de-sac.

Added reference

Detail No.	DS-2		COUNTY OF PRINCE WILLIAM VIRGINIA	OFFSET (LEFT) CUL-DE-SAC ON DITCH SECTION STREET	Date
650.28					6/10/24



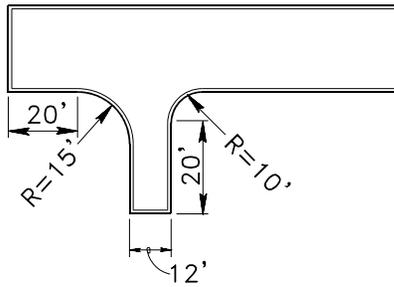
GENERAL NOTES:

- 1) If the cul-de-sac is determined by the County to be subject to regular bus or other large vehicle traffic, a larger pavement radius is required.
- 2) Minimum length of cul-de-sac is one lot width between the intersecting street and the beginning of the circular turn-around.
- 3) Design of cul-de-sac should consider counter-clockwise movement on the entry into the offset segment.
- 4) On category I residential streets, a minimum 30.0' radius may be acceptable. However, prior approval from Department of Fire & Rescue, School Board, Transportation and VDOT shall be required. Parking along the cul-de-sac bulb shall not be allowed and appropriate traffic control signs shall be provided.
- 5) Cul-de-sac length to be in accordance with Section 602.10.01.D.

* Offset distance to be determined in the geometric design of the cul-de-sac.

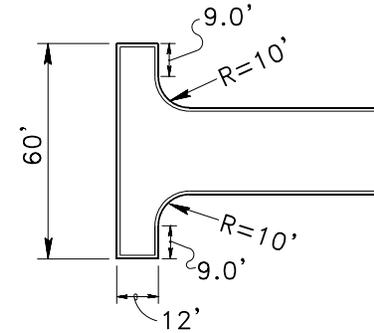
Detail No.	DS-3		COUNTY OF PRINCE WILLIAM VIRGINIA	Added reference OFFSET (RIGHT) CUL-DE-SAC ON DITCH SECTION STREET	Date
650.29					6/10/24

GEOMETRICAL SHAPE #1



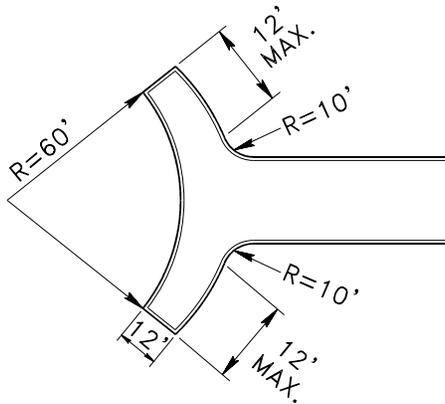
PAVING SECTION TO BE SAME AS STREET

GEOMETRICAL SHAPE #2



PAVING SECTION TO BE SAME AS STREET

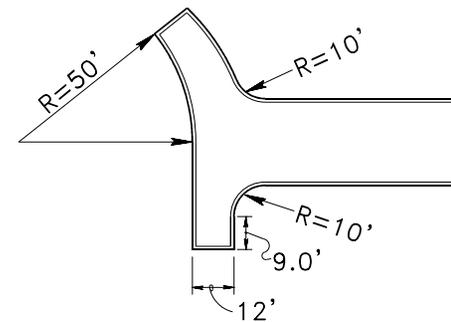
GEOMETRICAL SHAPE #3



PAVING SECTION TO BE SAME AS STREET

NOTE: ABOVE DESIGNS ARE MINIMUM REQUIREMENTS. DESIGNS CONFORMING TO VDOT'S MINIMUM REQUIREMENTS WHICHEVER IS MORE STRINGENT SHALL BE PROVIDED.

GEOMETRICAL SHAPE #4



PAVING SECTION TO BE SAME AS STREET

Detail No.

650.30

TT-1

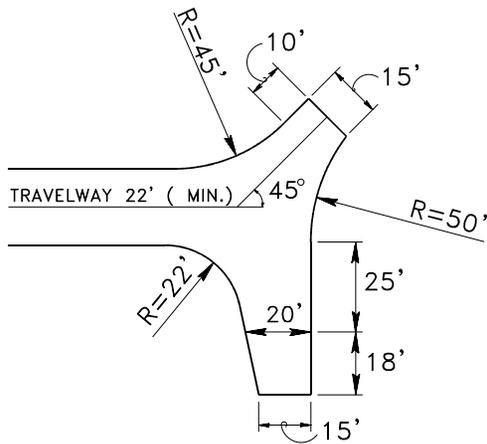


COUNTY OF
PRINCE WILLIAM
VIRGINIA

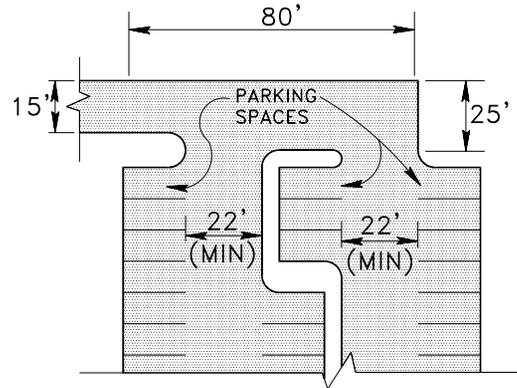
TRAVELWAY TURNAROUND
STANDARDS

Date
7/15/14

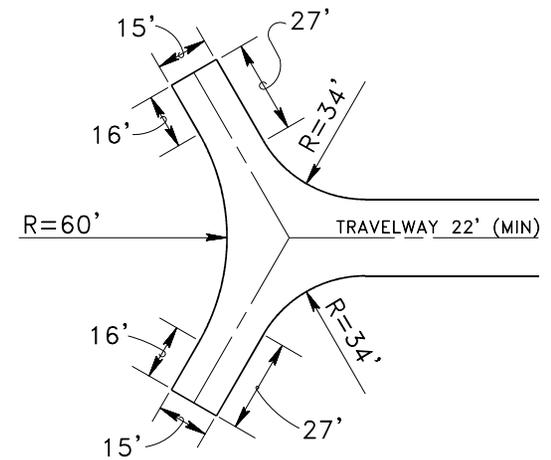
GEOMETRIC SHAPE #1



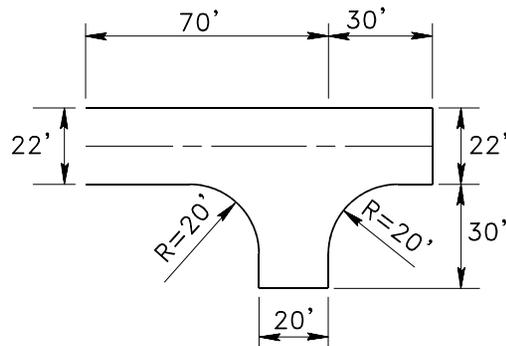
GEOMETRIC SHAPE #2



GEOMETRIC SHAPE #3



GEOMETRIC SHAPE #4
FOR SERVICE VEHICLES ONLY



MINIMUM TURNING AREA
FOR SERVICE VEHICLES

MINIMUM TURNING AREA FOR EMERGENCY VEHICLES

GENERAL NOTES:

- 1) Design based on 40 ft. (Bus) design vehicle for emergency vehicles and single unit trucks for service vehicles.
- 2) Geometric shapes shown are guidelines only. Other designs shall require prior approval.
- 3) The turnarounds (Geometric shapes #1-#3) shall be provided when the length of private travelway or street exceeds 250 feet measured from the face of curb of the driveway entrance to the edge of the driveway of the last dwelling unit. Turnaround (Geometric shape #4) shall be required where the length is 100-250 feet.
- 4) "No Parking" signs shall be required in the turning area and where required.
- 5) Above designs are minimum requirements. Designs conforming to VDOT's minimum requirements or whichever is more stringent shall be provided.

Detail No.

650.31

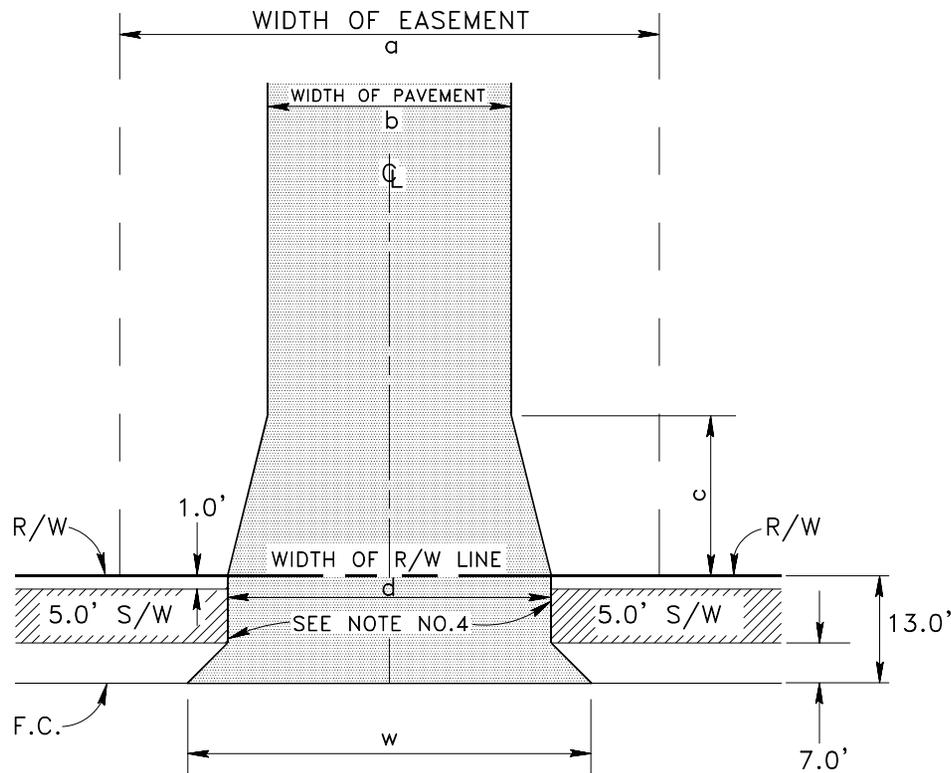
TT-2



COUNTY OF
PRINCE WILLIAM
VIRGINIA

TRAVELWAY TURNAROUND FOR
EMERGENCY VEHICLES AND
SERVICE TRUCKS

Date
7/15/14



Reduced from 40 feet

NUMBER OF LOTS	a (ft)	b (ft)	c (ft)	d (ft)	w (ft)
1	18	10	STD. DE-2		
2-5	30	18	12	24	28

GENERAL NOTES:

- 1) For pavement design refer to Detail 650.01.
- 2) Two percent (2%) landing required for first twenty (20) feet.
- 3) For ditch section also refer to detail 650.38 for DE-4.
- 4) The entrance section of the driveway within the right-of-way limits should be designed in accordance with the alternative entrance with curb and gutter standard DE-2 or CG-9D standard of VDOT.
- 5) Design of entrance apron shall conform to County or VDOT requirements whichever is more stringent.

Detail No.

650.32

PP-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

PIPESTEM ENTRANCE DESIGN
WITH CURB AND GUTTER

Date
6/10/24

RESERVED FOR FUTURE USE

Detail No.

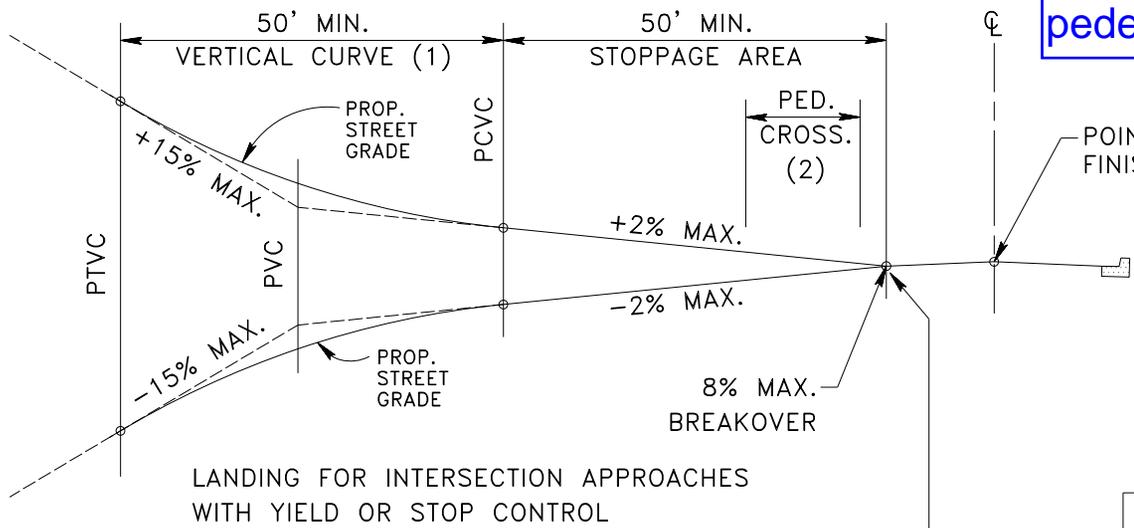
650.33



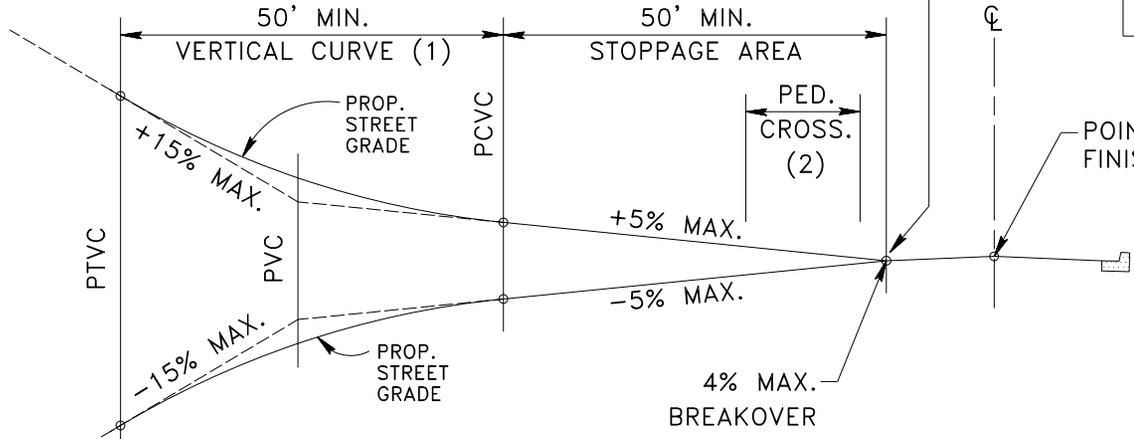
COUNTY OF
PRINCE WILLIAM
VIRGINIA

Date
6/10/24

Updated to ensure proper grades for pedestrian crossings, compliance with VDOT



LANDING FOR INTERSECTION APPROACHES WITH YIELD OR STOP CONTROL

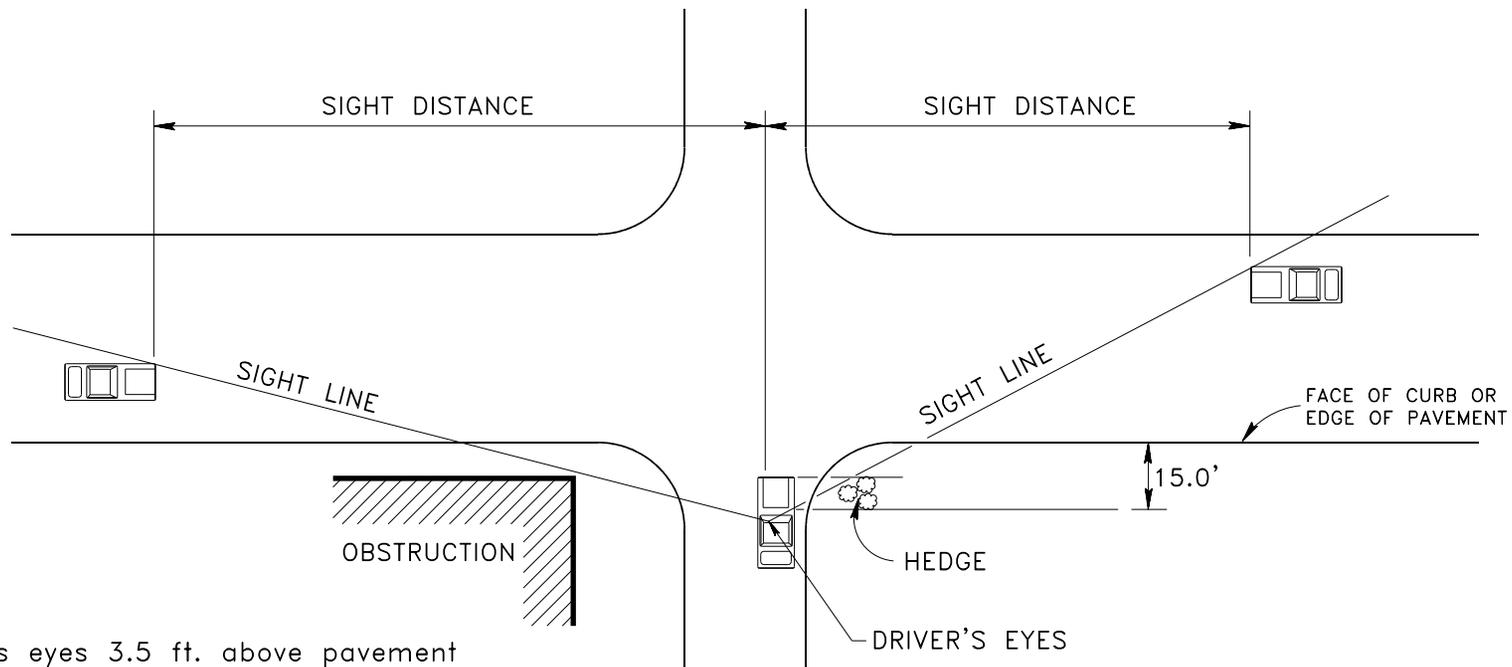


LANDING FOR INTERSECTION APPROACHES WITHOUT YIELD OR STOP CONTROL (3)

- Streets with curb and gutter design landing at curb line location and top of curb elevation.
- Streets without curb and gutter begin landing at outside edge of pavement and centerline elevation.
- Major thoroughfare begin landing at curb line/edge of pavement and top of curb/edge of pavement elevation.

- NOTES:
- (1) The length of this vertical curve shall be 50' as a minimum but not less than the length required to provide the minimum stopping sight distance for the typical section.
 - (2) Pedestrian crossing to adhere to PROWAG requirements for pedestrian access routes.
 - (3) Pedestrian street crossings without yield or stop control are crossings where there is no yield or stop sign, or where there is a traffic signal that is designed for the green phase.

Detail No.	IL-1		COUNTY OF PRINCE WILLIAM VIRGINIA	INTERSECTION LANDING REQUIREMENTS	Date
650.34					6/10/24



Driver's eyes 3.5 ft. above pavement
 Object height 3.5 ft. above pavement

Desirable sight triangle

General Notes:

- 1) The profile of the sight line shall be required.
- 2) Driver's Eyes are 3.5 ft. above the pavement.
- 3) Object height is 3.5 ft. above the pavement.

Detail No.	ISD-1		COUNTY OF PRINCE WILLIAM VIRGINIA	INTERSECTION SIGHT DISTANCE REQUIREMENTS	Date
650.35					7/15/14

REFER TO VDOT ROAD DESIGN
MANUAL APPENDIX A(1)

Updated to refer directly to VDOT standards
since this facility will be VDOT maintained

Detail No.	BT-1		COUNTY OF PRINCE WILLIAM VIRGINIA	BICYCLE TRAIL/SHARED USE PATH STANDARDS FOR VDOT MAINTENANCE	
650.36					Date 6/10/24

REFER TO PRINCE WILLIAM COUNTY PARKS & RECREATION TRAIL STANDARDS MANUAL

Updated to refer to current Parks & Recreation
trail standards

Detail No.

650.37

PT-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

ASPHALT PARK TRAIL
(NOT ELIGIBLE FOR VDOT MAINTENANCE)

Date
6/10/24

REFER TO PRINCE WILLIAM COUNTY PARKS & RECREATION TRAIL STANDARDS MANUAL

Updated to refer to current Parks & Recreation
trail standards

Detail No.

650.38

CT-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

FULL BENCH CUT TRAIL
(NOT ELIGIBLE FOR VDOT MAINTENANCE)

Date
6/10/24

REFER TO PRINCE WILLIAM COUNTY PARKS & RECREATION TRAIL STANDARDS MANUAL

Updated to refer to current Parks & Recreation
trail standards

Detail No.

650.39

HT-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

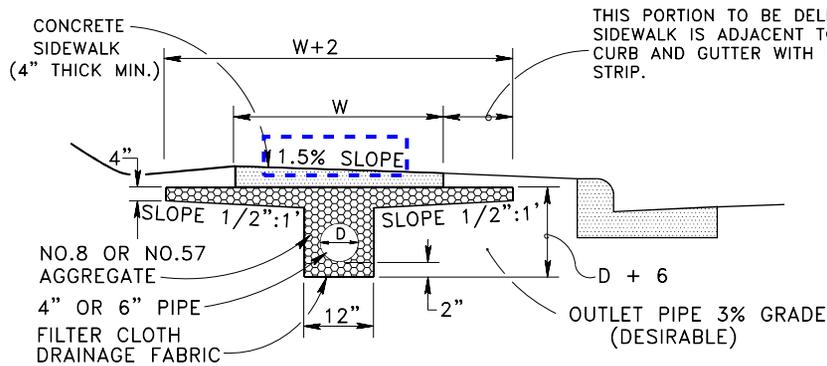
HIKING TRAIL
(NOT ELIGIBLE FOR VDOT MAINTENANCE)

Date
6/10/24

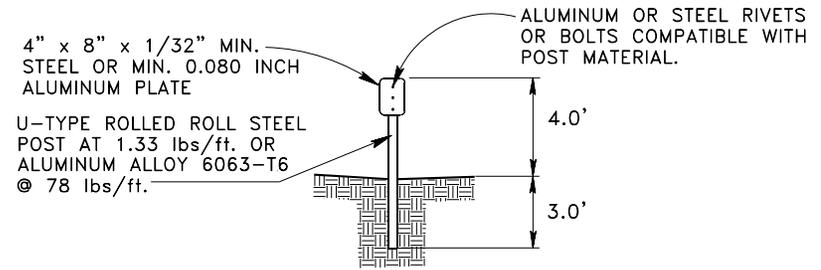
REFER TO PRINCE WILLIAM COUNTY PARKS & RECREATION TRAIL STANDARDS MANUAL

Updated to refer to current Parks & Recreation
trail standards

Detail No.	ET-1		COUNTY OF PRINCE WILLIAM VIRGINIA	EQUESTRIAN TRAIL (NOT ELIGIBLE FOR VDOT MAINTENANCE)	
650.40					Date 6/10/24



UNDERDRAIN OUTLET MARKER DETAIL



LONGITUDINAL PERFORATED PIPE

Type of Pipe	Crushing Strength LBS/FT			
	W.T.*	4in. I. D.	W.T.*	6in. I. D.
Vitrified Clay		1000		1000
Concrete		1000		1100
Corrugated Steel		1500	0.52	1500
Corrugated Alum.			0.48	
Asphalt Fiber		1200		1400
Small Wall PVC	103		0.153	
Smooth Wall PE**		ASSHTO M 252		ASSHTO M 252

* Wall Thickness (minimum) in inches

** Colled tubing allowed in four inch (4 in.) diameter only.

NON - PERFORATED OUTLET PIPE

Type of Pipe	Crushing Strength LBS/FT			
	W.T.*	4in. I. D.	W.T.*	6in. I. D.
Vitrified Clay		1000		1000
Concrete		1500		1500
Corrugated Steel			0.52	
Corrugated Alum.			0.48	
Asphalt Fiber		1200		1400
Small Wall PVC	103		0.153	
Smooth Wall PE		70 PSI**		70 PSI **

* Wall Thickness (minimum) in inches

** Tested according to ASTM D 4212 at five percent deflection.

GENERAL NOTES:

- Concrete sidewalk shall be Class A3 per VDOT specifications.
- Sidewalks underdrain is to be used when the sidewalk longitudinal gradient is three percent (3%) or more and when the underlying soil has more than 34 percent passing the NO. 200 sieve and has a P1 of 13 or less.
- Sidewalk underdrains should be tied into the storm sewer system at a point about one city block apart. Underdrain runs must not exceed 1,000 feet in length without discharging into the storm drain system or into an open drain.
- All pipe to be six inches (6 in.) unless otherwise noted on plans.
- Steel posts and plates to be painted or galvanized in accordance with the specification. If painted, the final coats shall be No. 13 aluminum paint or No. 11 white paint.
- Marker to be placed at the outlet end of all underdrain installations barring locations where underdrain is tied into other drainage structures or as directed by the Department of Public Works.
- Sidewalk cross slope to be 2% maximum.

Detail No.

650.41

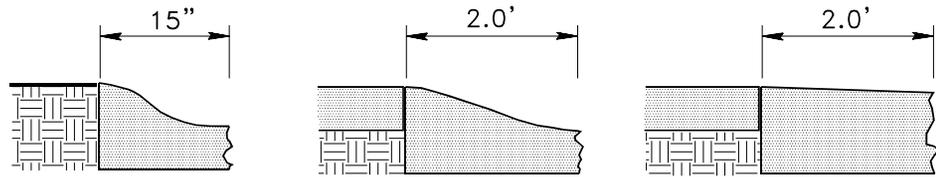
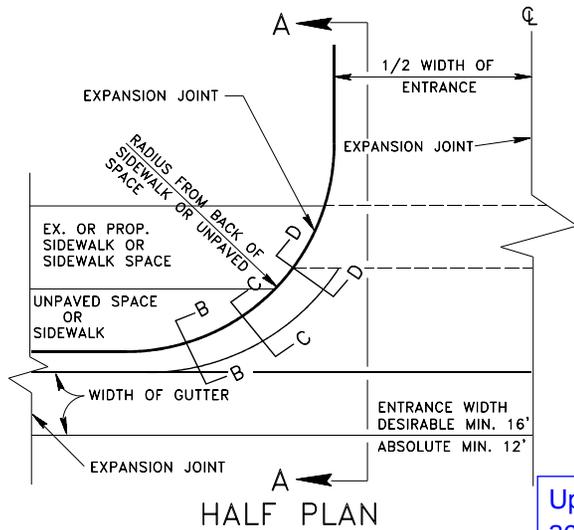
SS-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

STANDARD SIDEWALK WITH UNDERDRAINS

Date
6/10/24

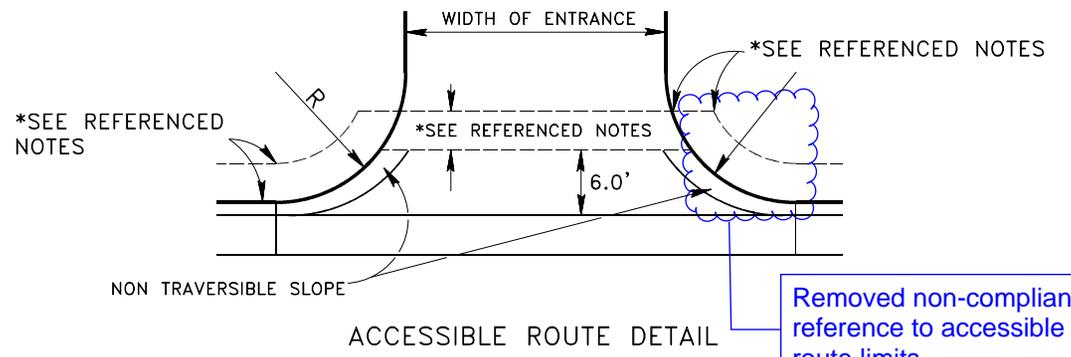
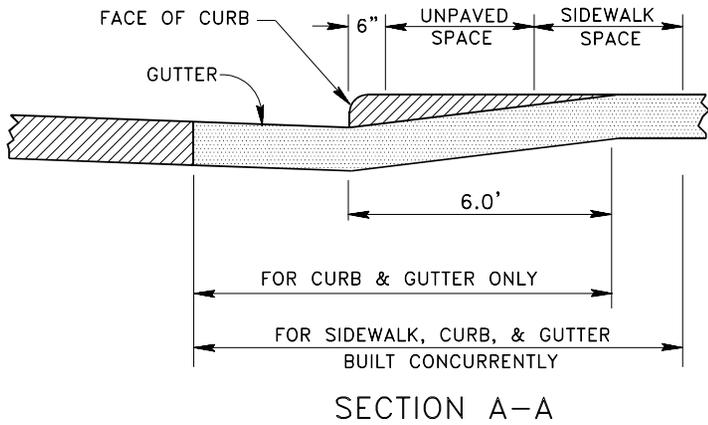


SECTION B-B SECTION C-C SECTION D-D

WHEN USED IN CONJUNCTION WITH STANDARD CG-3, OR CG-7 THE CURB FACE ON THIS STANDARD IS TO BE ADJUSTED TO MATCH MOUNTABLE CURB CONFIGURATION

Updated to ensure accessibility compliance

*NOTE: DESIGN SHALL CONFORM TO VDOT AND PROWAG REQUIREMENTS
 (1) REFER TO VDOT IIM LD-55 FOR DESIGN STANDARD NOTES FOR TRAVERSIBLE PATHS.
 (2) REFER TO PROWAG R305 FOR PEDESTRIAN ACCESS ROUTE MAXIMUM CROSS SLOPE.



Removed non-compliant reference to accessible route limits

Detail No.
650.42

DE-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

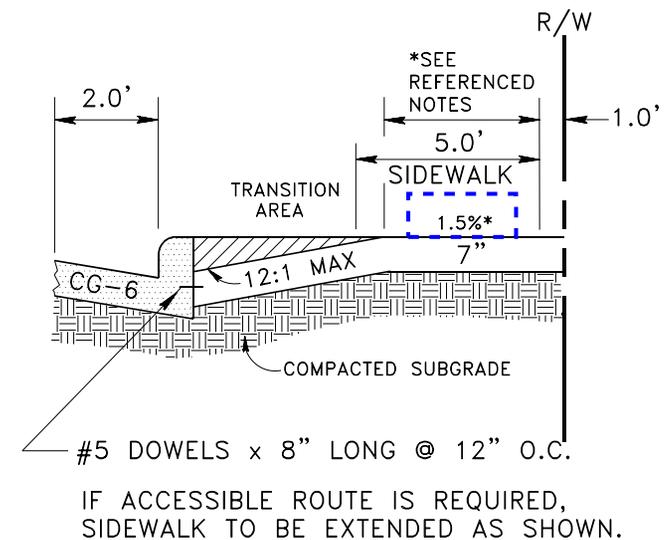
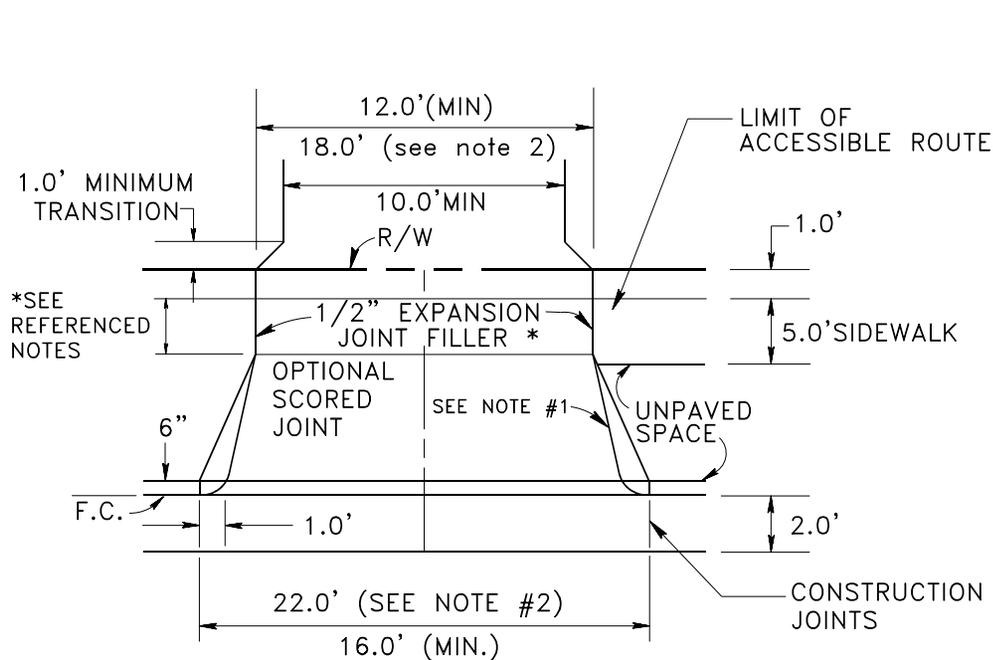
ALTERNATIVE ENTRANCE
WITH CURB AND GUTTER
SHEET 1 OF 2

Date
6/10/24

GENERAL NOTES:

- 1) Detail to be used when the combined width of unpaved space and sidewalk spaces is less than seven feet (7 ft.).
- 2) Additional right-of-way is required if the limits of accessible route extends beyond existing or proposed VDOT right-of-way.
- 3) Accessible route is defined as a continuous unobstructed, stable, firm and slip resistant path connecting all accessible elements of a facility that can be approached, entered and used by persons with mobility impairments.
- 4) In situations such as extremely narrow lots, close spaced entrances, or if the lane adjacent to the curb will be used for parking at all times, CG-9A and 9B entrance gutters would be considered as last resort. This is per I & I Memorandum LD-94(D 208 of VDOT.
- 5) Six inches (6") of aggregate base material Type I, size 21B should be added beneath the Class A3 concrete.
- 6) Final pavement grades of driveways must be constructed on both ends flush, level, smooth and even with the garage approach and the driveway entrance aprons. The jointing of concrete and asphalt pavement and/or of concrete shall be done in a manner that will result in a smooth connection without a noticeable grade differential or lift. The grading must also provide positive drainage away from the garage.

Detail No.	DE-1		COUNTY OF PRINCE WILLIAM VIRGINIA	ALTERNATIVE ENTRANCE WITH CURB AND GUTTER SHEET 2 OF 2	
650.42					Date 6/10/24



***NOTES:**

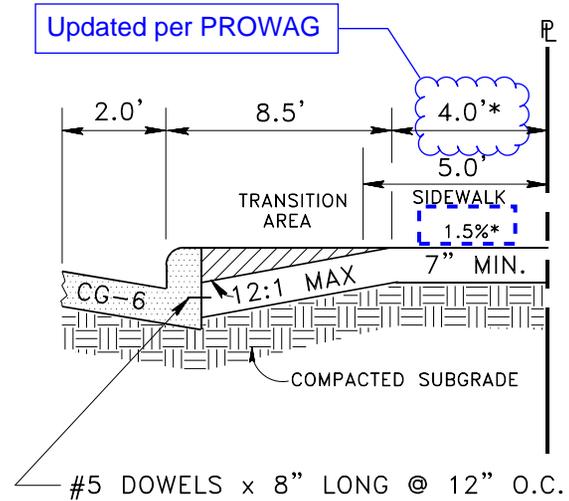
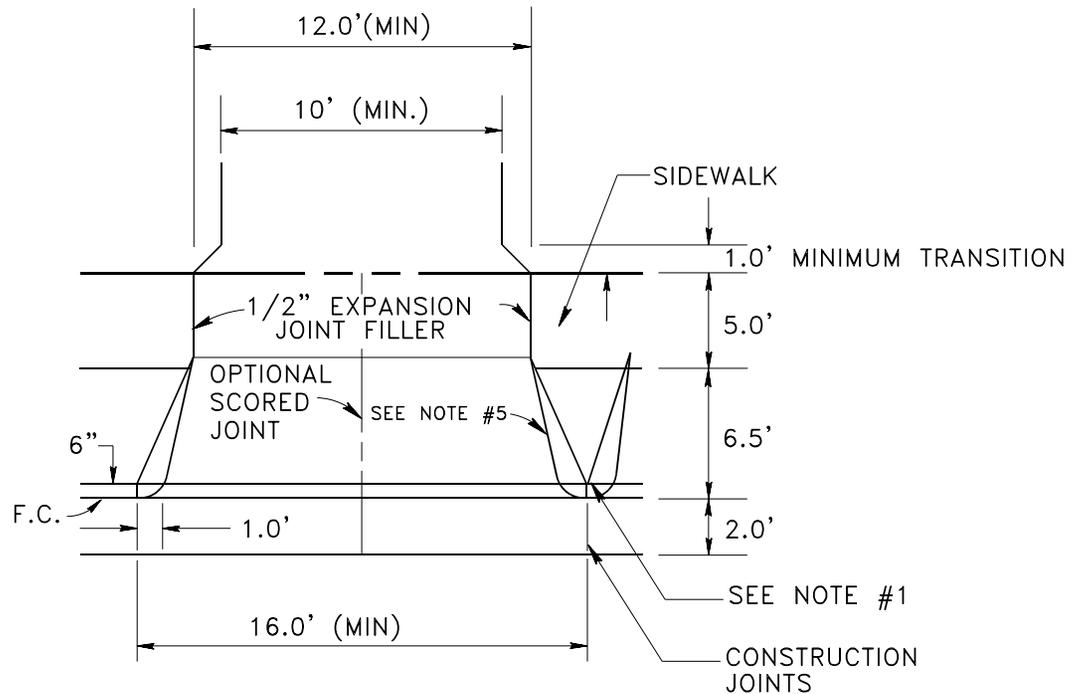
- (1) REFER TO VDOT IIM LD-55.15 FOR DESIGN STANDARD NOTES FOR TRAVERSIBLE PATHS.
- (2) REFER TO PROWAG R305 FOR PEDESTRIAN ACCESS ROUTE MAXIMUM CROSS SLOPE.

GENERAL NOTES:

- 1) For streets without sidewalk, the entrance apron may be constructed 2.5 feet beyond the back of the curb.
- 2) The driveway entrance widths shown are to be used on RPC, R-4C, R-4, R-2, and PMR zoning districts with double garage dwelling units and where the lot frontage is less than 70'. The driveway is to be aligned with the garage and the length or depth is less than 40 ft. measured from the right of way to the garage.
- 3) Slip forms will be allowed initially in the construction of CG-6.
- 4) Six inches (6") of aggregate base material type I, size 21B should be added beneath the class A3 concrete.
- 5) Final pavement grades of driveways must be constructed on both ends flush, level, smooth and even with the garage approach and the driveway entrance aprons. The jointing of concrete and asphalt pavement and/or of concrete shall be done in a manner that will result in a smooth connection without a noticeable grade differential or lift. The grading must also provide positive drainage away from the garage.
- 6) Design shall conform to VDOT and PROWAG requirements.

Updated reference

Detail No.	DE-2		COUNTY OF PRINCE WILLIAM VIRGINIA	DRIVEWAY ENTRANCE WITH CURB AND GUTTER (SINGLE FAMILY DETACHED)	Date
650.43					6/10/24



NOTES*

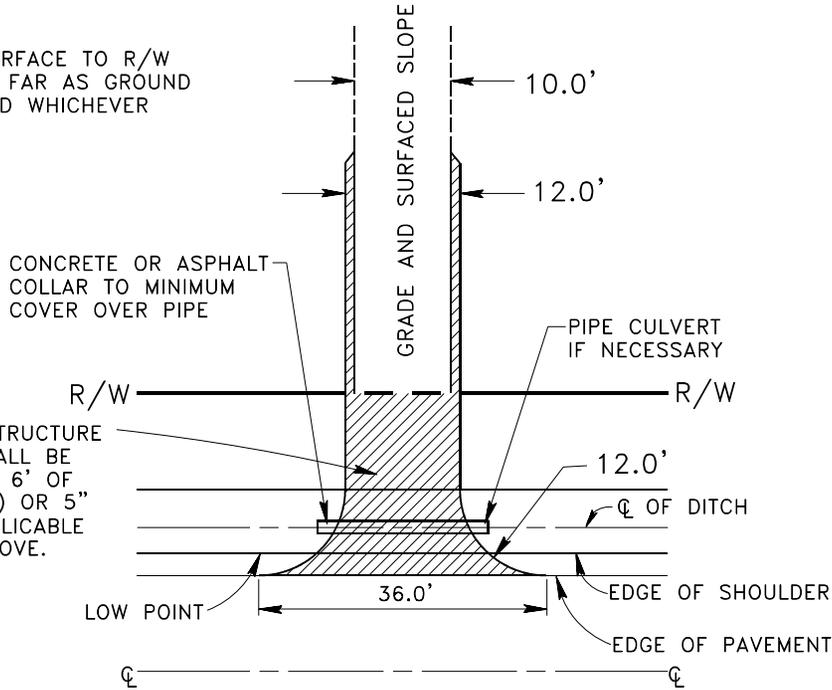
- (1) IF ACCESSIBLE ROUTE IS REQUIRED, SIDEWALK TO BE EXTENDED AS SHOWN.
- (2) A MINIMUM 4.0' TRAVERSIBLE ACCESSIBLE ROUTE TO BE PROVIDED.
- (3) REFER TO PROWAG R305 FOR PEDESTRIAN ACCESS ROUTE MAXIMUM CROSS SLOPE.

General Notes:

- 1) Depending on the layout of the units or the garage, the developer can modify the spacing or layout of the entrance apron provided that the minimum requirements are attained or achieved. Modifications will require the approval of the Director of Transportation.
- 2) Slip forms will be allowed initially in the construction of CG-6.
- 3) Six inches (6") of aggregate base material type I, size 21B should be added beneath the class A3 concrete.
- 4) Design shall conform to VDOT and PROWAG requirements.
- 5) For streets without sidewalk, the entrance apron may be constructed 2.5 feet beyond the back of the curb.

Detail No.	DE-3		COUNTY OF PRINCE WILLIAM VIRGINIA	TRAVELWAY DRIVEWAY ENTRANCE WITH CURB AND GUTTER (SINGLE FAMILY ATTACHED WITH GARAGE)	Date
650.44					6/10/24

9" STONE SURFACE TO R/W LINE OR AS FAR AS GROUND IS DISTURBED WHICHEVER IS GREATER



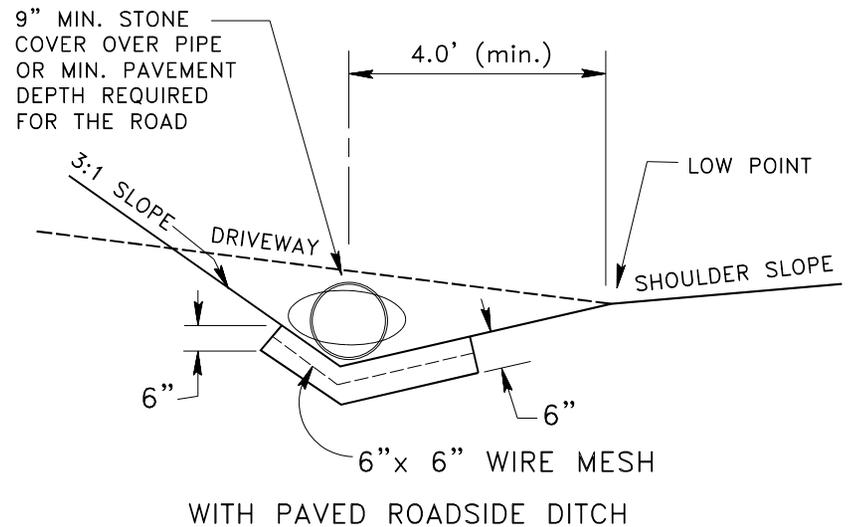
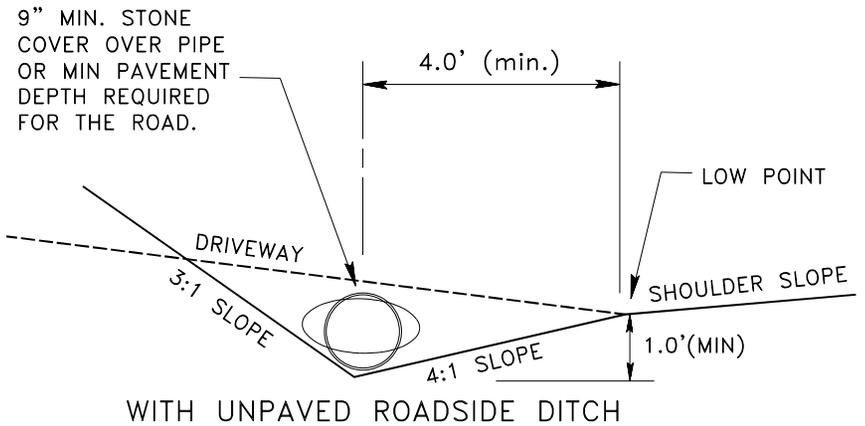
THE PAVEMENT STRUCTURE TO R/W LINE SHALL BE 2" SM-9.5A AND 6' OF AGGREGATE (MIN.) OR 5" CONCRETE IF APPLICABLE OR AS NOTED ABOVE.

WITH PAVED ROADSIDE DITCH

A paved ditch is required where soil conditions and runoff velocities will cause erosion.

2:1 slopes will be allowed where special stabilization is provided in accordance with erosion and sedimentation control ordinance.

NOTE: Design shall conform to County or VDOT requirements whichever is more stringent.



DRIVEWAY CULVERT PIPE INSTALLATION

Detail No.	DE-4		COUNTY OF PRINCE WILLIAM VIRGINIA	DRIVEWAY ENTRANCE WITH DITCH SECTION SHEET 1 OF 2	Date
650.45					7/15/14

GENERAL NOTES:

- 1) All construction methods and materials shall conform to current VDOT standards
- 2) Concrete pipe or corrugated metal pipe may be used. The type and size shall be indicated on the plans.
- 3) Driveways shall be surfaced from edge of pavement to property line with the same type of surfacing used on the street.
- 4) All driveway grades shall slant back of the shoulder line.
- 5) In cut sections, the sides of the driveway shall be graded to a maximum 3:1 slope.
- 6) Lengths of culverts shall be a minimum of twenty feet (20 ft.), if not shown on plans.
- 7) For dimension of S, see Standard RL - 1, and RM - 1.
- 8) Ditch line may be moved back to provide required cover. The transition of the ditch line should be smooth with a minimum length of ten feet (10 ft.).
- 9) This detail shall only be used for entrances on local streets with projected traffic counts not exceeding 1000 vpd. Driveway entrance PE-1 of VDOT Road and Bridge Standard Manual shall be used on streets with projected traffic counts exceeding 1000 vpd but not more than 4000 vpd.
- 10) This driveway entrance shall be required on rural residential developments with ditch section paved roadways and where the minimum lot size is one (1) acre or more. Paving of driveway entrance shall be per Detail 650.01 of the DCSM and as shown.

DRIVEWAY CLEARANCES:

- 1) Grading plans must provide for adequate vehicular clearance for driveway approach, departure and breakover transitions. Driveway profiles are required where steep grades prevail. Driveways shall be graded to ensure positive drainage away from the house.
- 2) Final pavement grades of driveways must be constructed on both ends flush, level, smooth and even with the garage approach and the driveway entrance aprons. The jointing of concrete and asphalt pavement and/or of concrete shall be done in a manner that will result in a smooth connection without a noticeable grade differential or lift. The grading must also provide positive drainage away from the garage.

Detail No.	DE-4		COUNTY OF PRINCE WILLIAM VIRGINIA	DRIVEWAY ENTRANCE WITH DITCH SECTION SHEET 2 OF 2	Date
650.45					7/15/14

REFER TO VDOT STANDARD
CG-12

Updated to ensure compliance with VDOT
standards and PROWAG

Detail No.

650.46

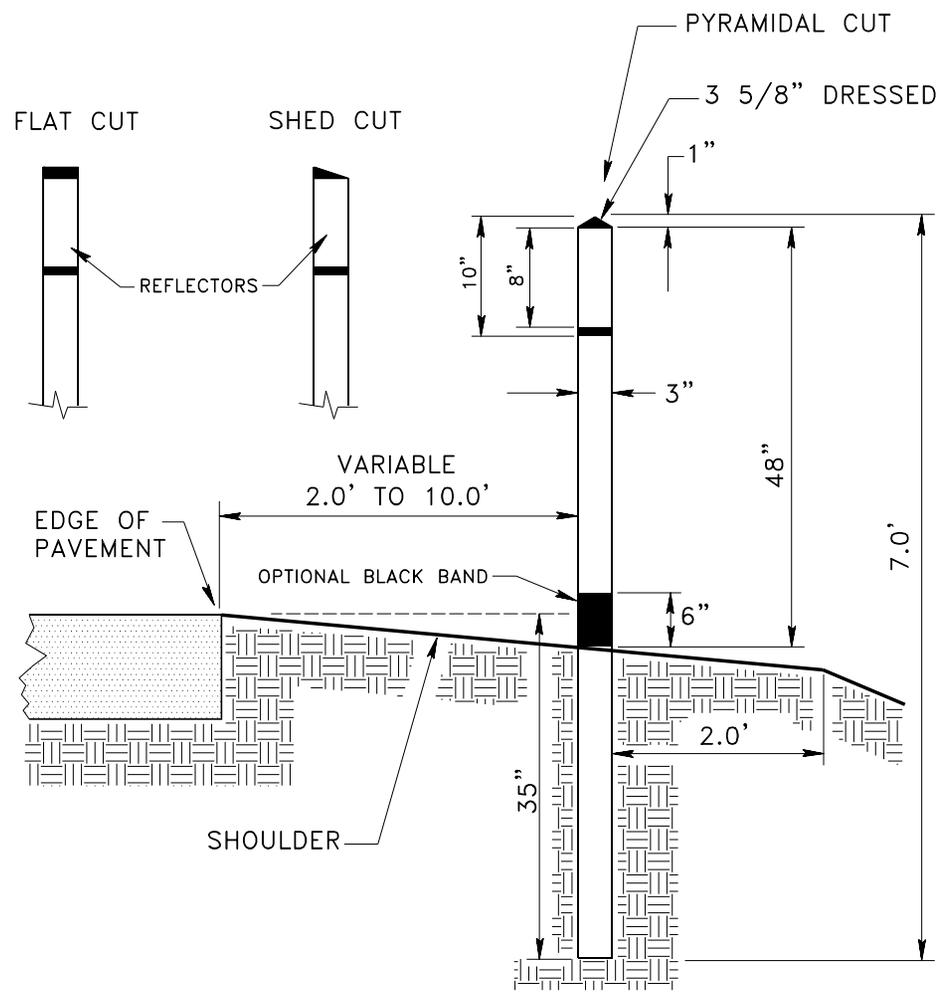
CCR-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

CURB CUT RAMP

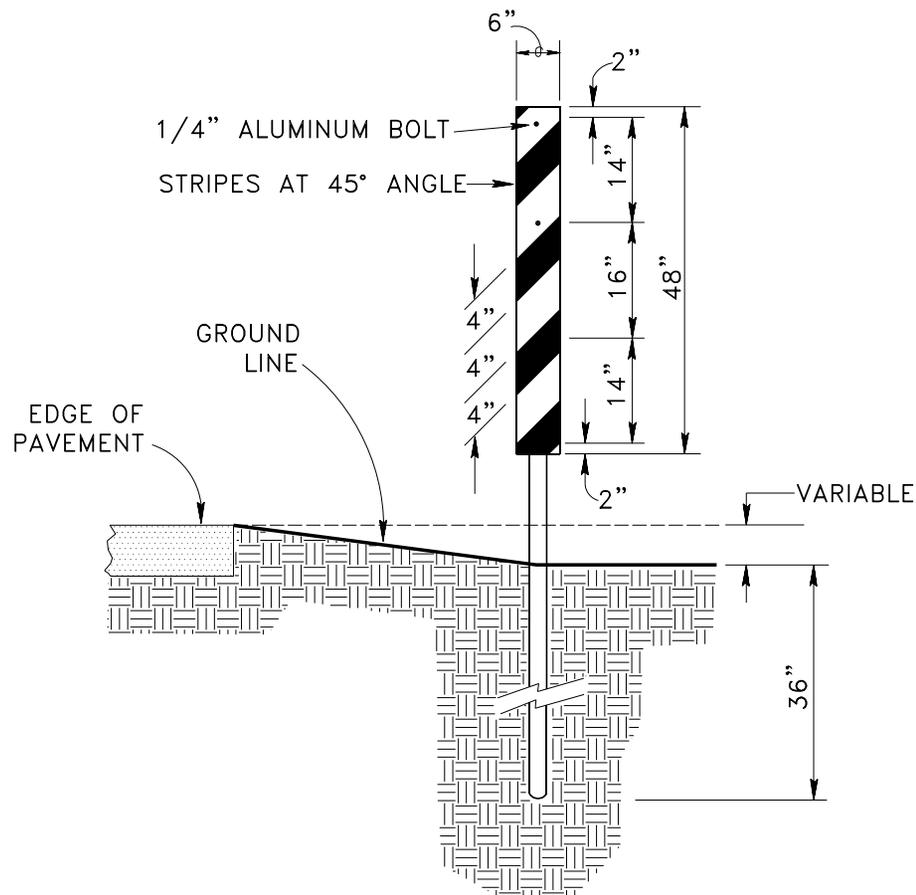
Date
6/10/24



General Notes:

- 1) Standard ED-1 delineators consist of reflectorized sheeting, cut to a 3 in. x 8 in. vertical rectangle, mounted on a backing of aluminum alloy, not less than 0.063 inches thick conforming to ASTM B209, alloy 6061-T6 or 5052-H38. The color of the reflective sheeting shall in all cases conform to the color of the edgelines.
- 2) The reflectors are attached to wood posts with a minimum of two (2) aluminum nails or screws produced from alloy 2024-T4 or 6061-T6.
- 3) The posts above the ground are painted white with paint No. 11.
- 4) Posts are treated with a water-borne preservative in accordance with section 236 of the VDOT Road and Bridge Specifications.
- 5) The top of the posts may have a flat, shed, or pyramidal cut; however they shall be uniform throughout the project in accordance with Standard WSP-1.
- 6) All construction methods and materials shall conform to the current VDOT standards.

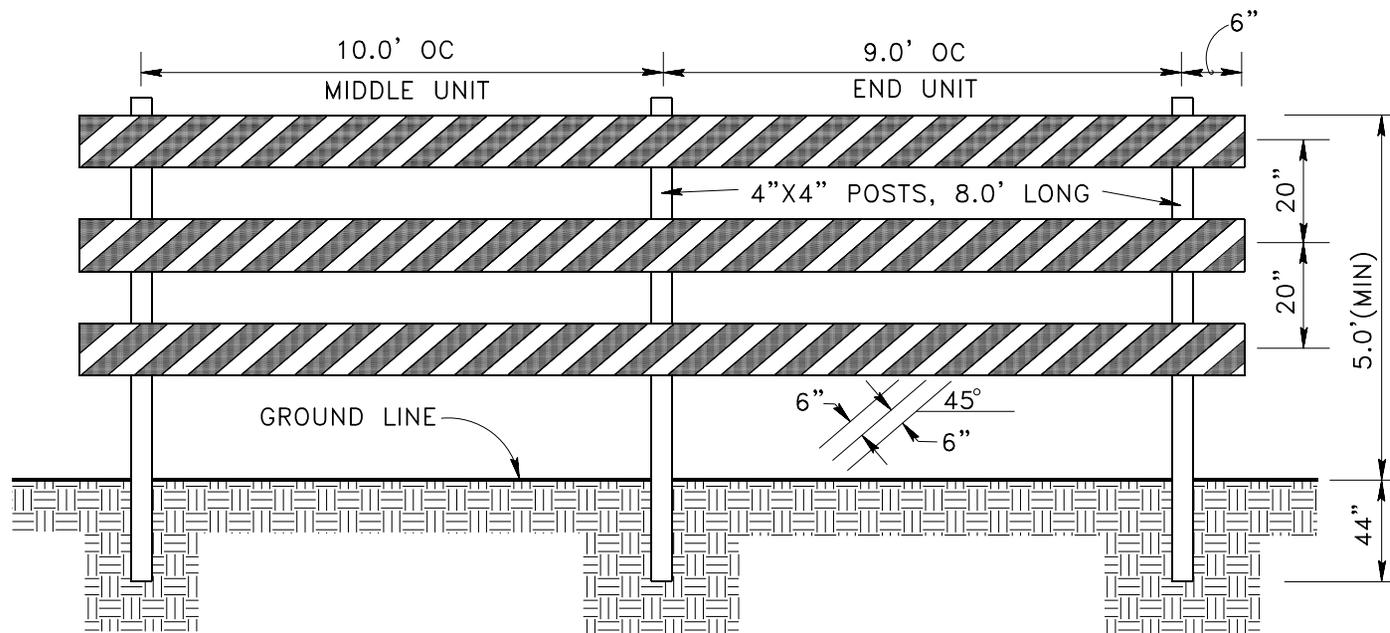
Detail No.	ED-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD ROAD EDGE DELINEATORS	Date
650.47					7/15/14



General Notes:

- 1) Special delineators are made from aluminum alloy not less than 0.080 inches thick conforming to ASTM B209, alloy 6061-T6 or 5052-h38.
- 2) All delineator are reflectorized and in all cases the color shall conform to the color of the edgelines alternating with a black stripe.
- 3) Stripes shall slope downward toward the center of the roadway.
- 4) The delineator panel extends one inch (1 in.) above the top of the post.
- 5) The bottom of the delineator panel is twelve inches above the edge of pavement elevation.
- 6) Delineators are mounted on u type posts fabricated from rolled steel 1.33 lb./lf. minimum.
- 7) All construction methods and materials shall conform to the current VDOT Road and Bridge Standards.

Detail No.	ED-2		COUNTY OF PRINCE WILLIAM VIRGINIA	SPECIAL ROAD EDGE DELINEATORS	
650.48					Date 7/15/14



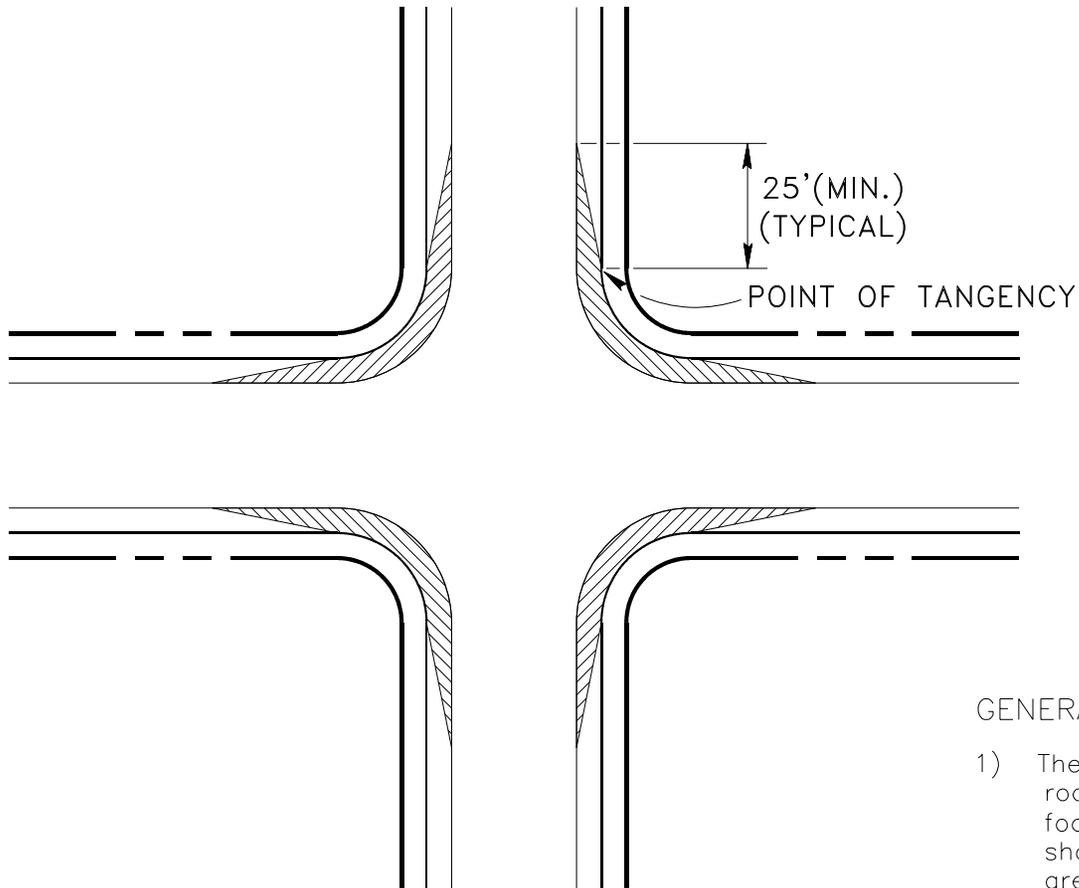
Characteristics:

- Color of stripes—Reflective orange and white
- Width of rail – 8" min. to – 12" max.
- Number of reflectorized rail faces:
 - 3 if facing traffic in one direction
 - 6 If facing traffic in two directions

GENERAL NOTES:

- 1) Barricades shall be used at the end of pavement on all dead end streets.
- 2) Posts and planks shall be in accordance with Section 236.02 (c) of VDOT's Road and Bridge Specifications.
- 3) Planks shall be painted completely white. Posts shall be painted white on all sides to within six inches (6 in.) of the ground level.
- 4) Good quality oil base exterior grade paint must be used. Six inch (6 in.) high intensity reflective orange and white stripe tape on one side for the full length of the barricade.
- 5) Each plank shall be secured to each post with (2)–3/8 in x 6–1/2 in. carriage bolts or with (2) 7/16 in. x 4 in. lag screws with washers. Bolts or screws are to be placed two inches (2 in.) from edge of planks.
- 6) Where necessary for safety of pedestrian traffic, a full extension of the barricade may be required to the limits of the right of way.
- 7) Where provision must be made for access of equipment and authorized vehicles, lockable gates may be provided in one section of the barricade.

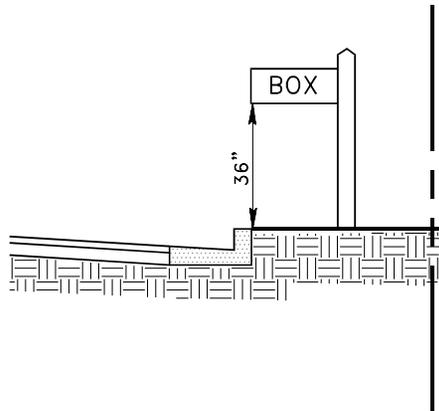
Detail No.	TB-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STANDARD TYPE III TRAFFIC BARRICADE	
650.49					Date 7/15/14



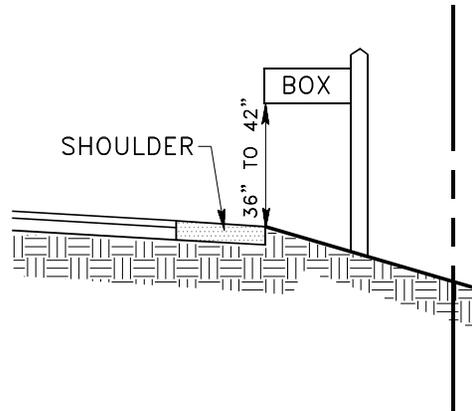
GENERAL NOTES:

- 1) The pavement structure of the mainline roadway pavement shall be extended one foot (1 ft.) at the same slope into the shoulder. The remainder of the shoulder areas requiring stabilization shall be paved with one and one-half inch (1-1/2 in.) SM-9.5A.
- 2) Minimum intersection turning radius shall be fifty feet (50').

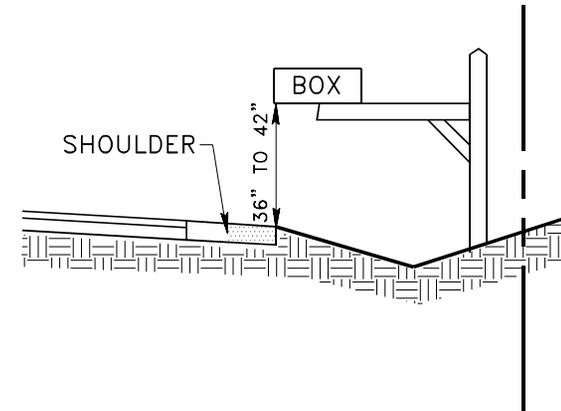
Detail No.	SI-1		COUNTY OF PRINCE WILLIAM VIRGINIA	SHOULDER STABILIZATION AT INTERSECTIONS	
650.50					Date 7/15/14



CURB AND GUTTER SECTION



FILL SECTION



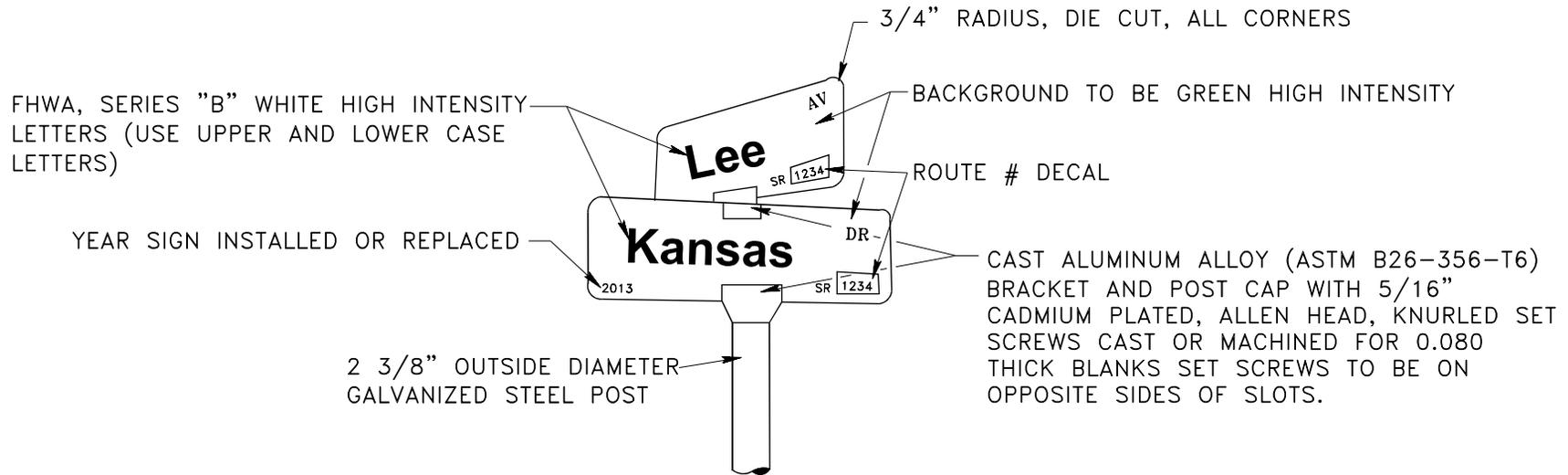
DITCH SECTION STREET

CUT SECTION

GENERAL NOTES:

- 1) On ditch section streets, the face of the mail box shall be in line with the back edge of the shoulder.
- 2) On ditch section streets in a cut section, the support for the mail box shall be a minimum of two feet (2 ft.) from the outside of the ditch line.
- 3) On curb and gutter section streets, the face of the mail box shall be in line with the back edge of the curb line.
- 4) The face of the mail box and post shall be set, as shown on line fill section detail, with-in the radius of the entrance.
- 5) The mail box height shall be:
 - a) On a ditch section, 36 inches to 42 inches from the shoulder grade to bottom of box.
 - b) On a curb and gutter section, 36 inches from the top of curb to the bottom of box.

Detail No.	MBL-1		COUNTY OF PRINCE WILLIAM VIRGINIA	MAILBOX LOCATION	Date
650.51					7/15/14



1. POST MAY BE SET IN TAMPED EARTH OR CONCRETE CLASS A3 IN ACCORDANCE WITH VDOT'S STP-1 DETAIL.
2. BREAK-AWAY POSTS ARE OPTIONAL.

Detail No.	SNS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STREET NAME SIGN STANDARD SHEET 1 OF 2	Date
650.52					7/15/14

GENERAL NOTES:

- Street name signs shall conform to the standards in the table below for sizes as follows:
 Size A: Subdivision streets
 Size B: Arterials, parkways and collector streets

Shape Horizontal Rectangle

Color
 Message: White (Reflectorized)
 Field: Green (Reflectorized)

Size *		Size A	Size B
	Street Name Sign		
	Horizontal	24 in. min.	30 in. min.
	Horizontal	48 in. max.	48 in. max.
	Vertical	6 in. min.	9 in. min.
	Route Decal		
	Horizontal (Field)	4 in.	6 in.
	Vertical	1.25 in.	2.50 in.

Message

* Street Name Sign – Use Upper and Lower Case Letters

Street Name	4 in. C	6 in. C
Suffix Capitals	3 in. C	4 in. C

Route Decal

Capitals/Numerals	1 in. C	2 in. C
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* Dimensions may be modified as approved by the Director of Transportation.

Detail No.

650.52

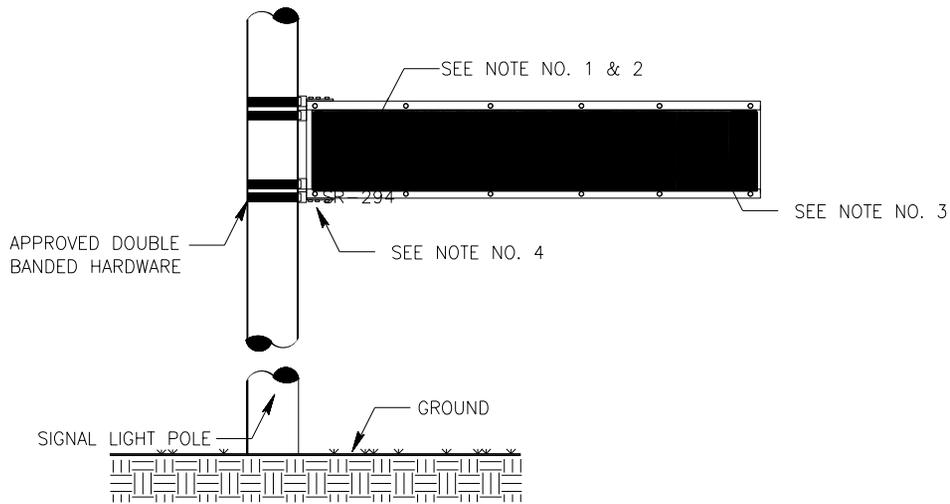
SNS-1



**COUNTY OF
PRINCE WILLIAM
VIRGINIA**

**STREET NAME SIGN STANDARD
SHEET 2 OF 2**

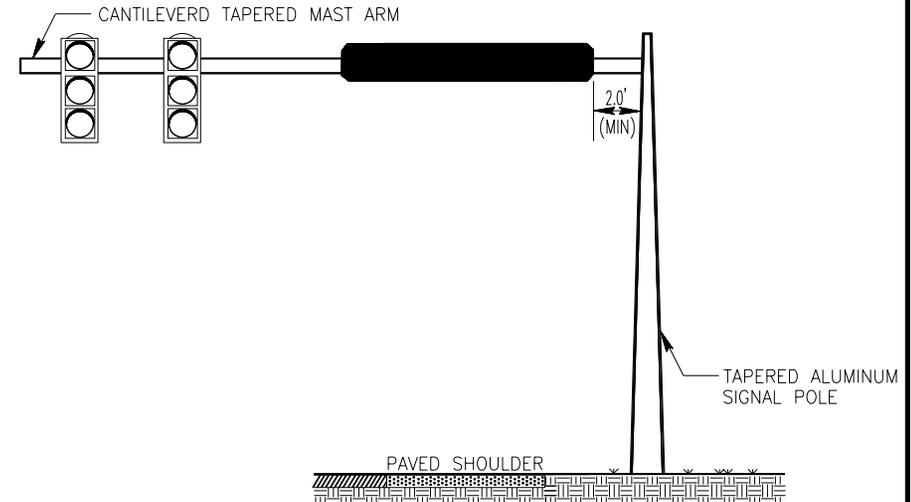
Date
7/15/14



SIGNAL POLE MOUNTED

GENERAL NOTES:

- 1) Standard sign panel should be .10 gauge (VDOT standard), and have dimensions of 1'X6'. Material shall be high intensity. Color shall be white on blue with 0.5" border.
- 2) Letter dimensions should be 8" E modified upper case letters with 6" E lower case letters in clearview font.
- 3) State Route numbers on bottom right of the sign panel should be 2" uppercase letters and numbers.
- 4) Use VDOT approved hardware only.
- 5) Signs should be 2 sided.
- 6) Street name sign placement on both mast arm and span wire intersections should be placed on the vertical pole to the right of the signal heads. These signs should be installed level with the bottom of the traffic signal heads as long as they do not interfere with any signal equipment. (Recommend 17')



MAST ARM MOUNTED

GENERAL NOTES:

- 1) All text should be in clearview font only.
- 2) Color should be white on blue with 0.5" border and 2" corner radius.
- 3) Please see VDOT specifications for sign mounting hardware.

Detail No.

650.53

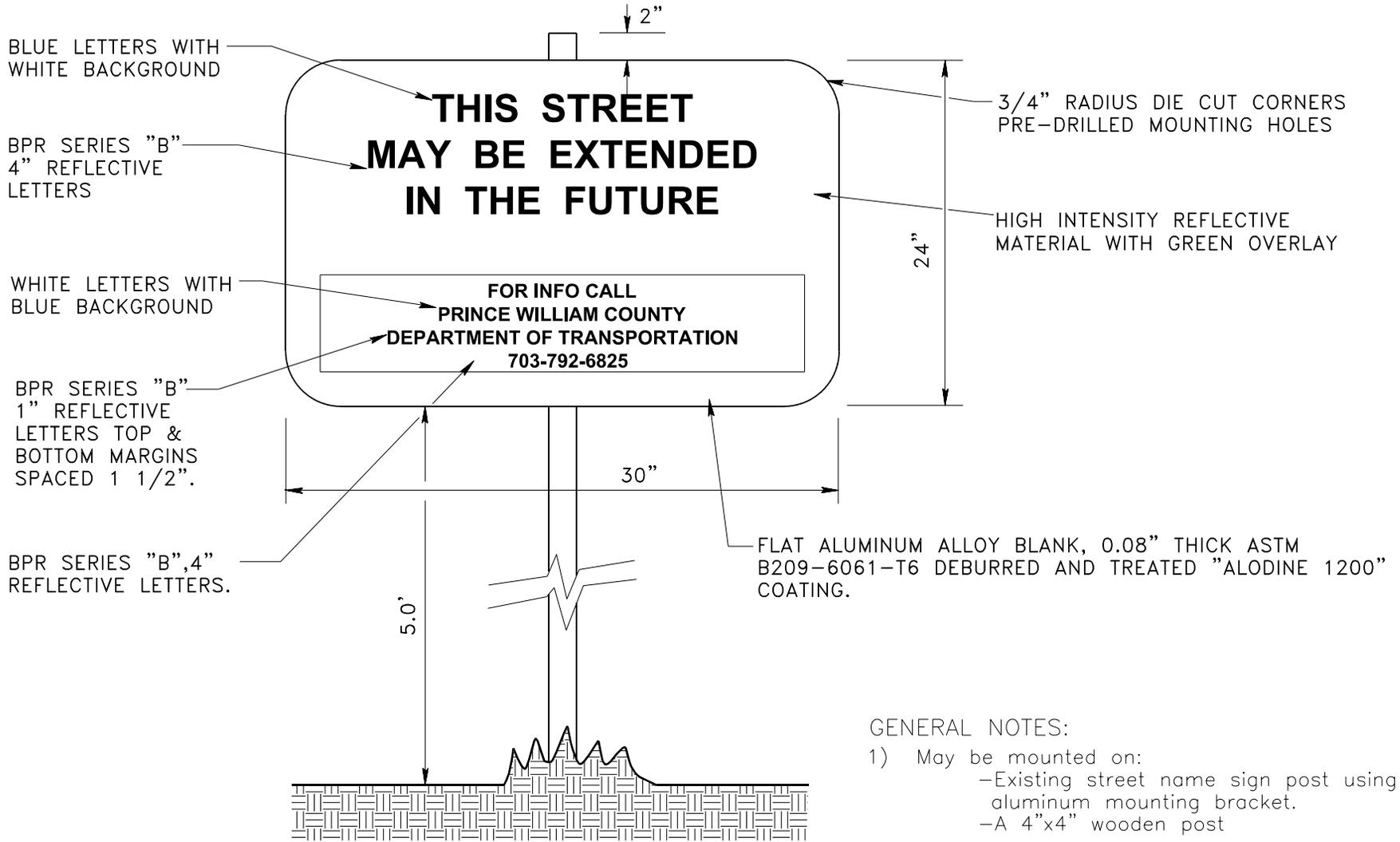
SNS-2



**COUNTY OF
PRINCE WILLIAM
VIRGINIA**

**STREET NAME SIGNS ON TAPERED
ALUMINUM SIGNAL POLES**

Date
7/15/14



Detail No.	TSS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	THRU STREET SIGN STANDARD	Date
650.54					7/15/14



W14-1P
36"x12"



W14-2P
36"x12"



W14-1
30"x30"



W14-2
30"x30"

GENERAL NOTES:

- 1) Refer to the current VDOT Road and Bridge Standard STP-1, Square Tube Sign Post for post specifications and installation.
- 2) Post may be set in tamped earth or concrete class A3 in accordance with VDOT's STP-1 detail.
- 3) The lowest portion of the signs shall be a minimum of seven (7) feet above the curb and gutter and five (5) feet above the crown on ditch section streets.
- 4) If plaques (W14-1P, 2P) are used in combination with the stop signs or the route markers, their placement shall be per Note 3 above.
- 5) Placement, sizes, and material specifications shall be in accordance with the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) unless otherwise directed by VDOT.

Detail No.	DES-1		COUNTY OF PRINCE WILLIAM VIRGINIA	DEAD END/NO OUTLET STREET SIGN STANDARD	Date
650.55					7/15/14



EXISTING STREET NAME SIGN
(FOR PIPESTEM DRIVEWAY ADDRESS)
RANGE WILL REPLACE EXISTING
STREET NAME SIGN)

HIGH INTENSITY REFLECTIVE
MATERIAL WITH GREEN
OVERLAY

1/2"

SEE DETAIL 650.52 FOR STREET
NAME SIGN AND DETAIL 650.60 FOR
ADDRESS RANGE SIGN

BPR. SERIES "B" WHITE
2" REFLECTIVE LETTERS
TOP AND BOTTOM MARGINS
SPACED 1 1/2".

**PRIVATE
STREET NOT
PUBLIC
MAINTAINED**

18"

FLAT ALUMINUM ALLOY BLANK
0.08 in. THICK
ASTM B209-6061-T6,
BEBURRED AND TREATED
"ALODINE 1200" COATING

3/4" RADIUS DIE CUT, ALL CORNERS
BOLTED TO EXISTING STREET NAME
SIGN POST

EXISTING STREET NAME SIGN POST

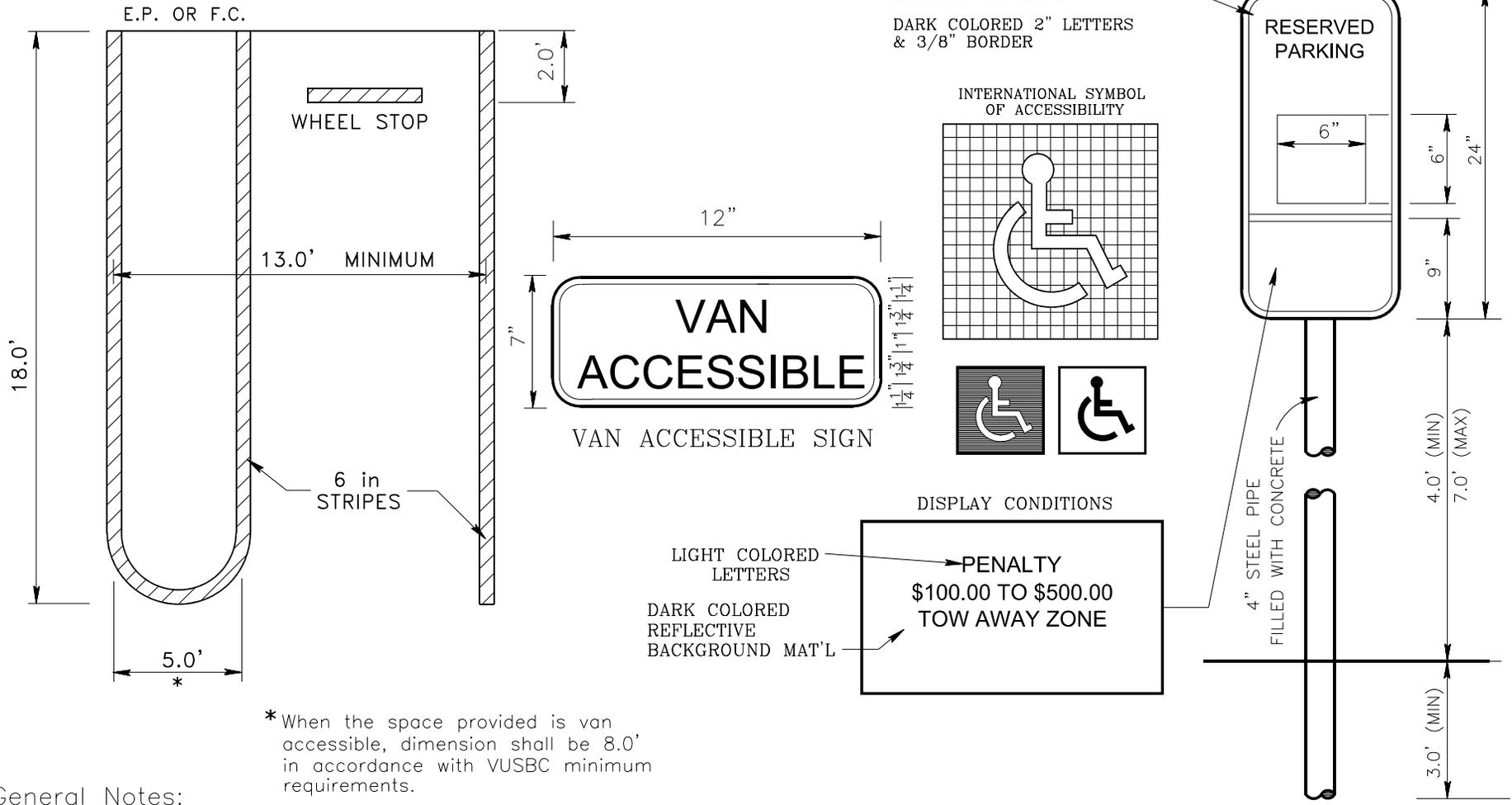
12"

GENERAL NOTES:

1. The sign is to be mounted with aluminum alloy brackets which clamp to sign post 1 1/2" from top.
2. Break-away posts are optional.

Detail No.	PSS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	PRIVATE STREET SIGN STANDARD	Date
650.56					7/15/14

SIGN SHALL BE LOCATED SUCH THAT IT WILL NOT BE OBSCURED BY VEHICLE PARKED IN SPACE.

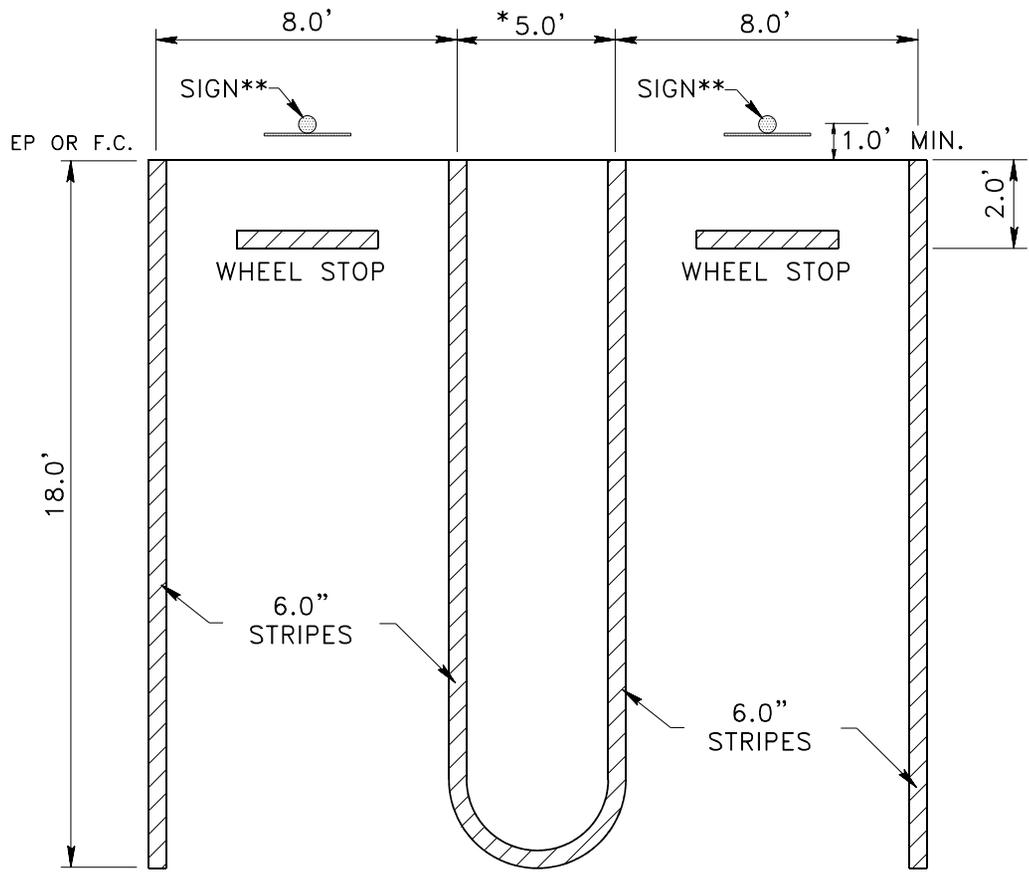


*When the space provided is van accessible, dimension shall be 8.0' in accordance with VUSBC minimum requirements.

General Notes:

- 1) Access ramp must be located at some point adjacent to the five foot (5 ft.) aisle.*
- 2) Slopes on parking spaces and accessible aisle shall not exceed two percent 2% in all directions.
- 3) Van accessible signs shall also be provided where required.

Detail No.	HP-1		COUNTY OF PRINCE WILLIAM VIRGINIA	ACCESSIBLE PARKING SPACE STANDARD	
650.57					Date 6/10/24



* Where the space provided is van accessible, dimensions shall be eight feet (8 ft.) in accordance with VUSBC minimum requirements. When accessible parking spaces are used for emergency access, they shall be located as close as possible to the entrance of the building.

** Refer to HP-1 (Std. 650.57) for sign detail and location.

GENERAL NOTES:

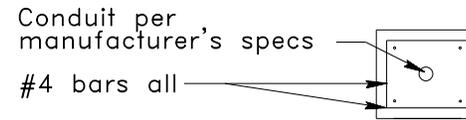
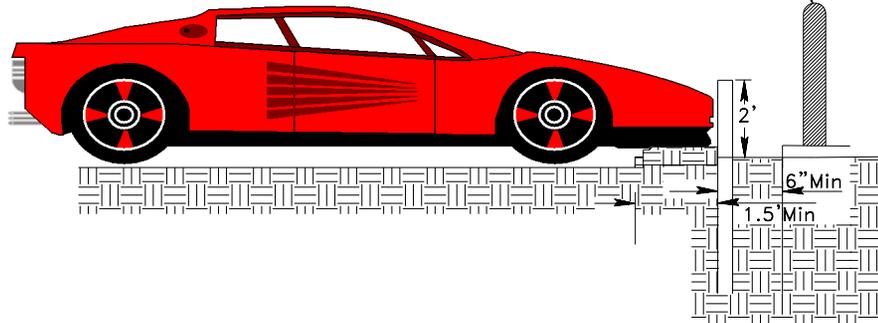
- 1) Access ramp must be located adjacent to the five foot (5 ft.) aisle.*
- 2) Slopes on the parking spaces and accessible aisles shall not exceed two percent (2%) in all directions.

Detail No.	HP-2		COUNTY OF PRINCE WILLIAM VIRGINIA	ACCESSIBLE PARKING SPACE STANDARD FOR TWO ADJACENT PARKING SPACES	Date
650.58					7/15/14

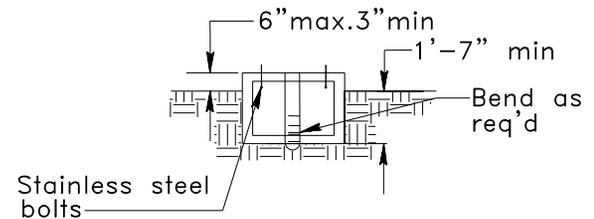
HARDWIRED CHARGING STATION
OR 240V OUTLET FOR PORTABLE
LEVEL 2 CHARGING CABLE.
REFER TO SECTION 603.09.A.

Updated note

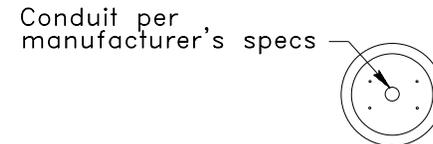
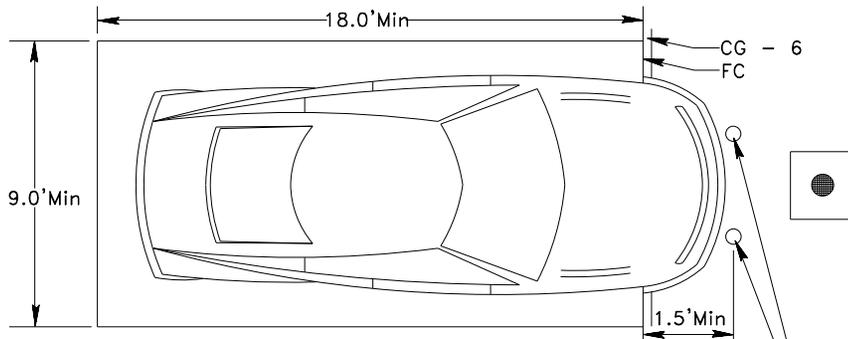
ELEVATION VIEW



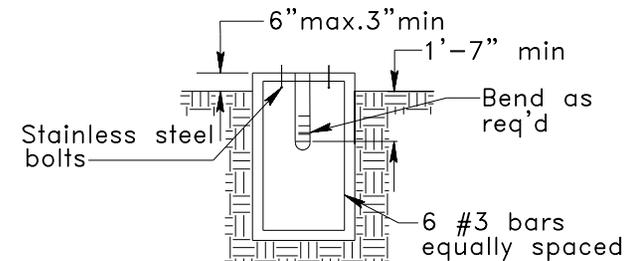
PLAN VIEW



ELEVATION VIEW
RECTANGULAR CHARGER FOUNDATION



PLAN VIEW



ELEVATION VIEW
CIRCULAR CHARGER FOUNDATION

PLAN VIEW

2 Bollards 6" dia. steel pipe
5' long filled with concrete

Notes:

1. 28 day strength of concrete shall be 3,000 psi min.
2. Reinforcing steel shall conform to ASTM AG-15-89 (SI), grade 40.
3. Refer to charger manufacturer's specifications.

Detail No.

650.59

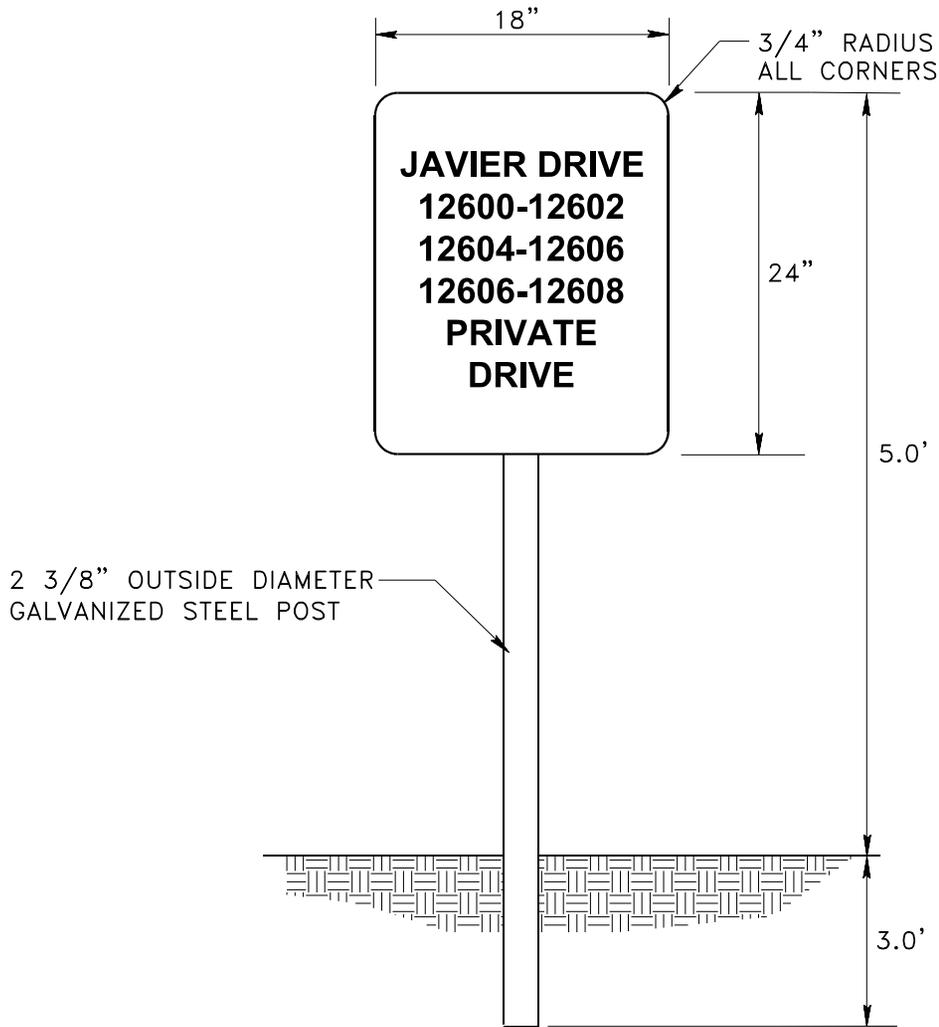
EV-1



COUNTY OF
PRINCE WILLIAM
VIRGINIA

ELECTRIC VEHICLE (EV)
CHARGING STATION

Date
6/10/24

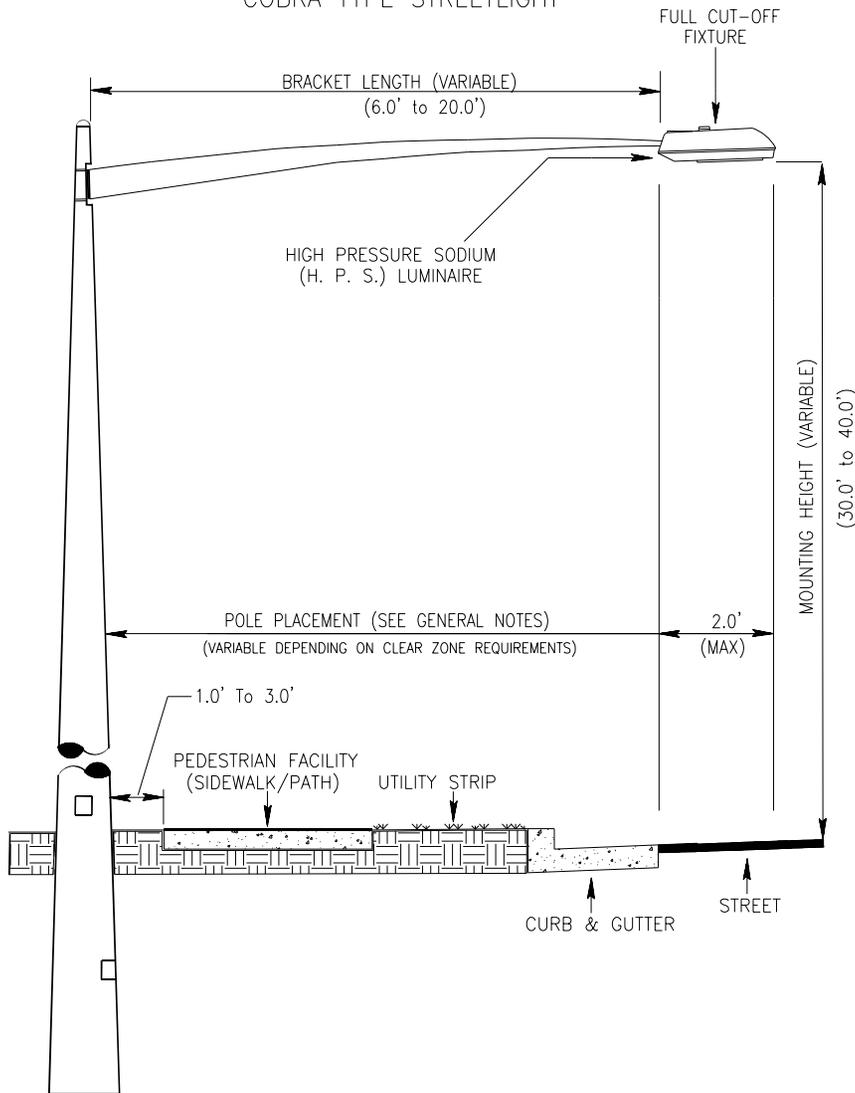


General Notes:

- 1) The sign shall be placed on right side of the pipestem driveway and outside of the sight distance easement.
- 2) The sign shall include the street name of the pipestem driveway, house numbers and the words "Private Street" or "Private Drive."
- 3) The lettering on the sign should be 2" in height. The background shall be made of green reflective materials.
- 4) Alternate design will require pre-approval from the Director of Transportation.
- 5) The sign shall be located outside the existing or proposed roadway right of way.
- 6) Break-away posts are optional.

Detail No.	ARS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	ADDRESS RANGE SIGN FOR PIPESTEMS	Date
650.60					7/15/14

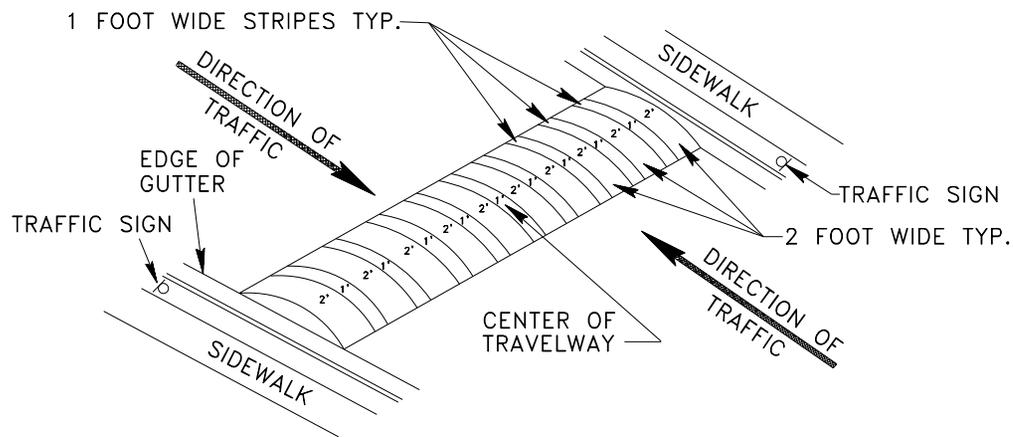
COBRA TYPE STREETLIGHT



GENERAL NOTES:

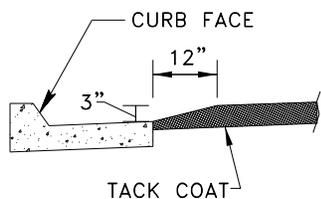
- 1) All lighting shall be installed in accordance with the most recent County and VDOT standards. Any deviation shall require approval from the Director of Transportation and VDOT.
- 2) Poles shall be located at a distance equal or greater than the minimum clear zone requirements for different types or class of roadways.
- 3) Poles should be located in an easement and be outside of the VDOT right-of-way.
- 4) Poles shall not be located with the median.
- 5) Poles should not be located in the utility strip.
- 6) Pole locations for streetscapes or locations in front of sidewalks or shared use paths shall be reviewed on a case-by-case-basis.
- 7) On ditch section roadways, poles shall be located behind the ditch line.
- 8) On curb section roadways, the poles shall be located a minimum of three feet behind the backside of the curb (measured from the backside of the curb to the face of the pole).
- 9) Poles shall be located a minimum of one foot from the the backside of the sidewalk (measured from the backside of the sidewalk to the face of the pole).
- 10) Poles shall be located a minimum of three feet from a shared use path/paved path (measured from the backside of the trail to the face of the pole).
- 11) Poles shall be located a minimum of three feet behind the guardrail (measured from the backside of the guardrail post to the face of the pole).
- 12) Footing or foundation shown is illustrative only. Standard foundation required by utility company shall be provided.
- 13) Additional County fixture types are available and when requested are reviewed on a case-by-case basis.

Detail No.	SLI-1		COUNTY OF PRINCE WILLIAM VIRGINIA	TYPICAL STREET LIGHT INSTALLATION	Date
650.61					7/15/14



NOTE : NUMBER OF 1 FOOT WIDE STRIPES DEPENDS ON THE WIDTH OF HUMPS. START 1ST STRIPE IN CENTER OF TRAVELWAY.

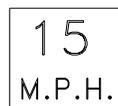
PLAN VIEW



EDGE DETAIL

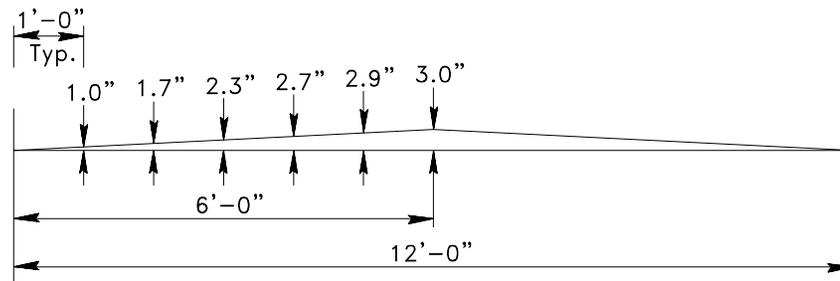


SPECIAL
30"x30"



W13 - 1
24"x24"

TYPICAL TRAFFIC SIGN



CROSS SECTION

GENERAL NOTES:

- 1) Applicable for use on commercial, shopping center, office and other land use sites approved by the Director of Transportation.
- 2) Speed humps locations shall require approval of the Department of Fire and Rescue and Director of Transportation prior to installation.
- 3) Speed humps should be used in series of 300 to 500 feet spacing.
- 4) Locations of speed humps should avoid manholes, water valves, roof drains, and handicapped crossings.
- 5) Signs and pavement markings shall be in accordance with the MUTCD.

Detail No.

650.62

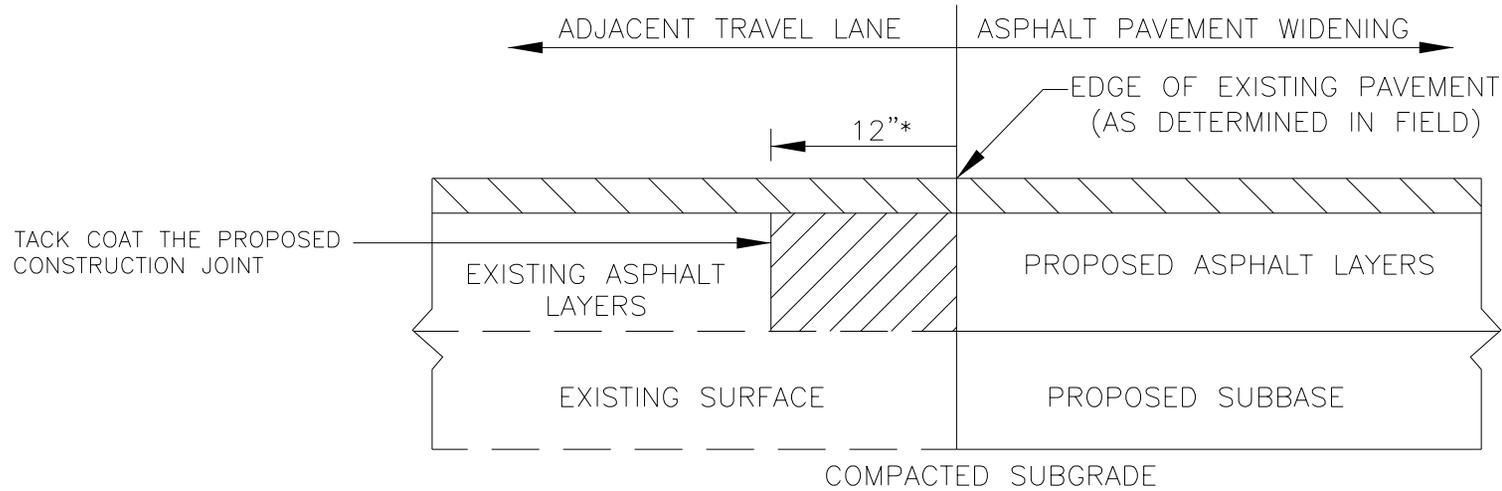
PTS-1



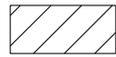
COUNTY OF
PRINCE WILLIAM
VIRGINIA

PRIVATE TRAVELWAY
SPEED HUMPS

Date
7/15/14



CONSTRUCTION JOINT DETAIL



Remove existing asphalt layers to existing subbase and replace with proposed asphalt widening layers.



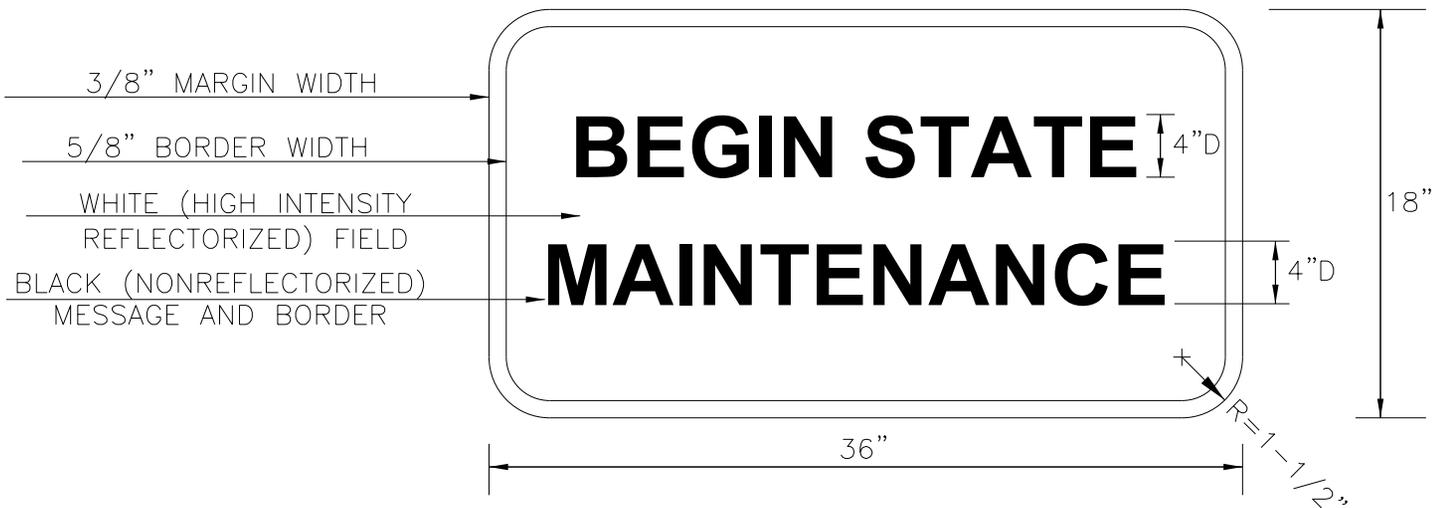
Proposed minimum 1-1/2 inch thick asphalt surface course (See Note 5).

* Minimum 12 inches or greater as necessary to abut the full thickness of existing asphalt layers as determined by cores (See Note 3).

NOTES:

- 1) Asphalt pavement widening shall have a pavement design in accordance with current VDOT procedures and be approved by the Engineer.
- 2) The pavement design for asphalt pavement widening shall meet or exceed the depths and types of the layers of existing pavement. Subsurface drainage of the existing and proposed pavement shall be addressed in the pavement design.
- 3) A minimum of three cores shall be taken along the center of the adjacent travel lane to determine the type and thickness of existing pavement layers. These cores shall be spaced no more than 500 feet apart.
- 4) The adjacent travel lane shall be milled a minimum depth of 1-1/2 inches and replaced with an asphalt surface course to match the proposed pavement widening surface course, unless waived by the Engineer.
- 5) The Engineer may required the milling depth of the existing pavement to be adjusted to achieve an acceptable pavement cross slope and effective surface drainage.
- 6) Existing pavement markings and markers within the project limits shall be restored subject to the approval of the Engineer.
- 7) Final transverse pavement tie-in shall conform to the requirements of Section 315.05 (c) of the specifications except that all joints at tie-in locations shall be tested using a 10-foot straightedge in accordance with the requirements of Section 315.07 (a) of the latest VDOT Road and Bridge Specifications Manual.

Detail No.	APW-1		COUNTY OF PRINCE WILLIAM VIRGINIA	ASPHALT PAVEMENT WIDENING FOR WIDENING SUBJECT TO TRAFFIC	
650.63					Date 7/15/14



General Notes:

- 1) The sign shall be erected at the beginning and end of section of routes maintained by the State.
- 2) Line 1 of the sign shall be changed to read END STATE when erected at the end of State maintained roads.

Detail No.	SMS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	STATE MAINTENANCE ROAD SIGN	
650.64					Date 7/15/14

WARNING

PRINCE WILLIAM COUNTY CODE SECTION 14-4(C) PROHIBITS CONSTRUCTION WORK
MONDAY - FRIDAY: BEFORE 6:00 A.M. & AFTER 10:00 P.M.
WEEKENDS AND HOLIDAYS: BEFORE 9:00 A.M. & AFTER 10:00 P.M.

AVISO

LA LEY DEL CONDADO DE PRINCE WILLIAM SECCION 14-4(C) PROHIBE EL TRABAJO DE
CONSTRUCCION LUNES A VIERNES: ANTES DE LAS 6:00 A.M. Y DESPUES DE LAS 10:00
P.M. SABADOS Y DOMINGOS Y DIAS FERIADOS: ANTES DE LAS 9:00 A.M. Y DESPUES
DE LAS 10:00 P.M.

1'

2'

General Notes:

- 1) This sign may be required by the Prince William County Site Inspector
- 2) The sign shall be posted at any entrances to the site.
- 3) The wording shall be in English and Spanish
- 4) Sign shall be a minimum W2' x H1'.
- 5) Lettering shall be in contrasting colors to background.
- 6) Height of 5-6' to bottom of sign or as determined by Site Inspector
- 7) Prince William County Noise Ordinance Code Section 14-4(C)

New detail

Detail No.	NOS-1		COUNTY OF PRINCE WILLIAM VIRGINIA	NOISE ORDINANCE SIGN	
650.65					Date 6/10/24