SECTION 1 - TRAFFIC PLANNING

1.1 TRAFFIC OPERATIONS

1.1.1 Roadway Functional Classification

The Multnomah County Comprehensive Framework Plan's *Policy 34: Trafficways and the Functional Classification of Trafficways Map,* includes nine roadway functional classifications, four within the broad arterial classification (principal, major, minor, and rural), three within the collector classification (major, neighborhood, and rural), and two within the local street classification (urban and rural). A brief description of each classification is presented in this section. In addition, a range of design treatments that can be accommodated within each functional classification will be described in subsection 1.1.2 of this manual. For a more detailed description of each functional classification, see *Policy 34: Trafficways and the Functional Classification of Trafficways Map.*

Arterials

Arterial streets comprise the regional roadway network, and provide for travel between communities in the County, and between counties. Arterial streets accommodate the full array of travel modes including the regional bikeway system, fixed-route transit network, goods delivery and higher volume automobile traffic than collector streets.

Principal Arterial Streets connect to freeways and highways that serve travelers without an origin or destination in the County. This interstate and interregional traffic, including trucks, is in addition to regional traffic traveling between cities and counties, and traffic generated by intensive and higher density land uses along the arterial corridor. The ability to move auto, truck, and regional bicycle traffic is preserved.

Major Arterial Streets carry high volumes of traffic between cities in the County as part of the regional trafficway system. Priority may be given to transit- and pedestrian-oriented land uses by way of regional boulevard design treatments. Design and management of major arterial streets emphasizes preservation of the ability to move auto and transit traffic by limiting accesses while also accommodating regional bikeways and pedestrian movements.

Minor Arterial Streets are the lowest order arterial facility in the urban regional street network. They typically carry less traffic volume than principal and major arterial streets, but have a high degree of connectivity between communities. Minor arterial streets provide major links in the regional road and bikeway networks; provide for truck mobility and transit corridors; and may serve as significant links in the local pedestrian system, especially where they are designed as community boulevards.

Rural Arterial Roads are the primary means of access into the County's large rural districts, and often connect between counties to accommodate through movements. Rural arterial roads connect to freeways or highways, and link rural collector and local roads to the urban area and other regions. Rural arterial roads carry greater traffic volumes than rural collector roads, including commuters and other home-based trips, natural resources involving trucks, and recreational trips involving autos, bicycles, and equestrians.

Collectors

Collector streets distribute traffic between local streets and the arterial street network. They are not intended to serve trips without an origin or destination inside the County. Collector streets provide for automobile, bicycle and pedestrian circulation, and basic transit service.

Major Collector Streets serve several purposes including linking neighborhoods to the regional system of bicycle and automobile streets, and basic transit service. They typically provide direct access between residential and commercial developments, schools, and parks.

Neighborhood Collector Streets provide access primarily to residential land uses and link neighborhoods to higher order roads. They generally have higher traffic volumes than local streets but through or non-local traffic is discouraged.

Rural Collector Roads distribute automobile traffic over large areas and generally connect to urban streets or rural arterial roads. They may also provide for recreational trips by auto, bicycle, and equestrian.

Local Streets

Local streets provide access to abutting land uses and do not serve through traffic. Local streets may be further classified by adjacent land use, such as residential, commercial, and industrial. Their primary purpose is to serve local pedestrian, bicycle, and automobile trips in urban areas. In rural areas, local roads serve automobile and farm circulation, as well as local pedestrian, bicycle, and equestrian uses.

1.1.2 Roadway Design Treatments

Metro's Regional Transportation Policy's "Regional Street Design Goals and Objectives," provides design guidelines for streets in the region. The County's roadway design treatments have incorporated Metro's Street Design Guidelines. (For detailed description of each treatment, see Metro's "Street Design Guidelines for 2040" and the Regional Street Design map in the current Regional Transportation Plan.)

Boulevards

Boulevards serve the multi-modal travel needs of the region's most intensely developed activity centers, including regional centers, station communities, town centers and some main streets. Boulevards are the continuation of the regional street network within more intensively developed activity centers. Boulevards are designed with special amenities that promote pedestrian, bicycle, and public transportation travel in the districts they serve.

Boulevards are classified as regional and community scale designs. Regional boulevards are designated on specific major arterial roadways while community boulevards are designated on specific minor arterial roadways.

Regional and community boulevards are located within the most intensely developed activity centers with development oriented to the street. These are primarily regional centers, town centers, station

communities and some main streets.

Regional boulevards consist of four or more vehicle lanes, balanced multi-modal function, and a broad right of way. Features highly desirable on regional boulevards include on-street parking, bicycle lanes, narrower travel lanes than throughways, more intensive land use oriented to the street, wide sidewalks, and landscaped medians.

Community boulevards consist of four or fewer vehicle travel lanes, balanced multi-modal function, narrower right of way than a regional boulevard, landscaped medians, no on-street parking, narrower travel lanes than throughways, more intensive land use oriented to the street, and wide sidewalks.

Streets

Streets serve the multi-modal travel needs of corridors, inner and outer residential neighborhoods and some main streets. Streets typically are more vehicle-oriented and less pedestrian-oriented than boulevards, providing a multi-modal function with an emphasis on vehicle mobility. Streets are classified as regional and community designs. Regional streets are designated on specific major arterial roadways, while the community streets are designated on specific minor arterial roadways.

Regional streets consist of four or more vehicle travel lanes, balanced multi-modal function, broad right of way, limited on-street parking, wider travel lanes than boulevards, land use set back from the street, sidewalks with pedestrian buffering from street, and a raised landscaped median or, usually a continuous two way left turn lane.

Community streets consist of two to four travel lanes, balanced multi-modal function, narrower right of way than regional streets, on-street parking, narrower or fewer travel lanes than regional streets and residential neighborhood and corridor land use set back from the street. Community streets provide a higher level of local access and street connectivity than regional streets. Community streets have the greatest flexibility in cross sectional elements. Depending on the intensity of adjacent land use and site access needs, community streets can have three different median conditions; center two way left turn lane, narrow landscaped median, or no median.

The relation of the design treatments to the functional classifications is shown in Table 1.1.1.

Table 1.1.1
Application of the Design Treatments to the Functional Classifications

Design Treatment	Functional Classification	
	Major Arterial	Minor Arterial
Street Type	Regional Street	Community Street
Boulevard Type	Regional Boulevard	Community Boulevard

1.1.3 Traffic Study Requirements

Site-Development Traffic Impact Study - A site-development traffic impact study may be required by the County with the proposed development's land use application, depending on the type of proposed development, location of the site, and its perceived impact on the surrounding transportation system. A traffic impact study will generally be required for a proposed development under the following circumstances:

The proposed development is expected to forecast more than 1,000 vehicle trips per weekday, or the proposed development's location, proposed site plan, or trip generation characteristics could affect traffic safety, access management, street capacity, or other known traffic deficiencies in the vicinity of the site.

A Professional Engineer competent in traffic engineering or a registered Traffic Engineer in the State of Oregon shall prepare the traffic impact study. The County may exercise the prerogative to require a pre-study memorandum of understanding to be agreed upon between the County and the developer to specify the scope of the study. Traffic impact studies involving street network planning shall follow design standards for street connectivity as described in section 1.2.3. The following elements of the traffic impact study should be included as a minimum:

Purpose and Objectives of Study - Discussion of the purpose of the study, key traffic issues to be addressed, the characteristics of the surrounding transportation system, and development objectives related to the proposed site.

Project Description - Discussion of existing land uses and proposed land uses, including a map showing the site plan. Description of whether the proposed land use is in compliance with the existing zoning of the site property. If not, the study is labeled as a "zone change." Include discussion of proposed location of access driveways and estimated time line for ultimate build-out of site.

Existing Conditions - Description of surrounding roadway facilities, including functional classification of roadways, nature and intensity of nearby pedestrian and bicycle facilities and activity, and current or planned transit routes. Level of service analysis of key study intersections and/or arterial corridors, with diagrams of intersection/ arterial lane configurations, and traffic control. The County Transportation Division will provide direction in determining the study area and intersections to be evaluated. In general, all study intersections which will be impacted by 10 or more site-generated trips during the weekday a.m. or p.m. peak hour should be analyzed. The standard level of service analysis methodology and criteria is documented in 1.1.5 & Appendix B of this manual.

Background Conditions - Level of service analysis for background traffic conditions. "Background" traffic conditions constitute the future non-project-related traffic volumes and committed roadway configurations (diagrammed) during the future year the proposed development is expected to be fully constructed and operational. Background conditions would also include approved, but not yet completed off-site developments within the study area. If the proposed development is a "zone change" (see description under *Project Description* section), then an additional level of service analysis for a 20-year forecast background year may be required. See 1.1.4 for a description of the methodology to be used in formulating 20-year volume forecasts.

Development Site-Generated Trip Characteristics - Evaluation of expected trip generation, trip distribution, trip assignment, and modal split. Trip generation analysis should follow trip generation rates given in the latest edition of the *Trip Generation* Manual, published by the Institute of Transportation Engineers (ITE), unless more appropriate local data is available. Trip distribution analysis shall be clearly documented. A roadnet diagram with percentage distributions and the resulting volumes should be provided. The trip distribution methodology can be based on trip patterns of similar nearby developments, existing intersection or corridor volumes, modeling results from a regional transportation planning model (from Metro or other local jurisdiction), and/or the anticipated market area of the proposed development. For a 20-year forecast condition, a sub-area comparison of trips from the proposed zoning change versus the modeled zone designation shall be performed.

Total (Background plus Site-generated) Conditions - Level of service analysis of total traffic conditions with full build-out of the proposed development. Analysis should include proposed site-access driveways. Zone change studies may also be required to evaluate total traffic conditions for a 20-year forecast year.

On-site Circulation - Evaluation of safety and efficiency of on-site circulation for all modes (vehicle, bicycle, pedestrian, etc.). Anticipated truck movements should be safely accommodated.

Summary of Findings and Recommendations - Summarize key findings of study and recommendations necessary to mitigate traffic operations deficiencies under background or total traffic conditions. Include lane configuration and traffic control diagrams noting recommended modifications.

Public Project Traffic Study - Prior to the design of a new roadway or reconstruction of an existing roadway financed using public funds, a traffic study shall be conducted to identify the functional layout of the roadway improvement. The traffic analysis may be incorporated into a project environmental study process or preliminary design study, or may be a stand-alone analysis.

A public project traffic study typically would utilize traffic projections developed for the roadway to be designed from Metro's regional "emme/2" transportation model or approved traffic impact studies. The model traffic projections would be desegregated into turning movements at major intersections, with the information used to identify the number of travel lanes and appropriate access control along the roadway, as well as intersection channelization and signalization requirements.

1.1.4 Design Year Traffic Projections

New or improved arterial and collector roadways in Multnomah County shall be designed to provide added capacity to accommodate 20-year traffic projections, unless a shorter time frame is identified for design by the County Engineer. Traffic projections will be developed based on Metro's regional "emme/2" model projections, adjusted as necessary to reflect the specific analysis year and the roadway or intersection being designed.

The 20-year traffic projections will be translated into design hour volumes, by direction of travel. The design hour volume is typically the 30th highest hourly volume during the year, and in some cases can be accommodated by a weekday p.m. peak hour volume pattern (which is included in Metro's regional "emme/2" model). Under certain circumstances, the design hour volume might be reflective of weekend peak hour conditions.

The development of roadway segment traffic projections shall include estimated truck and bus traffic, and preferably bike traffic. Where specific truck traffic projections have not been developed, estimates based on existing truck percentages on certain road segments can be used and adjusted as necessary.

At intersections, model approach link volumes can be translated into future turning movement projections through application of an algorithm approved by the County Engineer, that adjusts approach volumes to reflect realistic turning movement patterns at the intersection. Traffic model turning movements at intersections typically require such adjustments. In cases where the design year is less than 20-years, factoring of the traffic based on an existing intersection turning movement count would be appropriate.

The development of intersection traffic projections shall include estimated truck and bus, and preferably bike and pedestrian traffic.

1.1.5 Design Level of Service

The roadway level of service (LOS) concept is applied in the U.S. as a qualitative assessment of the road user's perception of the quality of flow. LOS is represented by one of the letters "A" through "F," with "A" representing free flow operation and "F" stop and go operation. LOS reflects the quality of flow as measured by some scale of driver satisfaction. Measures of effectiveness such as average travel speed, volume to capacity ratio, average seconds of delay, and others. have been developed to approximate these qualitative representations quantitatively. Different measures of effectiveness are used for different types of roadways because the user's perception of quality of flow varies by road type.

Appendix B discusses the level of service concept in greater detail related to rural/suburban highways, urban/suburban arterials, and signalized/unsignalized intersections.

All new and improved arterial and major collector roadways in urban areas shall be designed to accommodate a level of service "D" or better during the design hour. In rural areas, such facilities shall be designed to accommodate level of service "C" or better during the design hour. On neighborhood collectors in urban areas, the design level of service shall also be "C" or better. In special circumstances, such as downtown central business districts or designated regional centers, level of service "E" might be acceptable for roadway design purposes, if approved by the County Engineer. Local streets intersecting arterials or collectors may be level of service ”F” during the peak hour if approved by the County Engineer.

The required capacity (number of through lanes, intersection approach configuration) associated with a new or improved roadway project in Multnomah County will be identified using the procedures introduced in the latest edition of the *Highway Capacity Manual*, prepared by the Transportation Research Board. This document includes traffic operations analysis procedures for urban and suburban arterials, two-lane highways, multi-lane highways, and signalized and unsignalized intersections. At intersections, for sizing the number and configuration of lanes, the *operations* methodology will be applied, unless the *planning* methodology is approved by the County Engineer. At existing or new signal locations, the assumed signal cycle length and phasing shall be reviewed and approved by the County Transportation Division before any analysis proceeds.

Where there is a series of existing or prospective traffic signals in a roadway corridor to be upgraded, a corridor level operations analysis will be applied to verify the number of travel lanes and signalized intersection approach configurations. The TRANSYT-7F model is the preferred model of choice, with alternate models (PASSERII-90, TRAF-NETSIM, etc.) being applied only with the approval of the County Engineer. Analysis periods shall be at a minimum the weekday p.m. peak hour, and could also include the weekday a.m. peak hour and/or weekend peak hour if directed by the County Engineer.

1.2 ACCESS MANAGEMENT

Access management is needed to ensure both the safety and efficiency of traffic flow for vehicles traveling on the roadway system. Managing the access of roadways benefits the overall roadway system by increasing safety, increasing capacity, and reducing travel times. Controlling access must not become too restrictive, however, as to prohibit local businesses and home owners reasonable access to the roadway system. Overall, access management must balance the needs of through traffic, local traffic, pedestrians and bicyclists on a particular roadway. By the nature of the roadway functional classification system, arterial streets require the highest access management standards, while collector streets and local streets require less restrictive access management standards.

1.2.1 Minimum Traffic Signal Spacing

The minimum signal spacing standards on Multnomah County roadways is shown in Table 1.2.1.

Table 1.2.1
Minimum Traffic Signal Spacing Standards

Functional Classification	Minimum Traffic Signal Spacing
Major/Principal Arterial	800 m
Minor Arterial	800 m
Major Collector	400 m
Neighborhood Collector	400 m
Local Residential Street	N/A
Local Commercial/Industrial Street	N/A

Note: N/A = Not Applicable.

Typically, local street intersections should not be controlled by a traffic signal; thus, the signal spacing standard is not applicable for these streets. Traffic signals closer than the minimums can be considered if the signal will not cause vehicle queues to back-up into the adjacent signal, and if vehicle progression will not be impacted. Also, signals closer than the minimums can be considered for the purpose of optimizing vehicle capacity and safety, as well as for providing pedestrian crossing opportunities where appropriate.

Signals at private driveways, or access points, may be allowed with a variance but must adhere to the above signal spacing standards. One or more of the major signal warrants (No. 1 to No. 8) described in the Manual of Uniform Traffic Control Devices (MUTCD) should be met, or shown to be met upon full build-out of a development, before considering a traffic signal at a private access point. Private access points which are expected to become signalized shall be designed with full radius returns, and roadway type profiles/cross slopes per the geometric design section of this manual. Alternatives to signals should be investigated, including restricting turning movements. Final decisions shall be made on a case-by-case basis by the County Engineer.

1.2.2 Non-Traversable Median Openings

The minimum non-traversable median opening spacing standards on Multnomah County roadways are shown in Table 1.2.2. Refer to section 2.2.4 for a discussion of the criteria used in determining the type of median to be provided on a roadway: non-traversable (raised median) or traversable (center two way left turn lane). Table 1.2.2 also specifies the conditions where non-traversable medians are not recommended unless warranted under the criteria of section 2.2.4. These situations are noted with a "N/A." According to Table 1.2.2, there are three different area types, which affect the median opening standards; rural, urban, andCBD/Regional & Town Centers. "Rural" refers to the area outside the urban growth boundary, "urban" refers to the area within the urban growth boundary, and "CBD/Regional & Town Centers" refers to urban locations within a central business district or regional and town centers.

Table 1.2.2
Minimum Non-traversable Median Opening Spacing Standards

Functional Classification	Area (1)	Minimum Median Opening Spacing
Major/Principal Arterial	Rural	240 m
	Urban	180 m
	CBD/Regional & Town Centers	120 m
Minor Arterial	Rural	150 m
	Urban	90 m
	CBD/Regional & Town Centers	60 m
Major Collector	All	N/A
Neighborhood Collector	All	N/A
Local Residential Street	All	N/A
Local Commercial/Industrial Street	All	N/A

Notes:(1)-"Rural" refers to locations outside the urban growth boundary.
"Urban" refers to locations inside the urban growth boundary.
"CBD/Regional & Town Centers" refers to urban locations within a central business district or regional & town centers as defined by regional planning authorities.
"All" refers to all areas within Multnomah County.
N/A = Not Applicable, since non-traversable medians are not recommended under these conditions.

1.2.3 Public Intersection Spacing

The aggregate effect of local street design impacts the effectiveness of the regional system when local travel is restricted by a lack of connecting routes, and local trips are forced onto the regional network. Therefore, streets should be designed to keep through trips on arterial streets and provide local trips with alternative routes. The following design criteria is intended to improve local circulation in a manner that protects the integrity of the regional system.

1) For new residential and mixed-use development, all contiguous areas of vacant and primarily undeveloped land of five acres or more shall be identified and a map that identifies possible local street connections to adjacent developing areas will be prepared, consistent with region wide street design policies. The map shall include:

   a) Full street connections at intervals of no more than 160 m, except where prevented by topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers. Street connections at intervals of no more than 100m are recommended in areas planned for the highest density mixed-use development.
   b) accessways for pedestrians, bicycles or emergency vehicles on public easements or right-of-way where full street connections are not possible, with spacing between full street or accessway connections of no more than 100 m, except where prevented by topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers.

2) New residential and mixed-use developments shall include local street plans that:

   a) encourage pedestrian and bicycle travel by providing short, direct public right-of-way routes to connect residential uses with nearby existing and planned commercial services, schools, parks and other neighborhood facilities; and
   b) include no cul-de-sac streets longer than 60 m, and no more than 25 dwelling units on a closed-end street system except where topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers, prevent street extension; and
   c) provide bike and pedestrian connections on public easements or right-of-way when full street connections are not possible, with spacing between connections of no more than 100 m except where prevented by topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers; and
   d) consider opportunities to incrementally extend and connect local streets in primarily developed areas; and
   e) serve a mix of land uses on contiguous local streets; and
   f) support posted speed limits; and
   g) consider narrow street design alternatives that feature total right-of-way of no more than 15 m, including pavement widths of no more than 8.5 m, curb-face to curb-face, sidewalk widths of at least 1.5 m and landscaped pedestrian buffer strips that include street trees; and
   h) limit the use of cul-de-sac designs and closed street systems to situations where topography, pre-existing development or environmental constraints prevent full street extensions.

3) For redevelopment of existing land uses, the minimum public intersection spacing standards on Multnomah County roadways are shown in Table 1.2.3.

Table 1.2.3
Minimum Public Intersection Spacing Standards

Functional Classification	Major/Princ. Arterial	Minor Arterial	Major Collector	Neighborhood Collector	Local Residential Street	Local Commercial/Industrial Street
Major/Princ. Arterial	1.6 km	1.6 km	400 m	300 m	150 m	150 m
Minor Arterial	1.6 km	1/2 mile	300 m	240 m	120 m	120 m
Major Collector	400 m	300 m	240 m	180 m	90 m	100 m
Neighborhood Collector	300 m	240 m	180 m	150 m	60 m	60 m
Local Residential Street	150 m	120 m	90 m	60 m	45 m	45 m
Local Commercial/Industrial Street	150 m	120 m	90 m	60 m	45 m	45 m

As shown in Table 1.2.3, the minimum spacing between a major arterial and neighborhood collector shall be 300 m. The minimum spacing between a major collector and minor arterial shall also be 300 m. Intersection spacings closer than these standards may be granted through the variance process described in the "Street Standards Codes & Rules," and will be decided on a case-by-case basis by the County Engineer.

1.2.4 Private Access Driveway Requirements

Reducing the number of existing and proposed access points on arterials and major collectors and improving traffic flow and safety in accordance with Multnomah Comprehensive Framework Plan Policy 34: Trafficways will be the primary consideration when reviewing access proposals for approval. Variance to the access requirements of these rules for number, width, or location must be approved under the variance procedures in the "Street Standards Codes and Rules." Restrictions may be imposed when approving a variance request. The restrictions could include limiting the turning movements, requiring a shared access, and/or closing one or more existing driveways. Existing lots of record, too small to meet the requirements, and minor modifications to existing active uses, may be given some flexibility when evaluating a variance request.

Single Family Residential Uses - Direct access onto arterials or major collectors will not be allowed if an approved alternate access is available. If no alternate is available, then direct access will only be allowed through the variance procedure of the "Street Standards Codes and Rules." For access onto neighborhood collectors or local streets, the standard will be one driveway per lot.

Multi-Family Residential, Commercial, Office, and Industrial Uses - All requests for access must include a site plan and a traffic report as required by the County Engineer. The scope of the development will determine the information required, and could include, but not limited to, any or all of the information listed in the variance requirements of the "Street Standards Codes and Rules." The evaluation of the access request will consider the impacts that traffic generated by the proposed development will have on through traffic, traffic patterns, traffic queuing, and safety in the area. Approval will be based on the access requirements of section 1.2 of this manual. Shared driveways will be encouraged, or required where possible. Easements to accomplish shared access, either current or future, may be required as a condition of site design review or permit approval. Access may be denied if minimum requirements cannot be met and there is an approved alternate such as a shared access or access to an equal or lower classification street.

One driveway access per frontage, or reasonable shared access, will be the standard for approval. Double frontage lots will be limited to access from a single street, usually the lower classification street. Approval of more than one driveway access, must be requested through the variance procedure.

Private Access Driveway Width - Private access driveways shall conform to the following width dimensions shown in Table 1.2.4.

Table 1.2.4
Private Access Driveway Width Standards

Land Use	Minimum	Maximum
Single Family Residential	3.6 m	7.5 m
Multi-Family Residential	6 m	10.5m
Commercial	6 m	10.5 m
Industrial	6 m	12 m
Agricultural	6 m	10.5 m

In general, the minimum widths listed in Table 1.2.4 should be used in designing the appropriate driveway width. However, larger widths may be used, up to the maximum widths listed in Table 1.2.4, if there are high turning movements which require an additional traffic lane entering and/or exiting the driveway. These larger widths shall be secured through the variance process to accommodate a safe turning movement for buses or large trucks.

Private Access Driveway Spacing **-** Table 1.2.5 shows the private access driveway, or access point, spacing standards on Multnomah County roadways.

Table 1.2.5
Minimum Private Access Driveway Spacing Standards
As Shown in Figure 1.2.1

Functional Classification	Minimum Access Driveway Spacing (AD)	Minimum Setback from Intersecting Street (AS)
Major/Principal Arterial	120 m	60 m
Minor Arterial	90 m	45 m
Major Collector	45 m	30 m
Neighborhood Collector	30 m	30 m
Local Residential Street	15 m (1)	15 m
Local Commercial/Industrial Street	15 m (1)	15 m

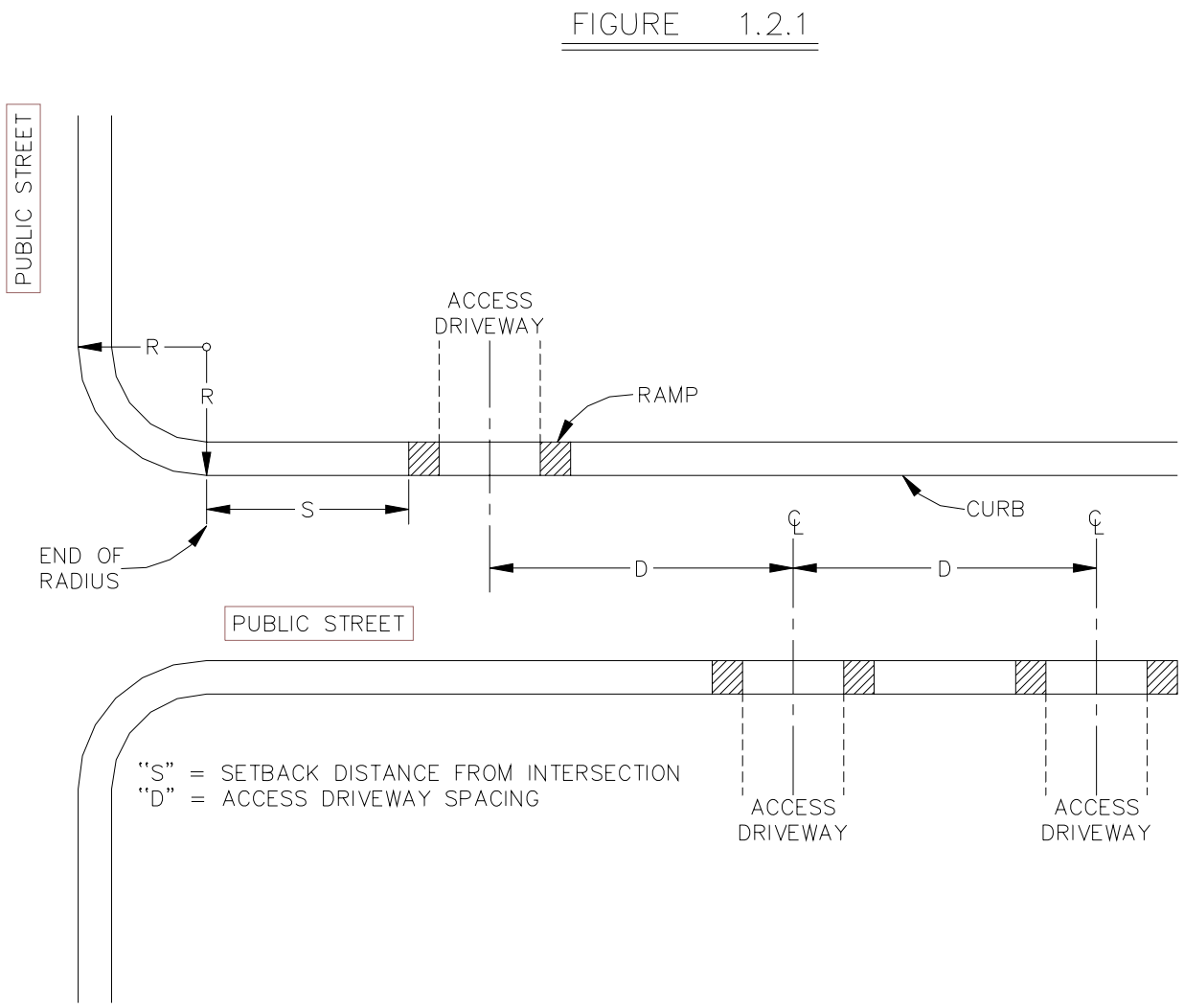
Note: (1) - 15 m spacing applies to all land uses except single family residential. There is no minimum spacing standard for single family residential driveways on local streets.

Figure 1.2.1 illustrates the definition of "access driveway spacing" and "setback from intersecting street." As shown in Figure 1.2.1, the access driveway spacing is defined as the distance between driveway centerlines. The minimums apply both to driveways on the same side of the street as well as driveways on opposite sides of the street. Access driveways on opposite sides of the street should be located directly opposite each other, whenever possible. If not possible, the minimum access driveway spacing shall conform to Table 1.2.5. If these access driveway spacing standards preclude a frontage development from having an access driveway within their property, a driveway closer than the spacing standards with restricted turning movements can be considered through the variance process.

With the exception of shared driveways, no driveway may encroach on any neighboring frontage, and the top of the driveway ramp must start at least 0.6 m from the property line.

The intersection setback distance is defined as the distance between the intersection end of curb radius and the top of the driveway ramp. Access driveways near an intersection with a major collector or arterial shall be located beyond the maximum standing queue length at the intersection approach and no less than 15 m from the end of the radius return. If these intersection setback requirements prohibit access to the site, a driveway with restricted turning movements can be considered through the variance process.

Figure 1.2.1 Access Spacing



1.2.5 Pedestrian Crosswalk Spacing

Crosswalks shall be marked at all signalized intersections. Mid-block crosswalks may be considered in urbanized or rural areas on major collector or arterial streets in the vicinity of a major pedestrian generator. For a mid-block crosswalk to be considered, the pedestrian generator must be located at a point where it is inconvenient for pedestrians to walk to the nearest crosswalk to cross the street. The minimum distance between a mid-block crosswalk and an intersection crosswalk in fully developed urban areas (CBD, regional centers, town centers and LRT station area) shall be such that pedestrians do not need to walk more than 45 m to reach either a crosswalk or an intersection. This distance shall be 90m in other urban areas.

All designated mid-block pedestrian crosswalks shall have advance crossing warning signs per the MUTCD. Signalization of pedestrian crosswalks at locations where vehicular signal warrants are not met is appropriate where MUTCD pedestrian volume or accident experience warrants are met.