# Chapter 5

# Street Access and Parking

## Engineering Design Standards

CITY OF PIERRE
SOUTH DAKOTA



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## 5.1 Traffic Impact Studies

### 5.1.1 Responsibilities for Traffic Impact Report

Traffic impact reports may be required by the City in order to adequately assess the impact of a proposal on the existing and/or planned street system. The primary responsibility for assessing the traffic impacts associated with a proposed development will rest with the developer with the City serving in a review capacity.

Unless waived by the City Engineer, a written report meeting the City guidelines will be required for a development proposal when trip generation during the peak hour is expected to exceed 100 vehicles, or any multifamily residential development with 100 or more dwelling units.

Preparation of the report shall be the responsibility of the developer and must be prepared by a licensed engineer with experience in transportation planning. Upon submission of a draft traffic report, the City will review the study data sources, methods, and findings. Comments will be provided in a written form. The developer and his engineer will then have an opportunity to incorporate necessary revisions prior to submitting a final report. All reports must be approved prior to issuance of a final building permit by the City

All previous traffic reports relating to the development that are more than two years old must be updated, unless it is determined that conditions have not changed enough to warrant an update.

Traffic reports will be required with the following submittals if the trip generation/dwelling unit criteria listed above is exceeded:

a) A rezoning application or Conditional Use Permit.
b) A final plan or final development plan if the property has already been rezoned for the proposed use and no traffic report was required for the rezoning.
c) Prior to issuance of a building permit, if the property has already been zoned/platted, and no previous traffic report less than two years old exists.
d) A request for additional access off an arterial street to an existing use.

The developer will be required to submit a traffic report if the land use intensity and traffic generation area increases to meet the criteria listed above.

Where access points are not defined or a site plan is not available at the time the traffic report is prepared, additional traffic work may be required when a site plan becomes available or the access points are defined.

The developer will be notified at the preplanning stage if a traffic report will be required, provided sufficient information is available for the City to determine whether the trip generation/dwelling unit criteria have been met. If insufficient information is available but the property appears to fall into the criteria above, the applicant will be informed that a traffic report is required.

### 5.1.2 Report Format

Traffic consultants are encouraged to discuss projects with the City prior to starting the Traffic Impact Study. Topics for possible discussion at such meetings might include directional distribution of traffic, types of vehicles, definition of the study area, intersections requiring capacity analysis, and methods for projecting build-out volume. This should provide a firm base of cooperation and communication between the City, the owner or developer, and his consultant in creating traffic characteristics that are in the best interest of the total community. Specific requirements will vary depending on the site location. However, all traffic reports shall contain, as a minimum, the following information:

#### 5.1.2.1 Land Use, Site, and Study Area Boundaries.

A brief description of the size of the land parcel, general terrain features, the location within the jurisdiction and the region should be included in this section. In addition, the roadways that afford access to the site, and are included in the study area, should be identified.

The exact limits of the study area should be based on engineering judgment, and an understanding of existing traffic conditions at the site. In all instances, however, the study area limits shall be mutually agreed upon by the developer, his design professional, and City staff. These limits will usually result from initial discussion with staff. A vicinity map that shows the site, in relation to the surrounding transportation system, should be included.

#### 5.1.2.2 Existing and Proposed Site Uses.

The existing and proposed uses of the site should be identified in terms of the various zoning categories of the City. In addition, the specific use for which the request is made should be identified if known, since a number of uses may be permitted under the existing ordinances.

#### 5.1.2.3 Existing and Proposed Uses in Vicinity of the Site.

A complete description of the existing land uses in the vicinity of the site, as well as their current zoning and use, should be included.

The developer should also state the proposed uses for vacant adjacent land in order that any proposed transition in uses is identified. This latter item is especially important where large tracts of undeveloped and/or underdeveloped land are in the vicinity of the site, and within the prescribed study area. Generally much of this information can be obtained from the initial meetings with the City's Planning staff.

#### 5.1.2.4 Existing and Proposed Roadways and Intersections.

Within the study area, the developer must describe existing roadways and intersections (geometrics and traffic signal control) as well as improvements contemplated by government agencies. This would include the nature of the improvement project, its extent, implementation schedule, and the agency or funding source responsible.

### 5.1.2.5 Trip Generation and Design Hour Volumes

A summary table listing each type of land use, the size involved, the average trip generation rates used (total daily traffic and a.m./p.m. peaks), and the resultant total trips generated shall be provided.

Trip generation will be calculated from the latest data contained within the *Institute of Transportation Engineers' Trip Generation Guide* (latest edition). In the event that data is not available for the proposed land use, the City must approve estimated rates prior to acceptance.

Site design hour volumes approximating the peak hour volume used to determine public improvements will be estimated by one of the following methods which are listed in order of preference:

a) Traffic volume counts for existing and projected uses.
b) Peak hour trip generation rates as published in the *ITE Trip Generation Guide* (latest edition)

### 5.1.2.6 Trip Distribution.

The direction of approach for site-generated traffic will be presented in this section. The technical analysis steps, basic methods, and assumptions used in this work must be clearly stated.

### 5.1.2.7 Trip Assignment.

This section will describe the utilization of study area roadways by site-generated traffic. The anticipated site traffic volumes must be combined with existing and projected area traffic volumes in Section 5.1.2.5 to describe mainline and turning movement volumes for future conditions with the site developed as proposed. Internal trips in excess of 10 percent will require analytical support to demonstrate how the higher figures were derived.
Nongenerated passerby traffic reductions in generation volumes may be considered if applicable. All estimates of trip distribution, assignment, and modal split are subject to review and approval by the City.

### 5.1.2.8 Existing and Projected Traffic Volumes.

Graph should show:

a) a.m. peak hour site traffic (in and out) including turning movements.
b) p.m. peak hour site traffic (in and out) including turning movements.
c) a.m. peak hour total including site(in and out) and through traffic including movements for current conditions
d) p.m. peak hour total including site (in and out) and through traffic including turning movements for current conditions and estimated build out conditions.

All raw traffic count data (including hourly ADT and peak hour turning movements) and analysis worksheets shall be provided in the appendices. Computer techniques and the associated printouts can be used as part of the report.

Build-out projections shall include major vacant properties around the proposed development as defined by the City. Volume projections for background traffic growth will be provided by the City, or a method for determining their volume will be recommended by the City.

All total daily traffic counts should be actual machine counts and not based on factored peak hour sampling. Latest available machine counts from the South Dakota Department of Transportation (SDDOT), the City, and other agencies may be acceptable if not more than two years old.

All traffic will be assigned to existing and planned facilities in a manner consistent with existing traffic patterns and approved by the City

**5.1.2.9 Level of Service.**

Level of Service (LOS) C during the peak hour will be the design objective for all new street components and intersections. Individual approaches shall be designed to at least LOS D for arterial street approaches or a LOS E for collector/local/private street approaches, with no individual movement having a volume/capacity ratio of greater than 1.00. Existing corridors with established adjacent development shall be designed to LOS D. The design year will be at build-out of the area. Levels of service are defined in *The Highway Capacity Manual (Transportation Research Board).*

**5.1.2.10 Traffic Crashes**.

Traffic crash data for affected street corridors may be required for the study. Where this is necessary, estimates of increased or decreased crash potential shall be evaluated for the development.

**5.1.2.11 Recommendations.**

In the event that analysis indicates unsatisfactory levels of service on study area roadways, a description of proposed improvements to remedy deficiencies shall be included. These proposals would not include committed projects by the City or the SDDOT.

In general, the recommendation section should include:

a) **Proposed Recommended Improvements.** This section shall describe the location, nature, and extent of proposed improvements to assure sufficient roadway capacity.
b) **Volume/Capacity Analysis at Critical Points**. A revised iteration of the volume/capacity analysis shall be described, which demonstrates the anticipated results of making these improvements.
c) **Levels of Service at Critical Points.** As a result of the revised volume/capacity analysis presented in the previous section, levels of service for the highway system with improvements shall be presented.

**5.1.2.12 Conclusion**. The last chapter of the report must be a clear, concise description of the study findings. It is anticipated that this concluding chapter will serve as an executive summary.

### 5.1.3 Revisions to Traffic Report.

Revisions to the traffic report must be provided as required by the City. The need to require revisions will be based on the completeness of the traffic report, the thoroughness of the impact evaluation, and the compatibility of the study with the proposed access and development plan.

### 5.1.4 Report Submittals.

The engineer shall submit two copies of the *Draft Traffic Impact Study* to the City Engineering Division. In addition, the engineer shall submit the electronic files of any modeled traffic data and output files.

The engineer shall submit to the City one paper copy and one electronic copy of the *Final Traffic Impact Study*. The electronic copy shall include the report in PDF format and all the appendices.

## 5.2 Access Control

### 5.2.1 General Access

Access in newly developing areas will follow these provisions. In areas being redeveloped, access will be determined as to the best fit based on traffic safety, existing conditions, future street improvements, and property development along with other considerations as appropriate.

A Right of Way Permit must be obtained from the City Engineer for any public or private access constructed to a public street.

Fire Department signed approval must be obtained and provided with the Right of Way Permit.

Access to streets or highways within the city limits under the jurisdiction of the South Dakota Department of Transportation (SDDOT) are also governed by requirements of the SDDOT. In addition to obtaining a permit from the City Engineer, a permit from the Area Engineer of the SDDOT must be obtained. Access shall be limited as dictated by this *City of Pierre Engineering Design Standards*. If access is in the State Right of Way, any discrepancy between SDDOT and City of Pierre regarding precedence of access design standards shall be jointly coordinated, reviewed, and approved.

Fire Department access to all buildings shall be provided and maintained during construction and upon completion of all improvements. Fire department access shall meet all requirements outlined in the current fire code.

### 5.2.2 Definition of Terms for Access Control

Several terms are used herein which have a somewhat distinct meaning. For the purpose of clarity, the definitions of some of these terms are listed below.

*Width of Curb Opening (W)*— The width of curb opening measured from toe of slope to toe of slope.

*Property Line (P)*— The distance measured along the property line from the nearest edge of the driveway to the property line.

*Corner Clearance (C)*— At an intersecting street the distance measured along the curb line from the end of the corner radius to the nearest opening measured at full height top of curb taper.

*Frontage*— The distance along the street right-of-way line of a single property or development within the property lines. Corner property at an intersection would have a separate frontage along each street.

*Residential*—Property used primarily for residential purposes such as single-family, two-family, and multifamily units.

*Single-Family (SF) Residential*—Single, detached family dwelling units or duplexes.

*Multifamily (MF) Residential*—Three or more attached dwelling units including townhouses, condominiums, and apartments.

*Taper* – The distance between toe of slope of curb and top of curb at full height.

### 5.2.3 Basic Principles for Curb Openings and Driveways

**Arterial Street Access.** Private residential access directly to arterial streets and any access to a principal arterial street shall be permitted only when the property in question has no other reasonable access to the general street system, or when denial of direct access to the arterial and alternative access to another roadway would cause traffic operation and safety problems as shown in the applicable *Traffic Report*. Any access to arterials must adhere to City street standards.

**High Volume Access.** In general, when trip generation served by the driveway exceeds 100 vehicles per hour during the peak hour or the driveway accesses an arterial street, returns using a standard street return radius as set forth in Table 8.1 will be required.

**Access Points.** Access will not be approved for parking or loading areas that require backing maneuvers onto or from a public street right-of-way except for single-family or duplex residential uses on local and minor collector streets.

**Standards.** Every property that accesses the street shall have a driveway. Driveways shall be constructed in accordance with these *Engineering Design Standards*.

**Existing and Future Demands.** The opening or driveway width shall be adequate to handle properly the anticipated traffic volume and character of traffic, as well as being within the limits specified for the type of property development. The controls established for curb openings and driveways shall apply to existing streets as well as new streets that may be developed in the future.

**Utility Conflicts.** Any adjustments which must be made to utility poles, street light standards, fire hydrants, catch basins or inlets, traffic signs and signals, or other public improvements or

installations which are necessary as the result of the curb openings or driveways shall be accomplished without any cost to the City. Adjustments to any fire hydrant, or its accessibility, must be pre-approved by the Fire Chief.

**Access Signs**. Driveway approaches, whereby the driveway is to serve as an entrance only or as an exit only, shall be appropriately signed by, and at the expense of, the property owner subject to approvals of City Planning and City Building Department. Sign location, height, and legend must be in accordance with the *Manual on Uniform Traffic Control Devices (Federal Highway Administration).*

**Abandoned Driveways**. Any curb opening or driveway which has been abandoned shall be removed and the street restored by the property owner.

### 5.2.4 General Requirements for Curb Openings

#### 5.2.4.1 Number of Curb Openings.

**Residential.** In general, each single-family residential property shall be limited to one access points per zoned lot as approved by the City Engineer.

The minimum distance between driveways shall be twenty (20) feet.

Applicable zoning setback requirements must be followed.

**Commercial/Industrial.** In general, access to commercial and industrial property shall be limited to the requirements as set forth in *Chapter 8* of the *Engineering Design Standards* and shall be based on the Street Classification per Federal Highway's Functional Classification. Functional Classification maps are available on the SDDOT website.

For commercial/industrial property located on a corner of an arterial street, access may be restricted to a side street only. Access may also be restricted if use of such access would be precluded by existing left turn lanes or other traffic control devices.

#### 5.2.4.2 Access to Roadways with No Curb and Gutter.

Private drive access to local, collector, or arterial streets that have no curb and/or gutter improvements shall extend from right-of-way line to the edge of the existing driving surface and shall be constructed of:

a) an 8-inchthick compacted aggregate base material, or if paved,
b) Minimum Pavement Thickness Requirements stated in the current *Street Design* Chapter of these *Design Standards.*

Access shall be governed by the driveway criteria.

Driveway width shall comply with Table 5.1. Driveway width shall be measured along the right of way line and shall be edge to edge of driving surface.

A culvert properly sized for the ditch flow shall be installed at the established roadside ditch flowline beneath the private drive access. Minimum size for the culvert shall be 15 inches. Culverts shall have a precast concrete-sloped end section or cast-in-place concrete headwall. If a cast-in-place headwall is built, it shall have a maximum slope of 4:1 on any exposed face. No vertical headwalls will be allowed.

A sketch plan of the installation must be submitted with the permit application. No construction will be allowed until the access and its construction plan or sketch are approved by the City Engineer.

**5.2.4.5 Mutual Access.** On commercial, industrial, and multifamily developments, mutual use of access to streets is encouraged and may be necessary to meet driveway spacing requirements. Mutual access must be shown on plans for approval prior to construction or change of use.

## Table 5.1 Dimensions for Driveways / Vehicle Access

| | Maximum Width of Curb Openings | Minimum Distance to Street Corner | Minimum Spacing between Driveways | Maximum # of Driveways per Zoning Lot |
|---|---|---|---|---|
| | Driveway Toe of slope to Toe of slope | End of curb radius to top of curb taper | Top of curb taper to Top of curb taper | |
| **Local** | | | | |
| Residential | 30 feet | 15 feet | 20 feet | 2 |
| Commercial | 40 feet | 40 feet | 25 feet | |
| Industrial | 40 feet | 40 feet | 25 feet | |
| **Collector/Arterial** | | | | |
| Residential | 30 feet | 50 feet | 35 feet | |
| Commercial | 40 feet | 50 feet | 50 feet | |
| Industrial | 40 feet | 50 feet | 50 feet | |

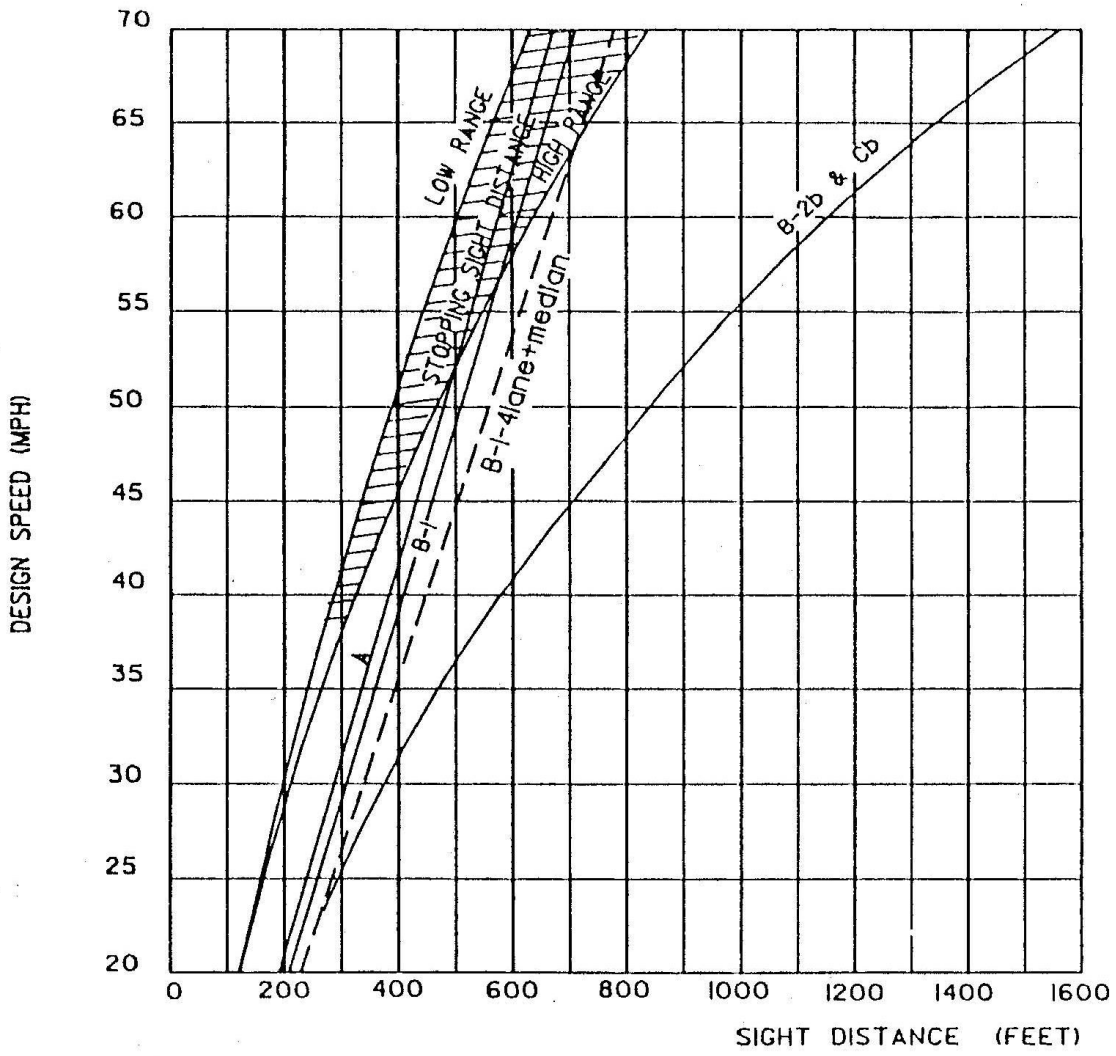
## 5.3 Access Design

### 5.3.1 Driveway Spacing

Where lots are large enough, the center of driveways not in alignment will normally be offset a minimum of 150 feet for all commercial/multifamily properties. Greater distances may be required if left-turn storage lanes require such on arterial streets. Minimum sight distance shall be

provided at all access points as shown in Figure 5.1, which applies to both city streets and driveway intersections.

## Figure 5.1 Intersection Distance at At-Grade Intersection




For types of traffic control see *AASHTO's Policy on Geometric Design of Highways and Streets*

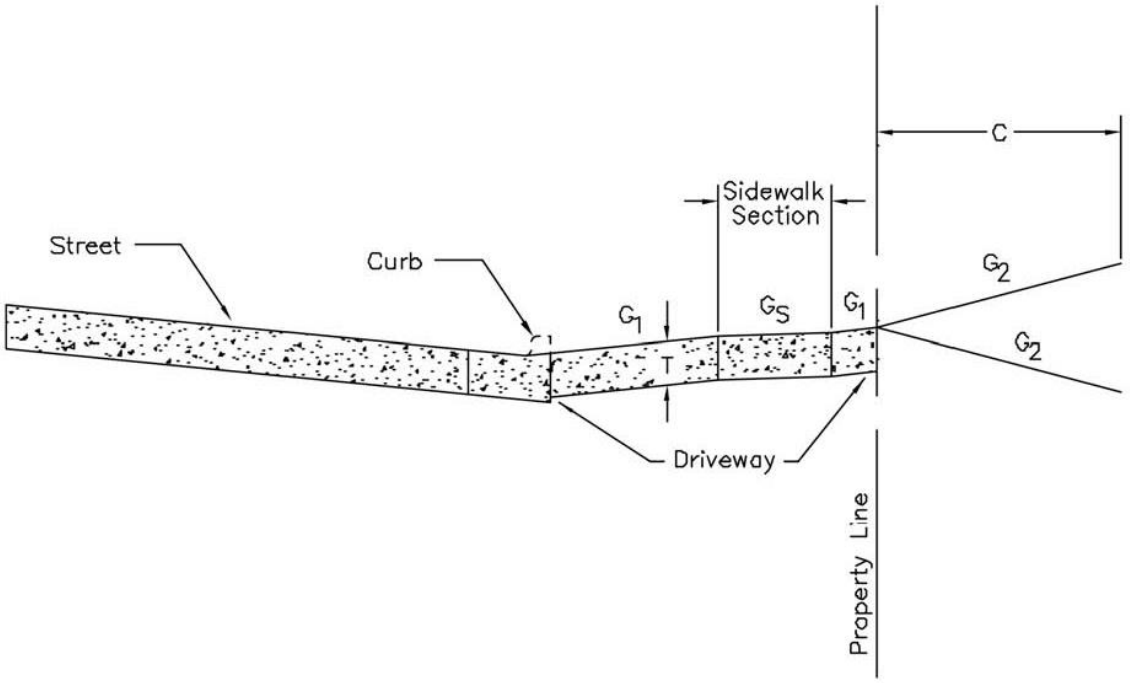
### 5.3.2 Driveway Design

Driveway sectional details are shown in Figure 5.2 with design requirements listed in Table 5.2.

All cross-slope sidewalk grades (Gs) shall be two percent (2.0%) or less for five (5) foot separated sidewalk, and five percent (5.0%) or less for curbside sidewalk.

Tip back on curbs shall be six and a quarter percent (6.25%).

## Figure 5.2: Driveway Grades

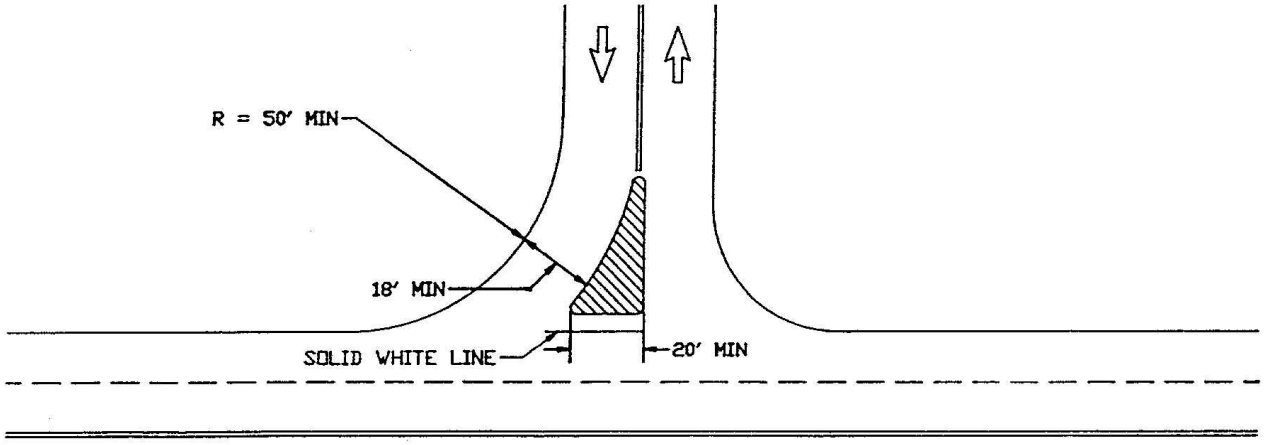



Table

## Table 5.2: Thickness and Grade of Driveways

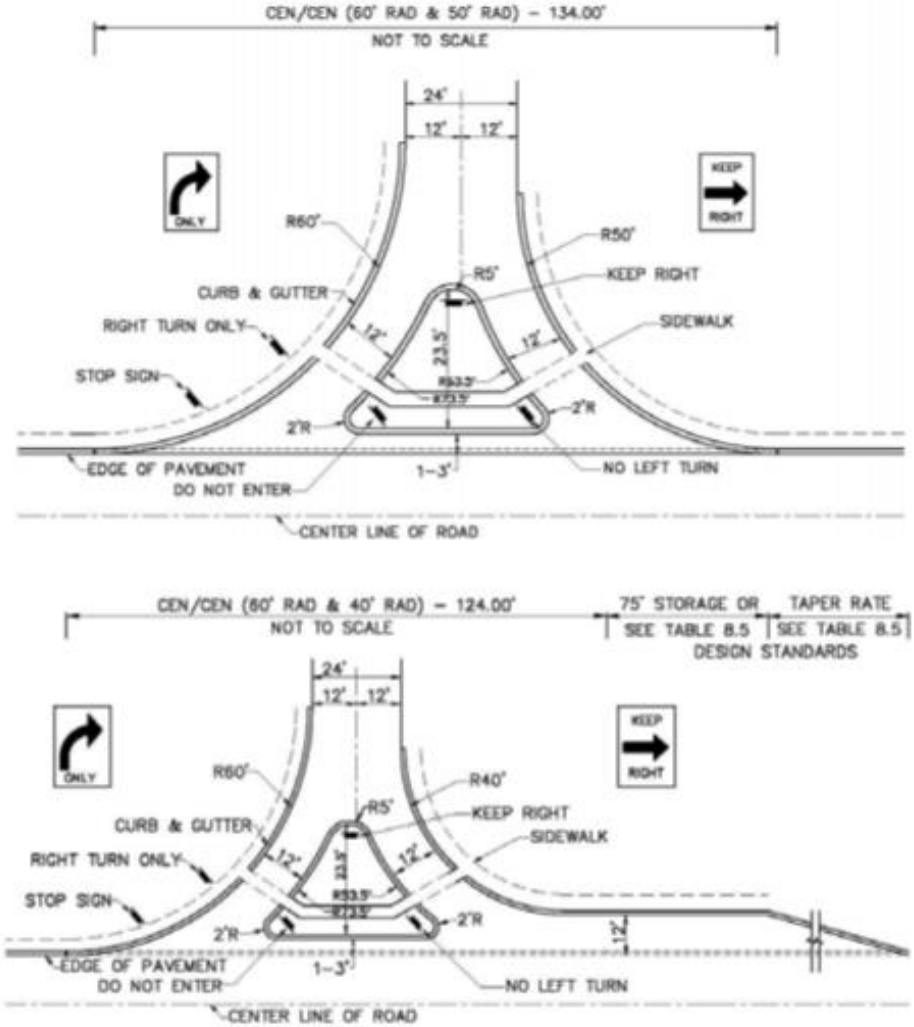
| Type of Driveway | Minimum Thickness Reinforced Concrete | Grade (G1) | | Grade (G2) | | Control Distance (C) |
|---|---|---|---|---|---|---|
| | | Min. | Max. | Min. | Max. | |
| **Residential** | 6” | +3.0% | +6.0% | ±0.5% | ±8.0% | 20’ |
| **Low Volume Commercial/ Industrial** | 6” | ±0.5% | ±6.0% | ±0.5% | ±6.0% | 40’ |

## Figure 5.3 Right-In, Right-Out, Left-In Driveway Design

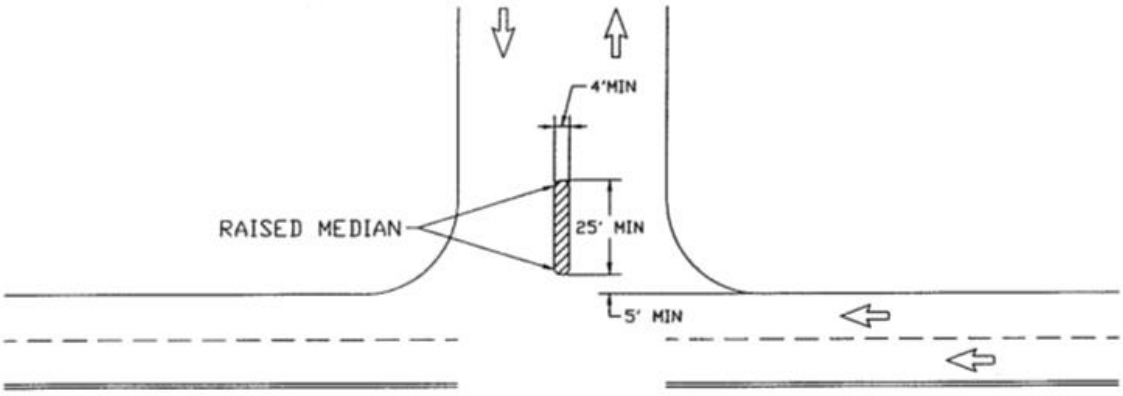



**Raised Median minimum: 1'.**

## Figure 5.4 Right-In, Right-Out, Left-In Driveway Designs



## Figure 5.5 Driveway Design with Median Divider




## 5.4 Off-Street Parking Area

### 5.4.1 General.

The following guidelines, along with City Ordinance, regarding the design of off-street parking areas shall be followed.

### 5.4.2 Minimum Parking Space Dimensions

The minimum parking space width shall be nine (9) feet in width and twenty (20) feet in length (180 square feet) and shall be of easily usable and convenient shape, orientation and grade. Each such space shall be readily accessible and aisles required for access to any space shall not be counted in meeting the requirements for spaces required in City Ordinance.

Loading spaces shall be at least twelve (12) feet wide and sixty (60) feet long for industrial and warehouse type uses but may be twelve (12) feet wide and thirty (30) feet long for retail, service and institutional establishments. Aisles adequate to accommodate the maneuvering into position of vehicles shall be provided as accessory to such space or spaces. Specified distances from the principal use for which a parking space is provided shall be measured from the edge of the useable parking space to a normal entrance to the building or use along a convenient and unobstructed pedestrian route.

**5.4.3 Backing Into Street Not Allowed**.

The spaces shall be so arranged so that no vehicle will be required to be backed into the street in order to exit the lot except for single-family or duplex dwelling units.

**5.4.4 Backing Over Sidewalk Not Allowed.** The spaces shall be so arranged so that no vehicle will be required to be backed over a public sidewalk in order to exit the stall.

**5.4.5 Minimum Module Depths** are listed in Table 5.3.

## Table 5.3 Minimum Parking Lot Requirements

| Parking Angle | Stall Depth | Stall Width | Module Depth (feet) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| (Degrees) | (feet) | (feet) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 45 | 18 | 9.0 | 30 | 48 | 45 | 58 | 54 | 51 | 42 | 42 |
| | | 9.5 | 30 | 48 | 45 | 58 | 54 | 51 | 42 | 42 |
| | | 10.0 | 30 | 48 | 45 | 58 | 54 | 51 | 42 | 42 |
| 60 | 20 | 9.0 | 36 | 56 | 54 | 60 | 58 | 56 | 52 | 52 |
| | | 9.5 | 34 | 54 | 52 | 60 | 58 | 56 | 50 | 50 |
| | | 10.0 | 33 | 53 | 51 | 60 | 58 | 56 | 50 | 50 |
| 75 | 20 | 9.0 | 40 | 60 | 59 | 60 | 59 | 58 | 58 | 58 |
| | | 9.5 | 39 | 59 | 58 | 59 | 58 | 57 | 57 | 57 |
| | | 10.0 | 38 | 58 | 57 | 58 | 57 | 57 | 57 | 57 |
| 90 | 19 | 9.0 | 43 | 62 | 62 | 62 | 62 | 62 | 62 | 62 |
| | | 9.5 | 42 | 61 | 61 | 61 | 61 | 61 | 61 | 61 |
| | | 10.0 | 41 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |

## 5.5 On Street Diagonal Parking

### 5.5.1 General

Generally, on street diagonal parking is not allowed on City streets except by City Commission approval.

When allowed, the minimum street width face of curb to centerline of street is thirty two (32) feet. Minimum right-of-way width is forty (40) feet from centerline of the street. Minimum stall width is ten (10) feet. The angle shall be sixty (60) degrees or less.

No diagonal parking will be allowed on arterial streets.