

ORDINANCE NO. 2001-7-25

AN ORDINANCE OF THE CITY OF PLANO, TEXAS, AMENDING SECTION I, SUBSECTION G, SUBPART NUMBER 4 (SPRING CREEK PARKWAY DESIGN STANDARDS (TYPE A) OF THE THOROUGHFARE STANDARDS, RULES AND REGULATIONS CODIFIED AND ADOPTED IN ORDINANCE NO. 2001-5-12, ALSO KNOWN AS ARTICLE II, CHAPTER 19, SECTION 19-21, (RULES AND REGULATIONS ADOPTED) OF THE CODE OF ORDINANCES OF THE CITY OF PLANO; RELATING TO REVISIONS TO MEDIAN SPACING REQUIREMENTS ON SPRING CREEK PARKWAY; AND PROVIDING A REPEALER CLAUSE, A SEVERABILITY CLAUSE, A PENALTY CLAUSE, A SAVINGS CLAUSE, AND AN EFFECTIVE DATE.

WHEREAS, on August 11, 1997, Ordinance No. 97-8-7 adopted the Plano Thoroughfare Standards Rules and Regulations thereby establishing minimum standards to be followed in the development of streets, thoroughfares, sidewalks, and appurtenances within the City; and

WHEREAS, the Transportation Engineer and the City Engineer of the City have advised the City Council that the continuing development of the City of Plano and the concurrent continuing development of its thoroughfare system have created the necessity for revisions to median spacing requirements on Spring Creek Parkway; and

WHEREAS, the Transportation Engineer and the City Engineer of the City have proposed to the City Council an amendment to Section I, Subsection G, Subpart No. 4 (Spring Creek Parkway Design Standards (Type A) of the Thoroughfare Standards Rules and Regulations adopted and codified in Ordinance No. 2001-5-12, also known as Article II, Chapter 19, Section 19-21, (Rules and Regulations Adopted) of the Code of Ordinances of the City of Plano which they deem advisable to improve traffic safety and operation conditions on Spring Creek Parkway; and

WHEREAS, the Planning and Zoning Commission has reviewed the proposed amendment and recommended approval of such request on July 2, 2001; and

WHEREAS, the City Council, after considering the recommendations of the Transportation Engineer, the City Engineer, and the Planning & Zoning Commission believes that the amendment to median spacing requirements on Spring Creek should be adopted to improve traffic safety and operation.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF PLANO, TEXAS, THAT:

Section I. Section I, Subsection G, Subpart No. 4 (Spring Creek Parkway Design Standards (Type A) of the Thoroughfare Standards, Rules and Regulations adopted and codified in Ordinance No. 2001-5-12, also known as Article II, Chapter 19, Section 19-21, (Rules and Regulations Adopted) of the Code of Ordinances of the City of Plano, duly passed and approved by the City Council of the City of Plano, Texas, on May 14, 2001, is hereby amended as follows:

"Median openings, traffic signals, or crossovers, shall be permitted at cross streets and at intervals of not less than one-quarter mile along the section of Spring Creek Parkway west of Alma Drive. For the section east of Alma Drive extending to Parker Road, median openings shall be permitted at both private drives and cross streets at intervals not less than five hundred (500) feet, and traffic signals at intervals no less than one-quarter mile. Median openings or crossovers for both road sections on Spring Creek Parkway shall be accompanied by left turn storage in both directions of not less than one hundred fifty (150) feet in length. When grade separations (overpasses) are constructed at major intervals, all median openings within one (1) mile of the cross street centerline shall be closed.

At all locations along Spring Creek Parkway, consideration of a median break, traffic signal, or crossover proposal submitted by the proponent of the road feature shall be accompanied by a traffic engineering study performed by a licensed professional civil engineer in good standing with the State of Texas Board of Professional Engineers. The engineering study shall evaluate traffic flow and safety during the peak traffic congestion periods on Spring Creek Parkway (as determined by the Office of the Transportation Engineering Manager) using methods, procedures, and standards specified in the current edition of the Transportation Research Board "Highway Capacity Manual," American Association of State Highway and Transportation Officials "A Policy on Geometric Design of Streets and Highways," and City of Plano "Thoroughfare Standards Rules and Regulations."

A proposed median opening, traffic signal, or crossover shall be approved if the traffic engineering study has the professional seal of the engineer that affirmatively states without equivocation that the current and five (5) year projected traffic flow on Spring Creek Parkway is not reduced below Level of Service "D" (LOS D), and all appropriate traffic safety standards are met.

This may not apply for median openings for Type "D" (four-lane divided) roadways."

Section II. All provisions of the Ordinances of the City of Plano, codified or uncodified, in conflict with the provisions of this Ordinance are hereby repealed, and all other provisions of the Ordinances of the City of Plano, codified or uncodified, not in conflict with the provisions of this Ordinance, shall remain in full force and effect, except that nothing contained herein shall be considered as repealing any portion of Ordinance Number 90-2-9, adopted on February 12, 1990 ("Subdivision Ordinance"), or any amendments thereto.

Section III. It is the intention of the City Council that this Ordinance, and every provision thereof, shall be considered severable, and the invalidity or unconstitutionality of any section, clause, provision or portion of this Ordinance shall not affect the validity or constitutionality of any other portion of this Ordinance.

Section IV. Any person, firm, or corporation violating any of the provisions or terms of this Ordinance shall, upon conviction, be fined a sum not exceeding \$500 for each offense, and each and every day such violation shall continue shall be deemed to constitute a separate offense.

Section V. The repeal of any Ordinance or part of Ordinances affected by the enactment of this Ordinance shall not be construed as abandoning any action now pending under or by virtue of such Ordinance or as discontinuing, abating, modifying, or altering any penalty accruing or to accrue, or as affecting any rights of the municipality under any section or provisions of any Ordinances at the time of passage of this Ordinance.

Section VI. This Ordinance shall become effective from and after its passage and publication as required by law.

DULY PASSED AND APPROVED THIS THE 23rd DAY OF July, 2001.



Jeran Akers, MAYOR

ATTEST:

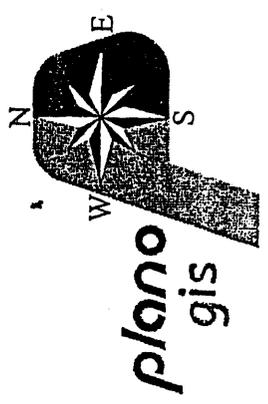
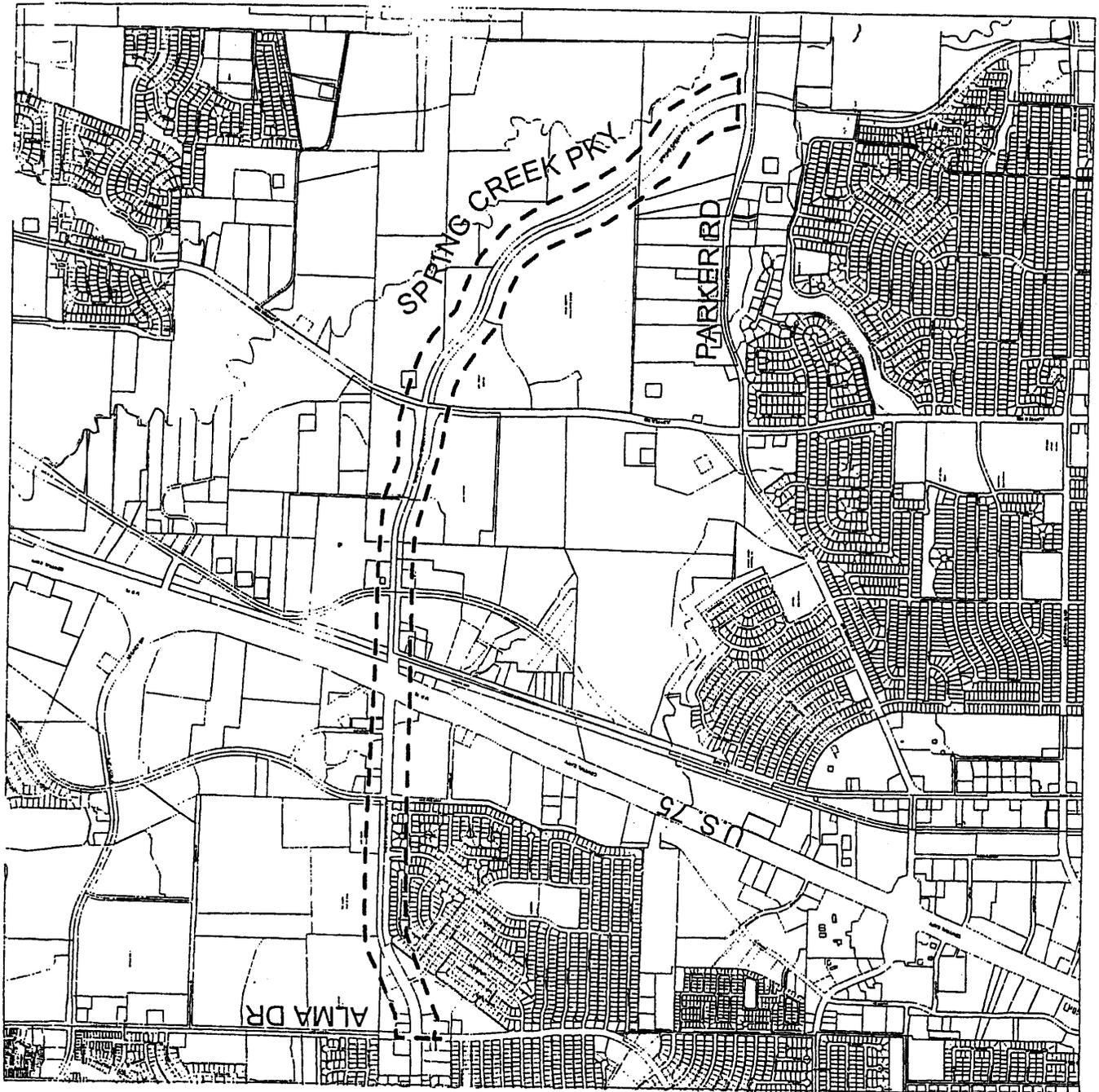


Elaine Bealke, CITY SECRETARY

APPROVED AS TO FORM:



Diane C. Wetherbee, CITY ATTORNEY



AMENDMENT TO THE
THOROUGHFARE STANDARDS
RULES AND REGULATIONS

ATTACHMENT TO
ORDINANCE NO. 2001-7-25

Thoroughfare Standards Rules & Regulations

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CITY OF PLANO DEVELOPMENT SERVICES DEPARTMENT

Rules And Regulations Governing The Design & Construction Of Streets And Thoroughfares, Sidewalks, & Appurtenances

SECTION I. STREET DESIGN STANDARDS

TABLE 1
**CITY OF PLANO'S
THOROUGHFARE
DEFINITIONS**

A. For City of Plano's Thoroughfare Definitions - see Table 1:

TYPE	DESIGNATION	R-O-W	PAVEMENT (Face to Face)	MEDIAN (Face to Face)
Expressway	A	144'-244'	6/12'(72')	28'
Major Thoroughfare	B+	140'	8/12'(96')	20'
	B	130'-160'	6/12'(72')	24'
Major Thoroughfare	C	110'	6/11'(66')	20'
Secondary Thoroughfare	D	92'	4/12'(48')	20'
Secondary Thoroughfare	E+	75'	5/11'(55')	None
	E	68'	4/11'(44')	None
Secondary Thoroughfare	F	60'	36'	None
Residential Street	G	50'	26'	None

Above defined by the City of Plano, Texas, Comprehensive Plan and most recent Major Thoroughfare Plan.

B. Minimum Horizontal Design Radius - Minimum Centerline Radius is defined by the design speed of the respective street. The design speed of each street in the City of Plano, as defined by the Thoroughfare Plan, can be determined from Table 2.

Street Type	Design Speed
G, F	30
D, E	35
C	40
B, B+	45
A	50

TABLE 2
**DESIGN SPEED
OF EACH TYPE
OF STREET**

The minimum acceptable horizontal centerline radius, for each respective street's design speed, is shown in Table 3.

TABLE 3
MINIMUM HORIZONTAL CENTERLINE RADIUS

v (mph)	f	e (ft/ft)	$(e+f)$	R (Calculated) (ft)	R (Rounded for Design) (ft)
30	0.16	-0.02	0.14	428.57	450
35	0.16	-0.02	0.14	583.33	600
40	0.15	-0.02	0.13	820.51	850
45	0.15	-0.02	0.12	1,038.46	1,050
50	0.14	-0.02	0.12	1,388.89	1,400
55	0.14	-0.02	0.12	1,680.56	1,700
60	0.12	-0.02	0.10	2,400.00	2,400

Minimum centerline design radius for residential streets shall be 250 feet for curves. This does not apply to turns approximating 90°. Maximum length of a horizontal curve on Type E, F, or G roadways shall not exceed 1.6 times the centerline radius for a radius of 250 feet or greater.

C. Minimum Vertical Alignment - Vertical Alignment is a function of Stopping Sight Distance (SSD) which is given by:

$$SSD = 1.47PV + \frac{V^2}{30(f+g)}$$

Stopping Sight Distances are calculated for $g=0$, rates of vertical curvature are used (K) to determine crest curve lengths as shown in Table 4 or sag curve

TABLE 4
MINIMUM ACCEPTABLE CREST CURVE GIVEN SPEED AND DIFFERENCE IN GRADE OF ROAD

S	K											
		MPH	FT	A=1	A=2	A=3	A=4	$L=KA$ A=5	A=6	A=7	A=8	A=9
30	200	30	100	100	100	120	150	180	210	240	270	300
35	250	50	100	100	150	200	250	300	350	400	450	500
40	325	80	100	160	240	320	400	480	560	640	720	800
45	400	120	120	240	360	480	600	720	840	960	1080	1,200
50	475	160	160	320	480	640	800	960	1,120	1,280	1,440	1,600
55	550	220	220	440	660	880	1,100	1,320	1,540	1,760	1,980	2,200

lengths as shown in Table 5, illustrated on following page.

TABLE 5
MINIMUM ACCEPTABLE SAG CURVE GIVEN SPEED AND DIFFERENCE IN GRADE OF ROAD

S	K		A=1	A=2	A=3	A=4	L=KA		A=6	A=7	A=8	A=9	A=10
	MPH	FT					A=5	A=5					
30	200	40	100	100	120	160	200	240	280	320	360	400	
35	250	50	100	100	150	200	250	300	350	400	450	500	
40	325	70	100	140	210	280	350	420	490	560	630	700	
45	400	90	100	180	270	360	450	540	630	720	810	900	
50	475	110	110	220	223	440	550	660	770	880	990	1,100	
55	550	130	130	260	390	520	650	480	910	1,040	1,170	1,300	
60	650	160	160	320	480	640	800	960	1,120	1,280	1,440	1,600	

D. Intersection Design

1. Street intersections shall be radial or perpendicular, within a five degree tolerance, at the intersection or the right-of-way lines.
2. The radius shall be 30 feet at the intersection of secondary and major, or major and major streets.
3. At all other intersecting streets, the radius shall be 20 feet.

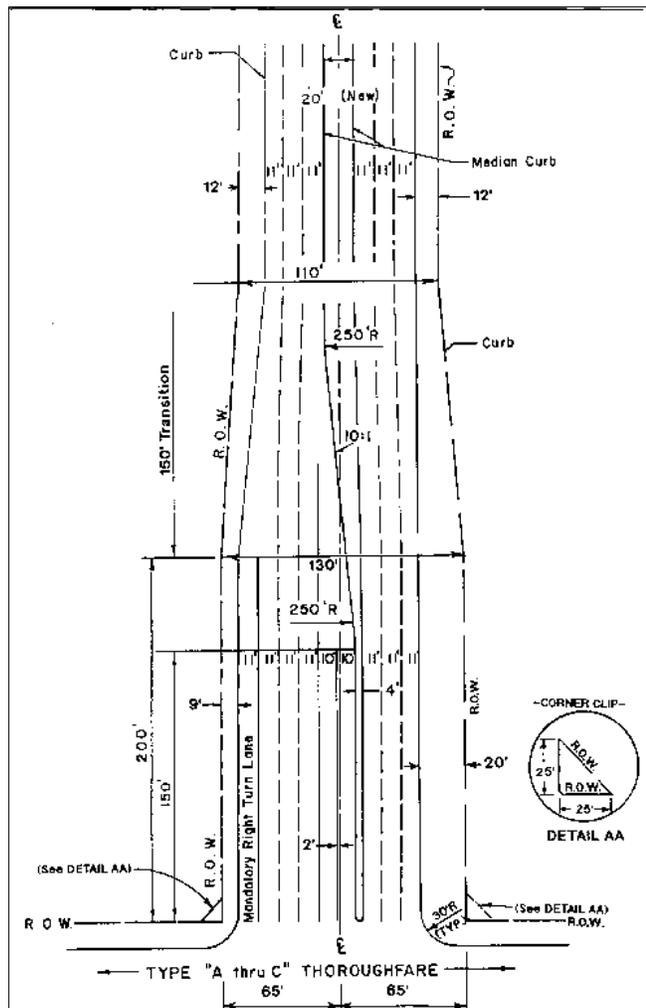
Note: At intersections, the curb radius encroaches on the right-of-way so as to not provide sufficient room for sidewalks, utilities, etc. within the parkway. Therefore, right-of-way shall be dedicated at the intersection of all streets such that a minimum of 9-1/2 feet of parkway shall be maintained from the back of the curb along the curb's radius.

E. R-O-W at a Type "C" Intersection - Right-of-Way width for a Type "C" Thoroughfare at the intersection of a Type "A thru C" Thoroughfare shall be 130 feet for a distance of 200 feet and then a 15:1 slope to the standard width to allow a build-out (see Figure 1). Right-turn lane required at all such intersections and on freeway service roads at their approach to intersections with Type "A" through Type "C" thoroughfares.

F. Residential Frontage - Residential houses shall not front a Type "A thru D" thoroughfare

FIGURE 1

INTERSECTION OF TYPE "C" R-O-W REQUIREMENTS AND POSSIBLE TOTAL BUILD OUT



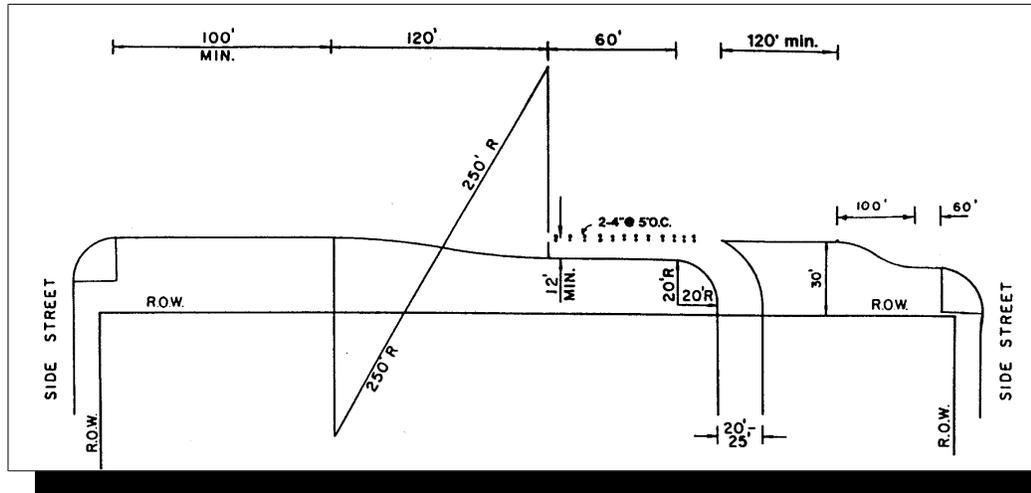
unless parallel access roads are provided. Minimum distances between adjacent curbs of the thoroughfare and the access road shall be 20 feet. Frontage Road R-O-W shall be in addition to the Thoroughfare R-O-W.

G. Spring Creek Parkway - (Type A) - Spring Creek Parkway is designed as a major traffic carrier with as few stops and cross-conflict traffic as possible. To accomplish this, the following standards shall be adhered to:

1. Driveways and streets less than Type D in size shall have deceleration lanes or weaving lanes (see Figure 2 (a)).

FIGURE 2 (a)

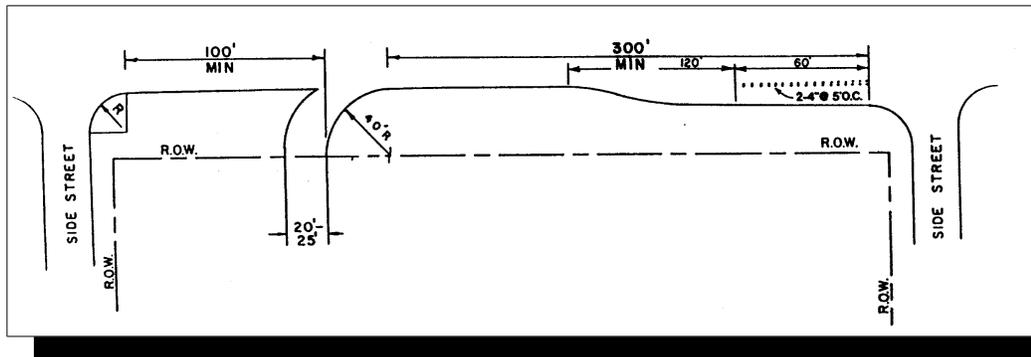
SPRING CREEK PARKWAY DESIGN STANDARDS Specifications for Roadways less than Type D



2. Egress from drives shall use a 40' exit radius. (see Figure 2 (b)).

FIGURE 2 (b)

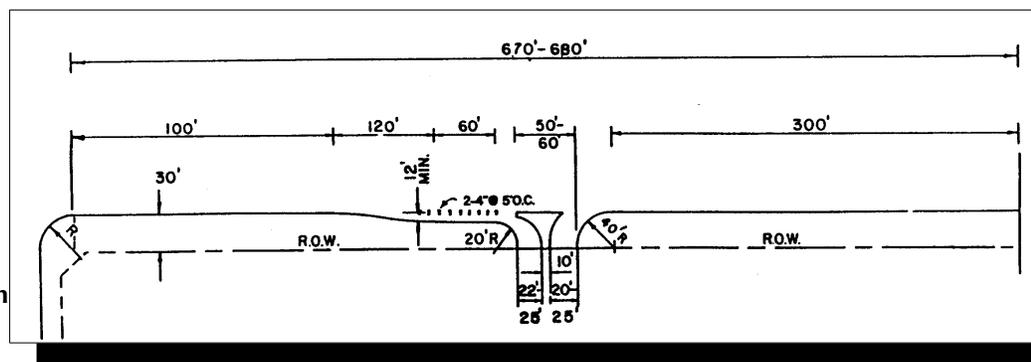
SPRING CREEK PARKWAY DESIGN STANDARDS Specifications for Egress from Drives



Note: Deceleration lanes shall be constructed to the same standards as the adjoining street and the cost shall be the developer's responsibility. A combination of deceleration lanes for a drive are shown in Figure 2 (c).

FIGURE 2 (c)

SPRING CREEK PARKWAY DESIGN STANDARDS Specifications for Deceleration Lanes



3. Parkway requirements are shown in Figure 2 (d).

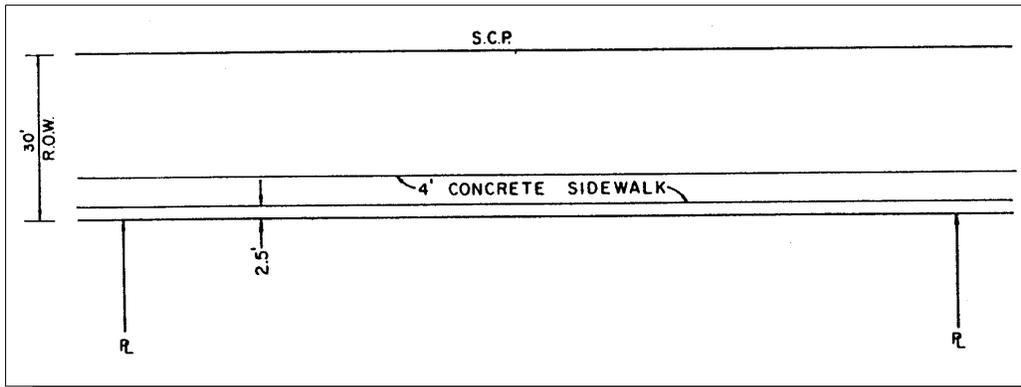


FIGURE 2 (d)

SPRING CREEK PARKWAY DESIGN STANDARDS Specifications for Parkway Requirements

4. Median openings (and traffic signals) or crossovers shall be only at cross streets and at intervals of not less than one-quarter mile. Such median openings or crossovers shall be accompanied by left-turn storage in both directions of not less than 150 feet in length. When grade separations (overpasses) are constructed at major intersections, all median openings within one mile of the cross street center line shall be closed. This may not apply for median openings for Type "D" (4 lane divided) roadways.
5. Dedication of R-O-W will be required for overpasses to be constructed at the intersection of major thoroughfares as shown in the Thoroughfare Plan.

H. Preston Road (Type B+) - Preston Road is designated as a major traffic carrier with as few stops and cross-conflict traffic as possible. To accomplish this, the following standards shall be adhered to:

1. Driveways and streets less than Type D in size shall have deceleration lanes or weaving lanes built as shown in Figure 3(a) 3(b) or 3(c).

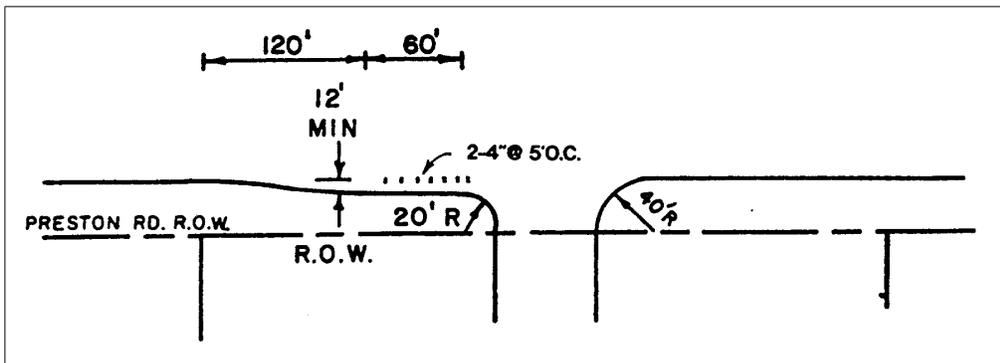


FIGURE 3 (a)

PRESTON ROAD DRIVE STANDARDS (for property with more than 410 feet of frontage)

FIGURE 3 (b)

PRESTON ROAD DRIVE STANDARDS (for property with more than 380 feet

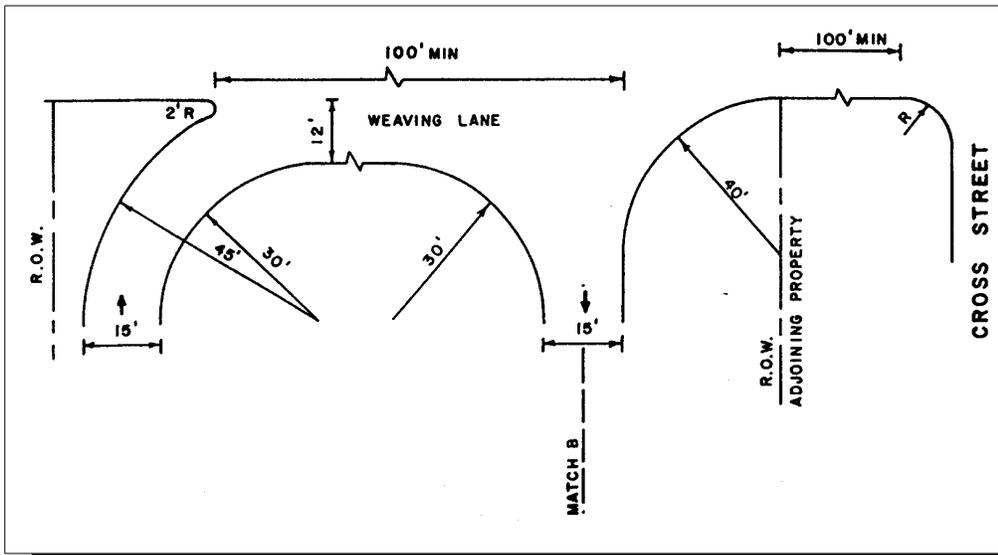
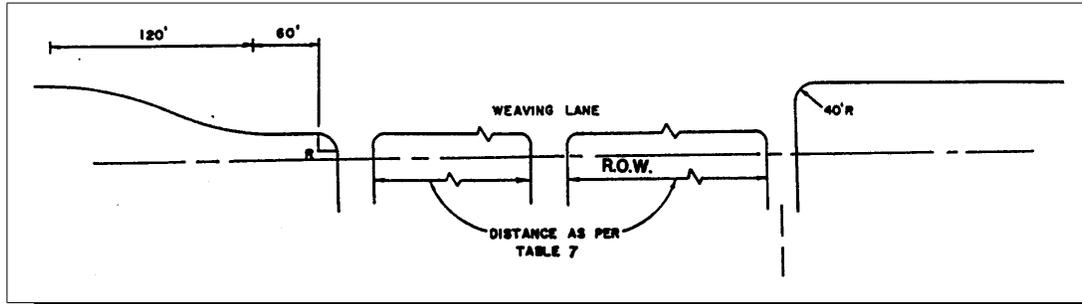
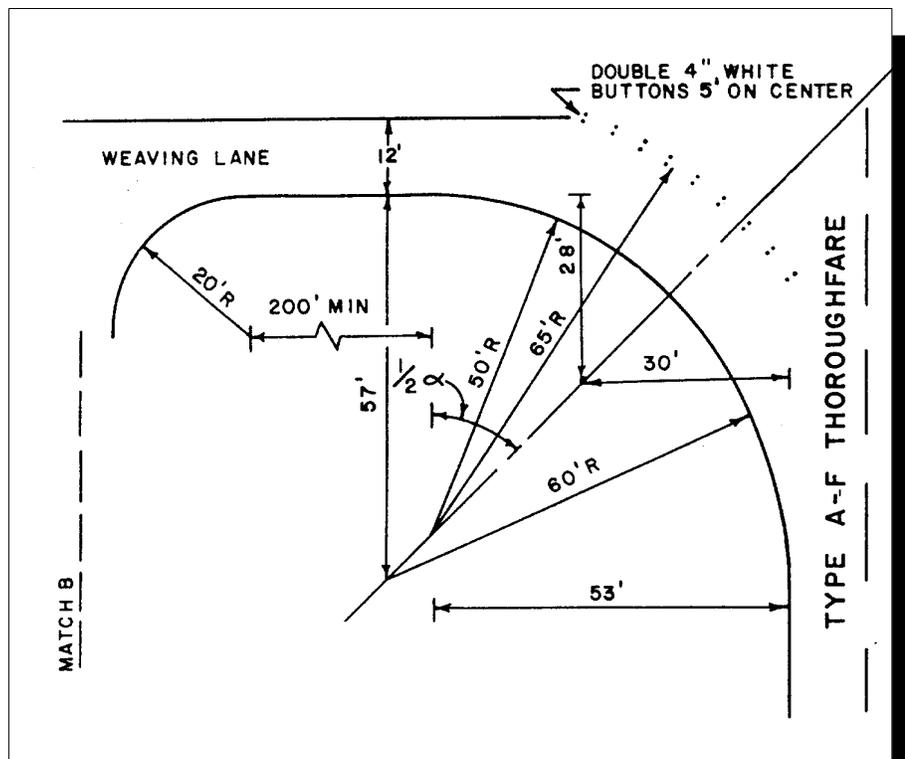


FIGURE 3 (c)

PRESTON ROAD DRIVE STANDARDS (for property with less than 380 feet of frontage)

FIGURE 3 (d)

PRESTON ROAD DRIVE STANDARDS (for property with downstream R-O-W being a street)



2. Full median openings for cross streets shall be at intervals of not less than one-quarter mile. Such median openings or crossovers shall be accompanied by left-turn storage of not less than 60' in each direction. Mid-block openings will be built to restrict cross-access as shown in Figure 3 (e).

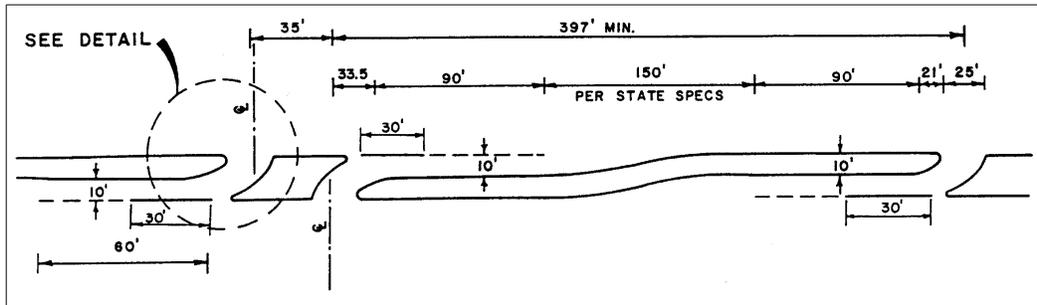


FIGURE 3 (e)

PRESTON ROAD MEDIAN STANDARDS Full Median Design

3. Dedication of R-O-W will be required for overpasses to be constructed at the intersection of major thoroughfares as shown on the Thoroughfare Plan.
4. Weaving lanes shall be constructed to the same standards as the adjoining street and the cost shall be the developer's responsibility.

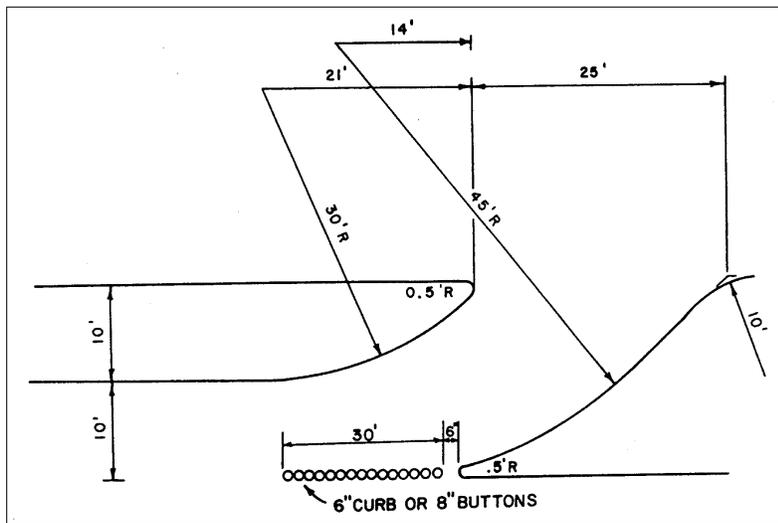
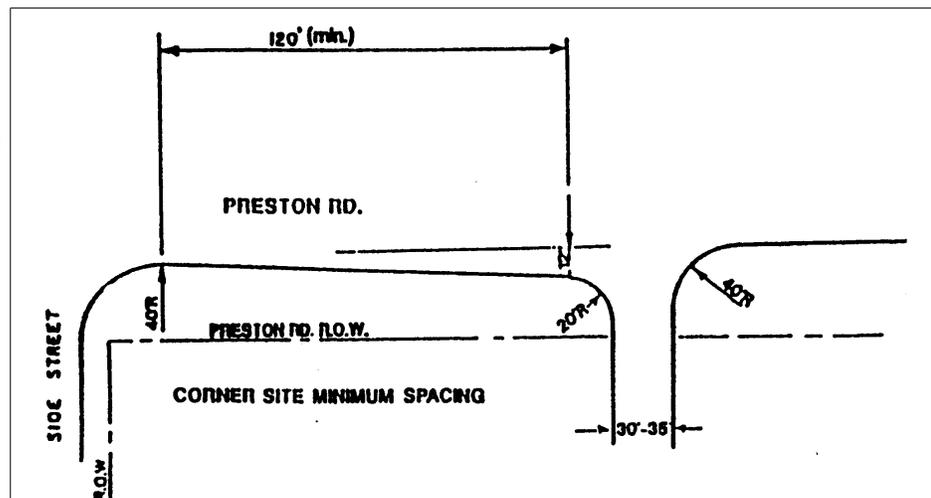


FIGURE 3(f)

PRESTON ROAD MEDIAN STANDARDS Median Opening Detail

FIGURE 3(g)

PRESTON ROAD MEDIAN STANDARDS Substandard Minimum Design



I. State Designated Roads - All such roads within the City of Plano will conform to State Design Standards unless otherwise directed by the City Engineer.

1. Dedication of R-O-W will be required for overpasses to be constructed at the intersection of major thoroughfares as shown on the Thoroughfare Plan.
2. Weaving lanes shall be constructed to the same standards as the adjoining street and the cost shall be the developer's responsibility.

J. Dallas North Tollway Corridor Access Standards - The Dallas North Tollway Corridor is bounded on the north by Spring Creek Parkway and on the south by the southern city limits. Its east and west boundaries are defined by two parallel thoroughfares - Parkwood Boulevard and Communications Parkway.

1. Service Roads
 - a. Minimum spacing of 160 feet from intersecting cross street to first driveway.
 - b. Minimum spacing of 325 feet between individual drives, except where two drives are served by one deceleration lane, the minimum

FIGURE 4(a)

DALLAS NORTH TOLLWAY ACCESS STANDARDS Service Road Driveway Spacing

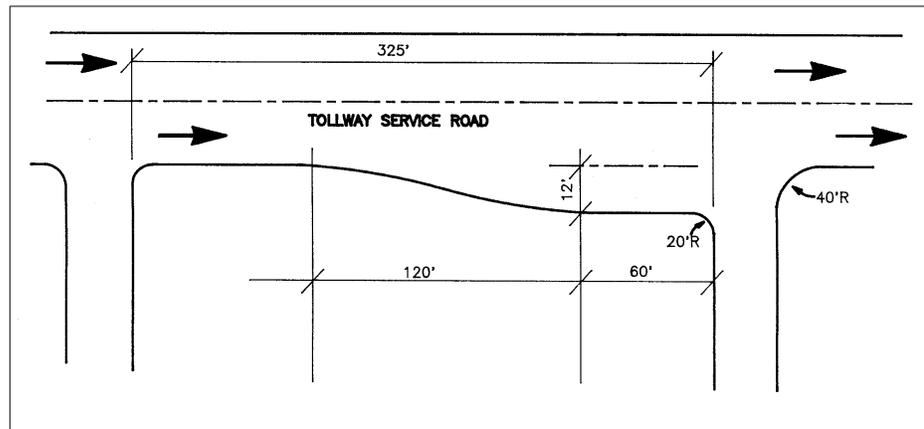
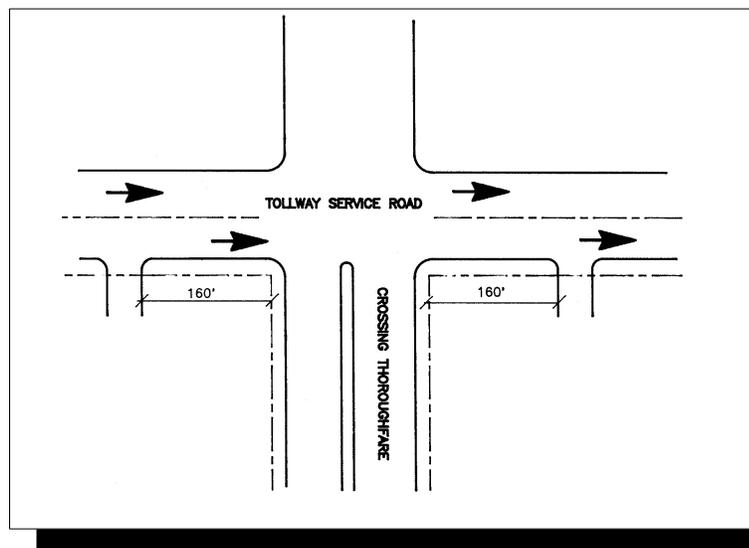


FIGURE 4(b)

DALLAS NORTH TOLLWAY ACCESS STANDARDS Service Road Driveway Spacing



- c. driveway spacing within the lane is 120 feet.
- Use 120 feet transition, 60 feet storage, 12 feet wide deceleration lane into all driveways or multiple driveway configurations served by one deceleration lane.

- d. No drive less than 50 feet in advance of the concrete curb gore of an exit ramp.
- e. No drive less than 400 feet beyond the concrete curb gore of an exit ramp.
- f. No drive less than 400 feet in advance of the concrete curb gore of an entrance ramp.
- g. No drive less than 50 feet beyond the concrete curb gore of an entrance ramp.

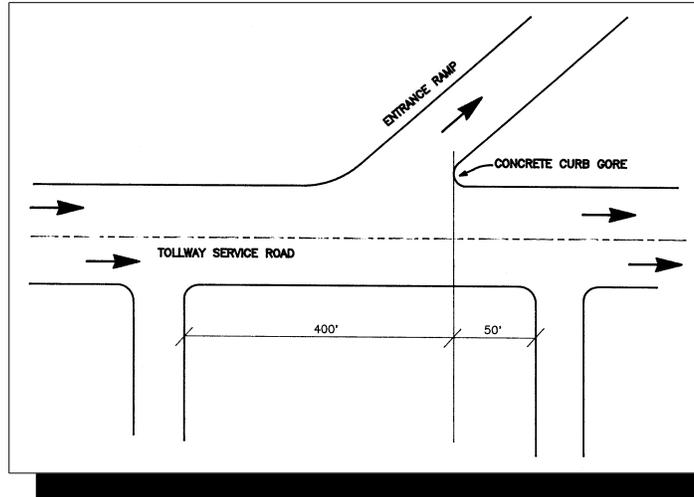


FIGURE 4(c)
DALLAS NORTH TOLLWAY ACCESS STANDARDS Service Road Driveway Spacing

- 2. Crossing Thoroughfares
 - a. Minimum spacing of 160 feet from intersecting cross street to first driveway.
 - b. Minimum spacing of 150 feet between drives.

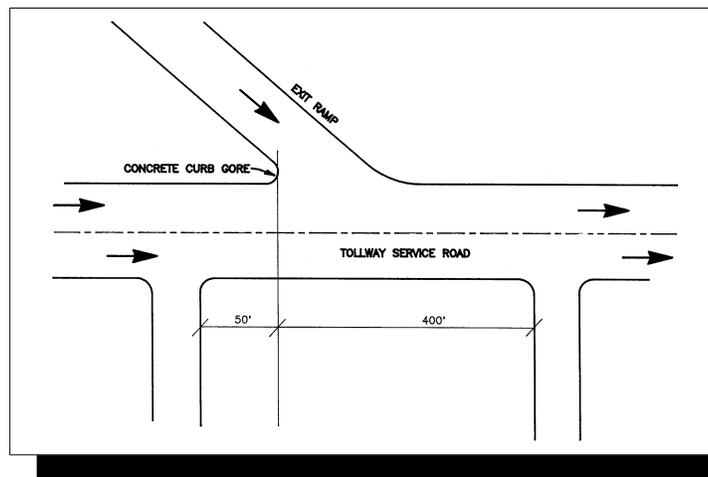


FIGURE 4(d)
DALLAS NORTH TOLLWAY ACCESS STANDARDS Service Road Driveway Spacing

- c. On divided thoroughfares mid-block median openings cannot be permitted.
- d. Mid-block one-way left turn lanes may be permitted as shown by Figure 4 Thoroughfare Standards Rules & Regulations.

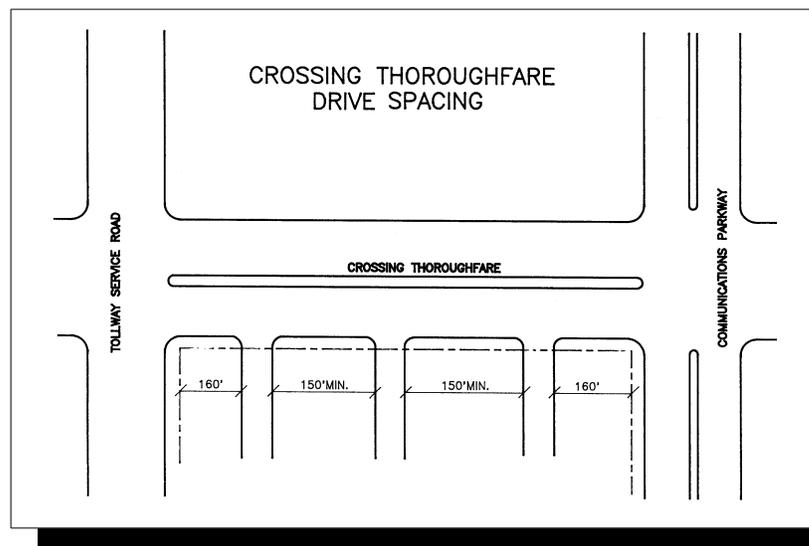


FIGURE 4(e)
DALLAS NORTH TOLLWAY ACCESS STANDARDS Crossing Thoroughfare Drive Spacing

- e. If only one mid-block turn lane is possible, priority will be given to the south side, east of the tollway and north side, west of the tollway.

K. State Highway 121 - Driveway Access Design - SH 121 forms the northern boundary of the City Limits. All of the right-of-way is in the City Of Plano from its intersection with Custer Road to just east of the Burlington Northern Railroad. In the future, SH 121 will be a freeway with three lane service roads in each direction. At present SH 121 is a divided roadway from the western city limits to SH 289 (Preston Road) and an undivided roadway from Preston Road to Custer Road. (Ordinance No. 98-2-9)

Prior to the construction of the permanent service roads the following standards shall be used for the design of driveway access to properties fronting on the south side of SH 121 from the Custer Rd. intersection to the Burlington Northern Railroad crossing. (Ordinance No. 98-2-9)

1. Driveways shall be no less than 325 feet apart measured from edge of drive to edge of drive. (Ordinance No. 98-2-9)
2. Each frontage is assured only one point of driveway access. (Ordinance No. 98-2-9)
3. Each driveway must be served by a protected left turn lane on the existing undivided section of SH121 roadway. (Ordinance No. 98-2-9)
4. Left turn lanes must be 12-14 feet wide with 200 feet of storage and 200 feet of transition length. (Ordinance No. 98-2-9)
5. Additional drives in the undivided section can only be allowed if left turn protection can be provided. (Ordinance No. 98-2-9)
6. Cross access in both the present and future divided sections shall be limited to the street intersections. (Ordinance No. 98-2-9)

SECTION II MEDIAN AND LEFT TURN LANE DESIGN STANDARDS

- A. Width of Median - Median widths vary from a minimum of 4' to a maximum of 28' (see Table 1).
- B. Required Median Openings and Left-Turn Lanes - Median openings on divided thoroughfares shall be required at all street intersections and at private drives where they conform to the City's spacing requirements. The median opening shall be accompanied by a left turn lane for the proposed drive or street.
- C. Cost of Median Openings and Left-Turn Lanes - Median openings and left-turn lanes constructed to serve private drives and new roads shall be paved to City standards, inspected by City inspectors, and paid for by owners served by the median openings and left-turn lanes. The City of Plano shall pay the costs of median openings and left-turn lanes constructed to serve existing dedicated streets and drives, when a Capital Improvement widening program is undertaken by the City of Plano on an existing public street.
- D. Minimum Left - Turn Storage, Transition Length, and Median Opening Width, Location, and Spacing Requirements

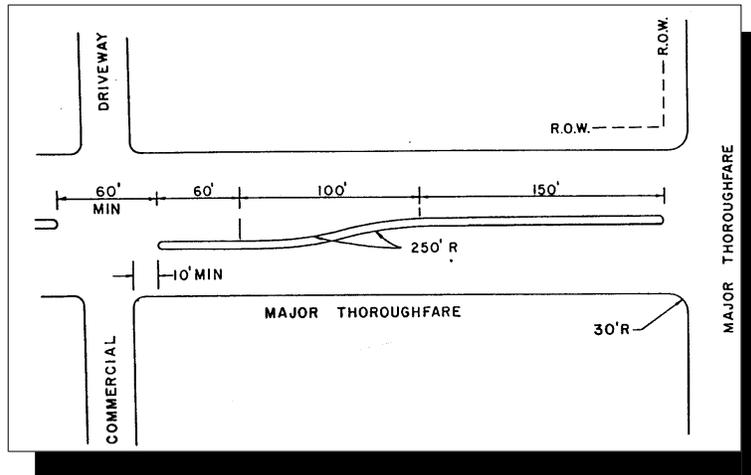
Note: Storage requirements listed herein are absolute minimums. Storage requirements may increase based upon actual and projected traffic demands.

- 1. Left turn Storage All left-turn storage areas shall be 10 feet wide with minimum storage requirements for left-turn lanes as in Table 6.
- 2. Transition Length The transition curves used in left-turn lanes shall be two, 250 foot radius reverse curves with a total transition length of 100 feet.
- 3. Median opening, width, location and spacing
 - a. Median openings at intersections shall be from right-of-way to right-of-way of the intersecting street, unless otherwise approved by the Transportation Engineer.
 - b. The width of mid-block median openings shall not be less than 60 feet, or greater than 70 feet.
 - c. Using the above requirements, examples of the minimum distance between median openings on a divided street where left-turn storage is provided in both directions are:
 - (1) 310 feet from nose to nose of the median from the intersection of two major thoroughfares to a street or drive (see Figure 5).
 - (2) 260 feet from nose to nose of the median from the intersection of two secondary thoroughfares or a secondary thoroughfare and a major thoroughfare to a residential street or a drive, and,
 - (3) 220 feet from nose to nose of the median for intersection combinations of drives and/or residential streets.

TABLE 6
MINIMUM LEFT TURN STORAGE REQUIREMENTS

INTERSECTING THOROUGHFARES	MINIMUM STORAGE
Major with major	150 feet
Major with Secondary	100 feet
Major with Residential	60 feet
Major with Private Drive	60 feet
Secondary with Major	100 feet
Secondary with Secondary	100 feet
Secondary with Residential	60 feet
Secondary with Private Drive	60 feet

FIGURE 5
TYPICAL MEDIAN SPACING ON A MAJOR STREET FROM A COMMERCIAL DRIVE TO A MAJOR STREET



E. Medians Where No Left Turn Pocket is Needed

- (1) If left-turn storage is provided in only one direction, (i.e., a drive cannot be

installed for the other direction), the minimum length of median must be the required left-turn storage and transition length, plus 30 feet of median length beyond the end of the transition, as reflected in Figure 6.

- (2) If the left-turn storage is not required in either direction, but the median is simply a spacer between two median openings, the minimum length of the spacer must be 50 feet (see Figure 6).

F. Medians into Developments on Public Street - Medians installed on undivided streets at entrances to subdivisions for aesthetic or any other

FIGURE 6
TYPICAL MEDIAN DIMENSIONS WITHOUT BACK TO BACK LEFT TURN POCKETS (*see FIGURE 7 for bullet nose details)

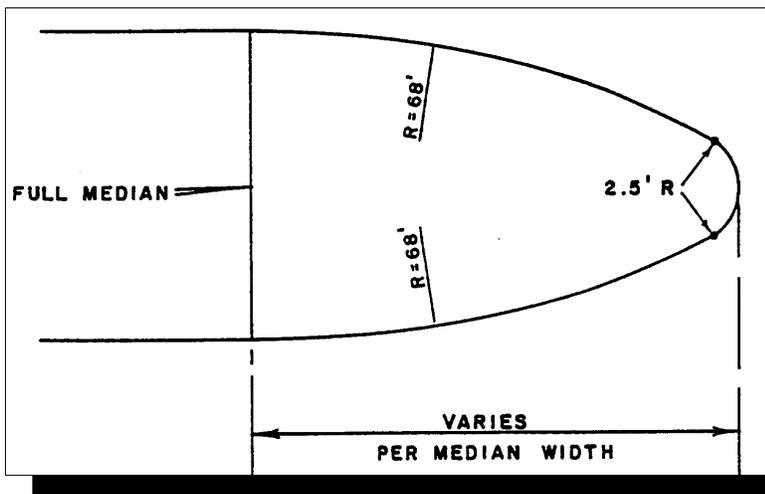
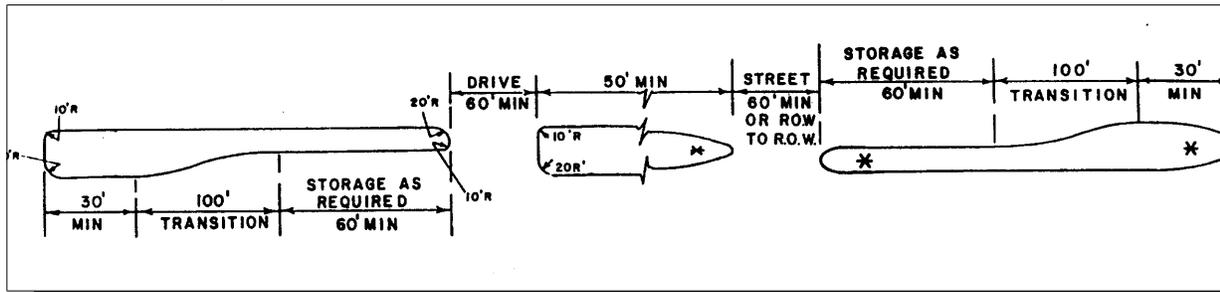


FIGURE 7
MEDIAN BULLET NOSE DETAIL

purpose shall be a minimum of 4 feet wide and 100 feet long.

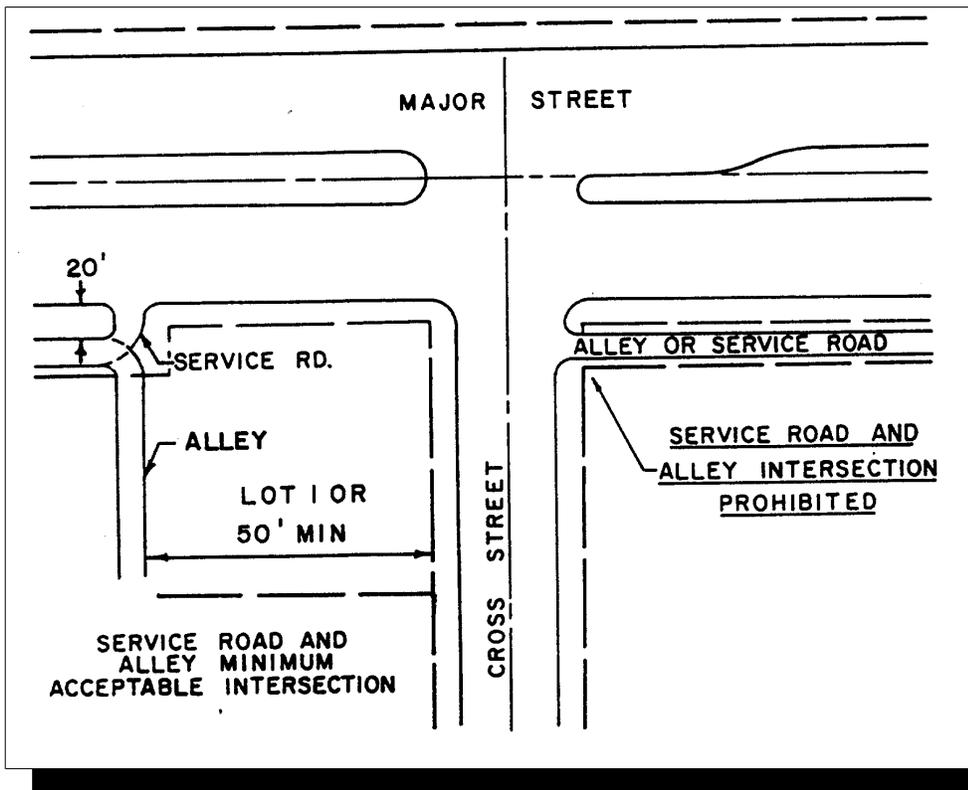


FIGURE 8
PARALLEL SERVICE ROAD/ALLEY MINIMUM INTERSECTION AT A MAJOR ROAD

SECTION III ALLEY AND SERVICE ROAD DESIGN STANDARDS

A. Alley Intersections - Alleys shall not intersect any thoroughfare with a median. Alleys which run parallel to and share a common right-of-way line with a major thoroughfare shall turn away from the major street not less than one subdivision lot width or a minimum of 50 feet (whichever is greater) from the cross street intersection as indicated in Figure 8. All alley intersections with streets shall be perpendicular or radial, within a five degree tolerance, at the intersection of the right-of-way lines. Alley offsets along residential streets shall be less than 15 feet or greater than 75 feet measured from alley R-O-W to alley R-O-W.

Note: See Article V, Section 5.4.g of City of Plano Subdivision Ordinance for Type E access restrictions.

B. Alley Radius - Alley radii at street intersections shall not be less than 15 feet.

C. Service Road Intersection - Major thoroughfare service roads shall turn into the thoroughfare at a point not less than one subdivisional lot width from the cross street intersection as indicated in Figure 8.

Note: Joint access residential drives shall have no less than 9 feet on each property.

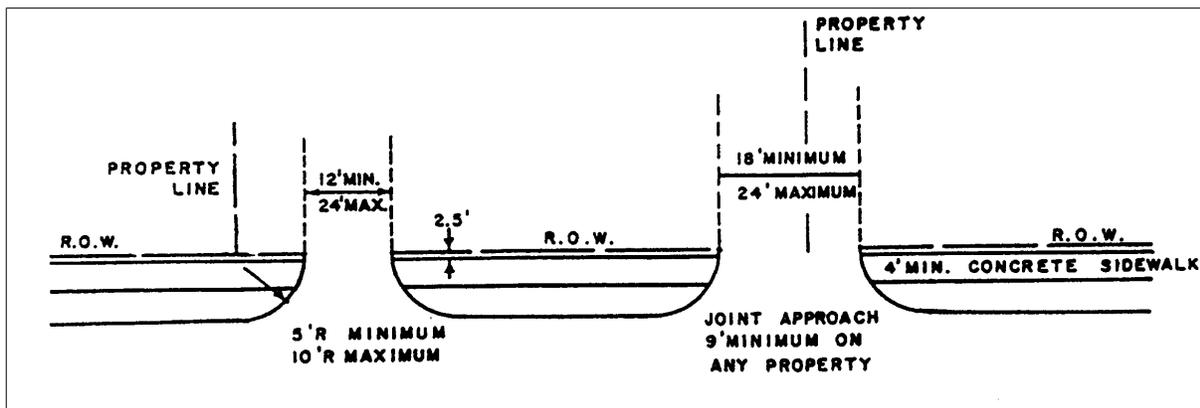


FIGURE 9(a)
DRIVEWAY WIDTH, RADIUS, SPACING for Residential Driveways

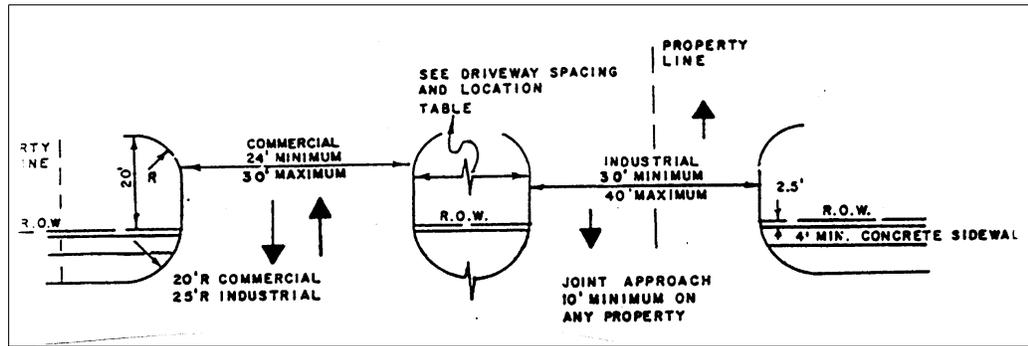
SECTION IV DRIVEWAY DESIGN STANDARDS

A. Definition of Driveway Types - For purposes of interpreting the provisions of these Rules and Regulations, the following definitions apply:

1. A "residential" driveway provides access to a single-family residence, to

FIGURE 9(b)

DRIVEWAY WIDTH, RADIUS, SPACING for Commercial Driveways



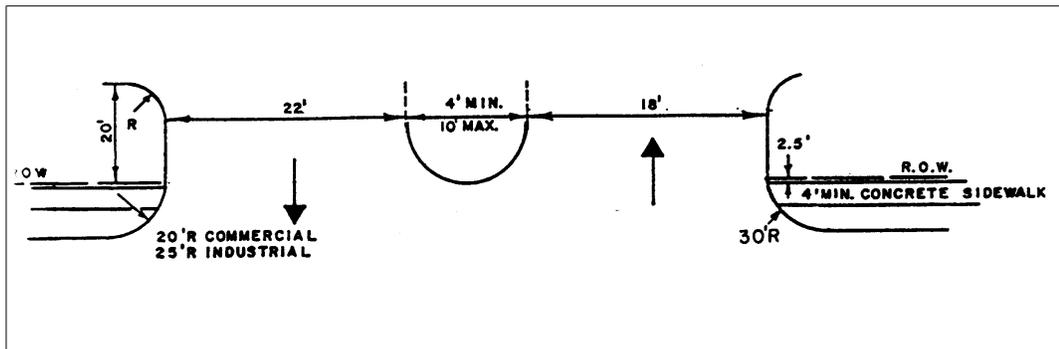
Note: Joint access commercial/industrial drives shall have no less than 10 feet on each property, with the full drive width and access pavement to the property built for the development at the same time.

a duplex, or to a multi-family building containing five or fewer dwelling units. These drives shall intersect Type E, F, and G roadways only. All access to residential property abutting all other thoroughfares shall be off an alley or a service road.

2. A "commercial" driveway provides access to an office, retail or institutional building, or to a multiple-family building having more than five dwelling units. It is anticipated that such buildings will have incidental truck service. Commercial drives shall access Major or

FIGURE 9(c)

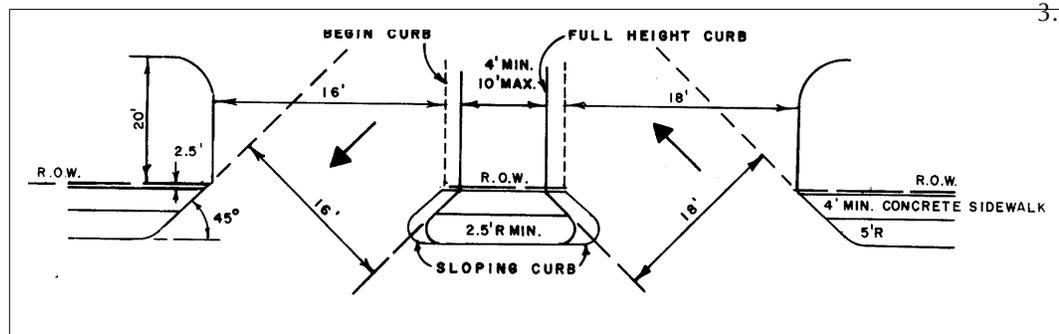
DRIVEWAY WIDTH, RADIUS, SPACING Industrial Driveways



Secondary Thoroughfares only.

FIGURE 9(d)

DRIVEWAY WIDTH



An “industrial” driveway serves truck movements to and from loading areas of an industrial facility, warehouse, or truck terminal. A centralized retail development, such as a community or regional shopping center, may have one or more driveways specially designed, signed, and located to provide access for trucks and such driveways shall be considered industrial driveways. Industrial plant driveways whose principle function is to serve administrative or employee parking lots shall be considered commercial driveways. Industrial drives shall access Major or Secondary Thoroughfares only.

Note: Two-way driveways shall always be designed to intersect the street at a 90 degree angle. One-way driveways may be designed to intersect a street at a 45 degree angle.

- B. Driveway Width - As the term is used here, the width of a driveway refers to the width of pavement at the property line.
1. Residential driveways onto streets shall have a minimum width of 12 feet and a maximum width of 24 feet (see Figure 9 (a)).
 2. Commercial/Industrial drives with two-way operation:
 - a. Commercial driveways shall have a minimum width of 24 feet and a maximum width of 30 feet. 35 or 40 foot drives may be used for service stations.
 - b. Industrial driveways shall have a minimum width of 30 feet and a maximum width of 40 feet (see Figure 9 (b)). 35 or 40 foot drives may be used for service stations.
 3. Commercial/Industrial - One way operation:
 - a. 90 degree drives shall have a width of 18 feet with a 30 foot radius for ingress and 22 feet for egress, with the separation median width being a minimum of 4 feet and a maximum of 10 feet (see Figure 9 (c)).
 - b. 45 degree drives shall have a width of 18 feet for ingress and 16 feet for egress, with the separation median width being a minimum of 4 feet and a maximum of 10 feet (see Figure 9 (d)).

C. Driveway Radius - All driveways intersecting dedicated streets shall be built with a circular curb radius connecting the 6-inch raised curb of the roadway to the design width pavement of the driveway. Driveway radii shall fall entirely within the subject property so as to begin at the street curb, at the extension of the property line.

1. 90 Degree Intersection
 - a. The curb radii for a residential drive shall be a minimum of 5 feet and a maximum of 10 feet (see Figure 9(a)).
 - b. The curb radii for a commercial drive shall be 20 feet (see Figures 9 (b), 9 (c)).
 - c. The curb radii of an industrial driveway shall be 25 feet (see Figures 9 (b), 9 (c)).
2. 45 Degree Intersection

Note: All commercial and industrial drives will have an unbroken curb length of not less than 20 feet from the right-of-way, or 30 feet from the roadway curb extending into the site on each side of the drive (see Figures 9 (b) & , 9 (c)).

TABLE 7

DRIVEWAY SPACING IN RELATION TO OTHER DRIVES GIVEN THE DESIGN SPEED OF THE STREET

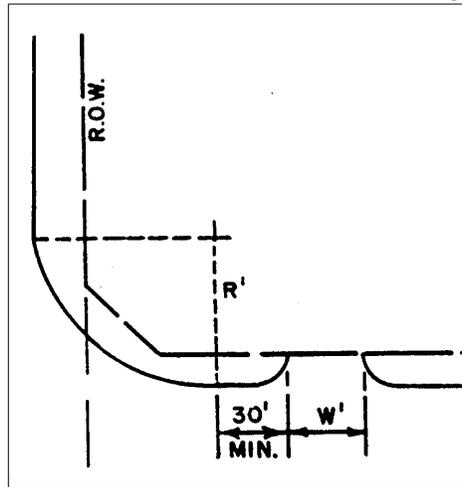
The curb radii shall be 5 feet for the outside of the drive and 2-1/2 feet for the median.

In order that the definition of the location of the edge of pavement for the thoroughfare may be maintained, driveway radii shall always

be designed to become tangent to the street curb line.

FIGURE 10(a)

DRIVEWAY SPACING IN RELATION TO A CROSS STREET 90° Drive Intersecting a Residential or Secondary



D. Driveway

Spacing and Location in Relation to Other Drives

Residential.

Driveway approaches on a tract of land devoted to one use shall not occupy more than 70% of the frontage abutting the roadway. No more than two driveway approaches shall be permitted on any parcel of property on each street.

Commercial and Industrial

The spacing and location of driveways shall be related to both existing adjacent driveways and those shown on approved development plans. The spacing between driveways shall depend upon the speed limit of the Major or Secondary Thoroughfare as shown in Table 7. Driveways shall not be permitted in the transition area of any deceleration lane or right turn lane.

FIGURE 10(b)

DRIVEWAY SPACING IN RELATION TO A CROSS STREET 90° Drive Intersecting a Major

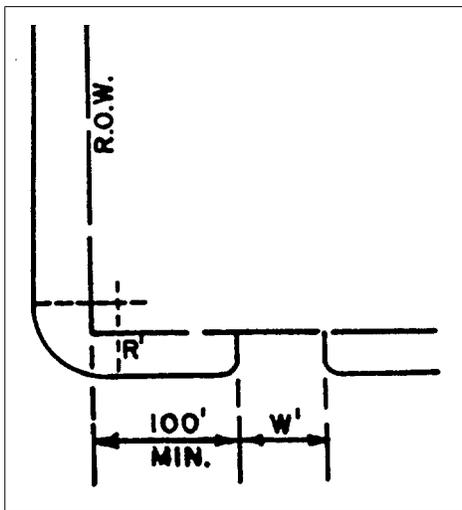
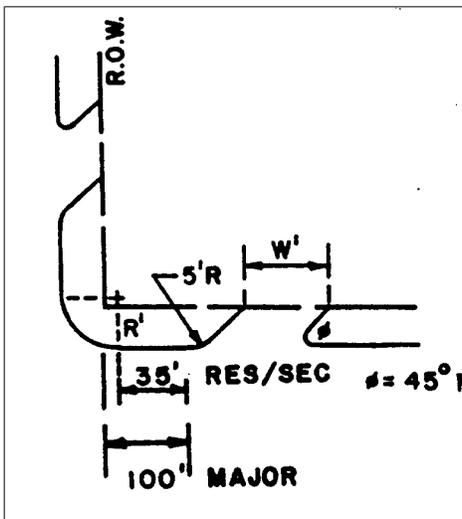


FIGURE 10(c)

ANGLE DRIVEWAY SPACING IN RELATION TO A CROSS STREET



STREET TYPE	DESIGN SPEED (MPH)	MINIMUM DRIVEWAY SPACING (FT)
F, G	30	90
D, E	35	100
C, B+	40	120
A, B	45	150
AA	50	200

Spacings between driveways will be measured along the property line from the edge of one driveway to the closest edge of the next driveway and not from centerline to centerline (see Figure 9 (b)).

E. Driveway

Spacing in Relation to a Cross Street

Note: A summary of driveway widths, radii, and angle requirements are given in Table 8.

90 Degree Intersection - Drive to Road Driveways that intersect at 90 degrees to a residential or "secondary street" shall be located a minimum of the drive radius from a residential street's end of curb radius.

- b. A driveway that intersects at 90 degrees to a residential or secondary street shall be located a minimum of 30 feet from a secondary or major street's

end of curb

**TABLE 8
SUMMARY OF DRIVE REQUIREMENTS**

	RESIDENTIAL	COMMERCIAL	ONE-WAY		INDUSTRIAL
			IN	OUT	
Width (ft)					
Minimum	12	24			
One-way (only)					30
90_			18	22	
45_			18	16	
Maximum	24	30			40
Curb Radius (ft)					
45_ (One Way)	5	5	5	5	5
90_	5-10	20	Same	Same	25
Intersection					
Angles (degrees)	90_ 45_	90_ 45_	90_ 45_	90_ 45_	90_ 45_

radius (see Figure 10(a)).

- c. A driveway that intersects at 90 degrees to a major street shall be located a minimum of 100 feet from any intersecting street's right-of-way. If the property length, along the street, is such that both the drive and the drive's curb radius cannot be totally within the proposed development, the drive shall be situated so as to be a joint access drive (see Figure 10 (b)).
- 2. 45 degree Intersection - Drive to Road
 - a. If one-way angle drives are used, the radius for the driveway on a residential or secondary may not begin less than 35 feet from an intersecting street's end of curb radius.
 - b. On a major street the drive shall be located a minimum of 100 feet from any intersecting street's right-of-way. If a property length, along the street, is such that both the drive and drive's curb radius cannot be totally within the proposed development, the drive shall be situated so as to be a joint access drive (see Figure 10 (c)).

Section V

Sidewalk and Location Design Standards

A. Definition of Sidewalk - A sidewalk is defined as that paved area in a roadway right-of-way between the curb lines or the edge of pavement of the roadway and the adjacent property lines for the use of pedestrians. The maximum grade of the sidewalk shall be 1/2" per foot, the maximum crossfall of the sidewalk shall be 1/4" per foot. These sidewalks shall conform to the following standards:

1. Zoning Classification Requiring Sidewalks. Concrete sidewalks designed and located according to City standards shall be constructed along all streets in all zoning classifications except agriculture zoning. Sidewalks shall be built at the time of site development. Should it be impractical to install the sidewalk at that time, funds for the sidewalk construction shall be placed in escrow with the City for use when the City determines sidewalks are needed. Payment of escrow shall be made prior to site plan or final plat approval.
2. Residential Areas (Single Family and Duplex). A concrete sidewalk, 4 feet in width, shall be located within the street right-of-way (R-O-W), 2-1/2 feet from the R-O-W line, unless pre-existing physical encroachments. (e.g. utility infrastructure or trees) dictate otherwise. Sidewalks and parkways (curb to R-O-W) shall be graded at 1/4-inch per foot above the top of the street curb.
3. Non-residential Areas and Apartment Complexes. A concrete sidewalk, 4 feet in width, shall be located in street right-of-way (R-O-W) not more

than 2 1/2 feet from the R-O-W line. If other materials are placed in the R-O-W between the sidewalk and curb, the material shall meet City specifications and be of a color and texture distinctly different from the sidewalk and specified on the site plan.

4. Meandering Sidewalks. Sidewalk easements adjacent to the standard R-O-W will be required, if necessary, for meandering sidewalks. The rear edge of the sidewalk closest to the street shall be located not less than 5 feet from the back-of-curb and shall meander into the sidewalk easement. Sidewalk easements shall provide a minimum clearance of 2-1/2 feet beyond the rear edge of the sidewalk.
5. Exceptions. If it should be necessary to construct the walk adjacent to the curb line, the walk shall be a minimum of 5 feet in width. At no time shall the side of the walk away from the street be less than 5 feet away from the curb line. If the required sidewalk is to be placed outside of the roadway right-of-way, it must be placed in a sidewalk easement. Approval of planned exceptions and sidewalk easements shall be made at the time of site plan or plat approval.
6. Waiver. The sidewalk required in non-residential areas may be waived by the Planning & Zoning Commission either temporarily or permanently at the time of site plan or final plat approval. The Waiver may be granted based on site conditions and/or location of the tract.
7. Areas Without Screening Walls. In areas on major and secondary roadways where screening is not required or a type of screening other than a wall is used, (e.g., a berm, foliage, etc.) a 4 foot sidewalk will be constructed not more than two and 2-1/2 feet from the right-of-way line as required by the Thoroughfare Plan.

8. Areas with Screening Walls.
In areas where a screening wall is provided, a concrete sidewalk shall be constructed contiguous with the screening wall. The street side of the sidewalk shall run parallel to the street curb. The sidewalk shall be a minimum of 5 feet wide and the measurement shall be made from the street side of the sidewalk to the face of the screening wall columns.

9. Sidewalk on Bridges.
Bridges on Type C or larger thoroughfares shall have a sidewalk constructed on each side of the bridge. The sidewalk shall be a minimum of 6 feet wide with a parapet wall provided adjacent to the curb of the thoroughfare and with a

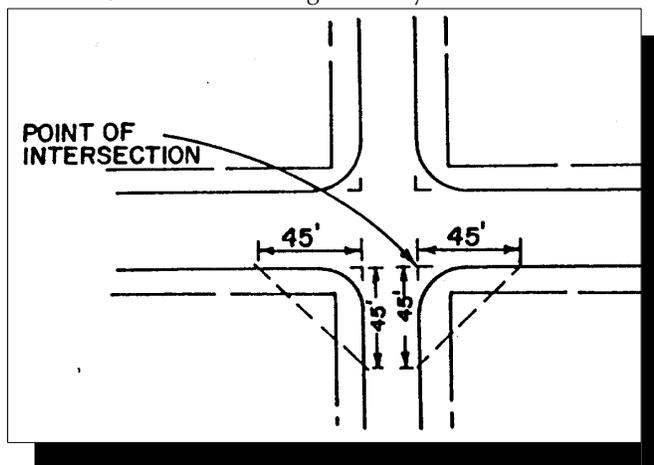


FIGURE 11
STREET INTERSECTION VISIBILITY TRIANGLE

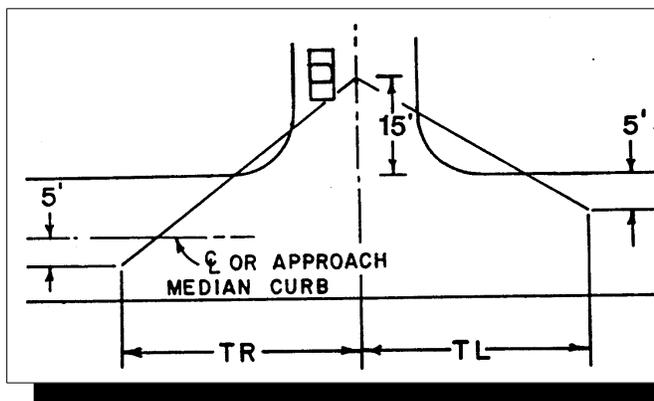


FIGURE 12
HORIZONTAL CLEAR TRIANGLE

standard pedestrian bridge rail protecting the sidewalk on the outside edge of the bridge.

10. Sidewalks Under Bridges. When new bridges are built as a part of the construction of a roadway or the reconstruction of a roadway and a pedestrian crossing is needed, an 8 foot sidewalk will be built as a part of the embankment design underneath the bridge structure.

B. Barrier-Free Ramps - Curbs and walks constructed at intersections of all streets and thoroughfares must comply with the provisions of the Americans with Disabilities Act and be constructed in a manner to be easily and safely negotiated by handicapped persons.

TABLE 9
MINIMUM SIGHT DISTANCE FOR A CAR AT AN INTERSECTION For Level-Two Lane Streets

STREET TYPE	MPH	T
F, G	30	110 + 200=310
D, E	35	130 + 250=380
B, C	40	130 + 325=475
A, B+	45	165 + 400=565
AA	50	190 + 475=665

Note: Single trunked trees within the triangles and in the median shall be allowed and spaced so as to not cause a “picket fence” effect. Because of the large variation of ways in which trees can be planted, the spacings shall be decided upon by the City of Plano Transportation Engineer and the developer at the time of review of the landscape plans. Any other item that obstructs these lines so as to interfere with the above requirements shall not be allowed.

SECTION VI PUBLIC RIGHT-OF-WAY VISIBILITY

A. Street/Drive Intersection Visibility Obstruction Triangles-Frontage Plan/Profile - A landscape plan showing the plan/profile of the street on both sides of each proposed drive/street to the proposed development with the grades, curb elevations, proposed street/drive locations, and all items (both natural and man-made) within the visibility triangles as described below shall be provided with all site plans, if not shown on engineering plans that are submitted at the same time. This profile shall show no horizontal or vertical restrictions (either existing or future) within the areas defined below.

1. Obstruction/Interference Triangles-Defined: No fence, wall, screen, sign, structure, foliage, hedge, bush, shrub, tree, berm, or any other item, either man-made or natural shall be erected, planted, or maintained in a position which will obstruct or interfere with the following minimum standards.

- a. Vision at all intersections where streets intersect at or near right angles shall be clear at elevation between two and 2-1/2 feet and 9 feet above the average gutter elevation, except single trunked trees, within a triangular area formed by extending the two curb lines from their point of intersection, 45 feet, and connecting these points with an imaginary line, thereby making a triangle. If there are no curbs existing, the triangular area shall be formed by extending the property lines from their point of intersection 30 feet and connecting these points with an imaginary line, thereby making a triangle as shown in Figure 11.
- b. Definitions for desirable minimum sight distance requirements for non-residential streets Type D and above, commercial driveways, and industrial driveways that intersect at or near right angles are presented below. The values presented are minimum sight distances which would permit the following:
TR = TL = T Upon turning left or right, an exiting vehicle could accelerate to the operating speed of the street (see Figure 12).

Note: No plantings or berms over 30-inches above the adjacent gutter elevation are allowed in the median for the length of the left turn stacking space unless specifically agreed upon by the City Transportation Engineer.

The desirable minimum sight distances are based on the premise that the approaching driver can observe the intersecting vehicle 2.5 seconds before he must apply the brakes and travel the minimum stopping distance for his approach speed. They are, therefore, particularly applicable to arterial streets. Actual sight distances provided at intersections should be much greater than these minimum values if practical. The minimum sight distance triangle shall also apply to visibility obstructions at intersections.

Conditions for Intersection Sight Triangle-Plan/Profile:

In the plan view, the horizontal clear area at the intersection of a proposed street/drive shall be defined as being within a triangular area formed by:

- (i) A line that is on the centerline of the proposed street/drive, beginning at the intersecting street's tangent curb and continuing for a distance of 15 feet back into the proposed street/drive to the end point.
- (ii) A line that is parallel to and 5 feet out from the intersecting street's curb, beginning at the centerline of the proposed street/drive and continuing for a distance "T" as prescribed by Figure 12 and Table 9, to the end point.

The aforementioned restrictions also apply to streets which do not intersect at right angles, except that the triangle dimensions shall not necessarily be minimum requirements. In such cases, the City of Plano Transportation Engineer shall have the authority to vary such requirements as deemed necessary to provide safety for both vehicular and pedestrian traffic.

- (iii) A straight line that connects the end point of (i) (that is on the centerline and 15 feet back into the proposed street/drive) and the end point of a.(ii) (that is a distance "T" along and 5 feet out from the existing street's curb from the centerline of the proposed street/drive).

In the profile view, the clear window shall be defined as being within the horizontal clear area and clear between 2.5 feet and 9 feet above the average pavement elevation.

B. R.O.W. Obstructions Outside the Visibility Triangles

1. Fences, walls, screens, signs and other structures shall conform to the Comprehensive Zoning Ordinance of the City, as amended, and to the Sign Ordinance of the City.
2. Foliage of hedges, trees and shrubs in public right-of-ways which are not governed by Section 3-1400 of the Comprehensive Zoning Ordinance of the City, or the above triangles shall be maintained such that the minimum overhang above a sidewalk shall be 7 feet and the minimum overhang above a street shall be 14 feet. The City of Plano Public Works shall develop vertical clearance guidelines for residential Type "F" (37' B-B) and Type "C" (27' B-B) roadways. The vertical clearances stated above shall apply on all other roadways.
3. All other areas within street rights-of-way shall be clear at elevations between 2-1/2 feet and 9 feet above the average street grade.
4. Plants in the public right-of-way that will grow over 30-inches (when mature) above the adjacent street's curb shall conform to all of the above requirements, where applicable. All landscape plans shall show all items as prescribed by the Parks and Recreation Department and Planning Department, including:
 - a. The locations and type of such plants; and
 - b. The prescribed visibility triangles.
5. Ground elevations, within both triangles, will be shown by contour lines.

C. Alley Visibility Obstructions. No fence, wall, screen, sign, structure, or foliage of hedges, trees, bushes, or shrubs shall be erected, planted or

maintained in any alley right-of-way. Foliage of hedges, trees, bushes, and shrubs planted adjacent to the alleys right-of-way which are not governed by the above triangles or Section 3-1400 of the Comprehensive Zoning Ordinance of the City, shall be maintained such that the minimum overhang or encroachment shall be 14 feet above the alley surface-one foot outside the edge of the pavement. A minimum 12 foot clear alley width shall be provided in every case.

D. Abatement.

- (1) The City Manager of the City of Plano, or his designee(s), shall have the authority to enforce the provisions of this Section. Upon determination of a violation, a written notice shall be issued to the property owner and occupant, if the property is non-owner occupied, requesting that said owner or occupant abate said violation within fifteen (15) days of the notice. Such written notice shall be given as follows: (Ordinance No. 97-12-1)
 - (a) Personal delivery to the owner and/or occupant; (Ordinance No. 97-12-1)
 - (b) By letter sent to such person at his post office address and which shall be deemed to have been received five (5) days from the date of mailing; or (Ordinance No. 97-12-1)
 - (c) If personal service cannot be obtained or the owner's and/or occupant's post office address is unknown: (Ordinance No. 97-12-1)
 - (i) By publication at least twice within fifteen (15) consecutive days; (Ordinance No. 97-12-1)
 - (ii) By posting the notice on or near the front door of each building on the property to which the violation relates; or (Ordinance No. 97-12-1)
- (iii) By posting the notice on a placard attached to a stake driven into the ground on the property to which the violation relates, if the property contains no buildings. (Ordinance No. 97-12-1)
- (2) The City of Plano or the owner or occupant shall abate the violation in the following manner: (Ordinance No. 97-12-1)
 - (a) The owner or occupant shall abate the violation within fifteen (15) days after receipt of notice or first publication or posting. (Ordinance No. 97-12-1)
 - (b) If owner/occupant fails or refuses to comply with the demand for compliance within fifteen (15) days of notice, the City may do such work or cause such work to be done and assess the costs, charges, and expenses to the owner of the property. (Ordinance No. 97-12-1)
- (3) In addition to the costs incurred by the City in abating the violation, an administrative fee of One Hundred and Fifty Dollars (\$150.00) per lot or tract of land shall be assessed. (Ordinance No. 97-12-1)

If a privileged lien is placed on the real property as provided in subparagraph (4) below, an additional administrative fee of Twenty-two Dollars (\$22.00) shall be collected by the City. (Ordinance No. 97-12-1)

- (4) If notice is delivered to the owner of such real property and he fails to comply within the applicable time period, the costs shall be, in addition to a charge to and personal liability of the owner, a privileged lien upon and against such real property, including all fixtures and improvements thereon. (Ordinance No. 97-12-1)

In order to perfect a lien, the owner shall be given written notice of demand for payment of such charges. Notice may be given by any one of the methods provided for the initial notice requiring compliance. If the owner fails or refuses to make complete payment of the charges within twenty (20) days of such notice, a written statement of such charges shall be filed with the county clerk of the county in which the real property is located, for filing in the county land records. The statement shall be sufficient if it contains the following: (Ordinance No. 97-12-1)

- (a) The name of the owner; (Ordinance No. 97-12-1)
- (b) A description of the real property; (Ordinance No. 97-12-1)
- (c) The amount of the charges including interest thereon; (Ordinance No. 97-12-1)
- (d) A statement that all prerequisites required by this section for the imposition of the charges and the affixing of the lien have been met; (Ordinance No. 97-12-1)
- (e) A statement signed by the City Manager of the City of Plano, or his designee(s), under oath, that the statements made therein are true and correct. (Ordinance No. 97-12-1)

The statement may also contain such other information deemed appropriate by the City

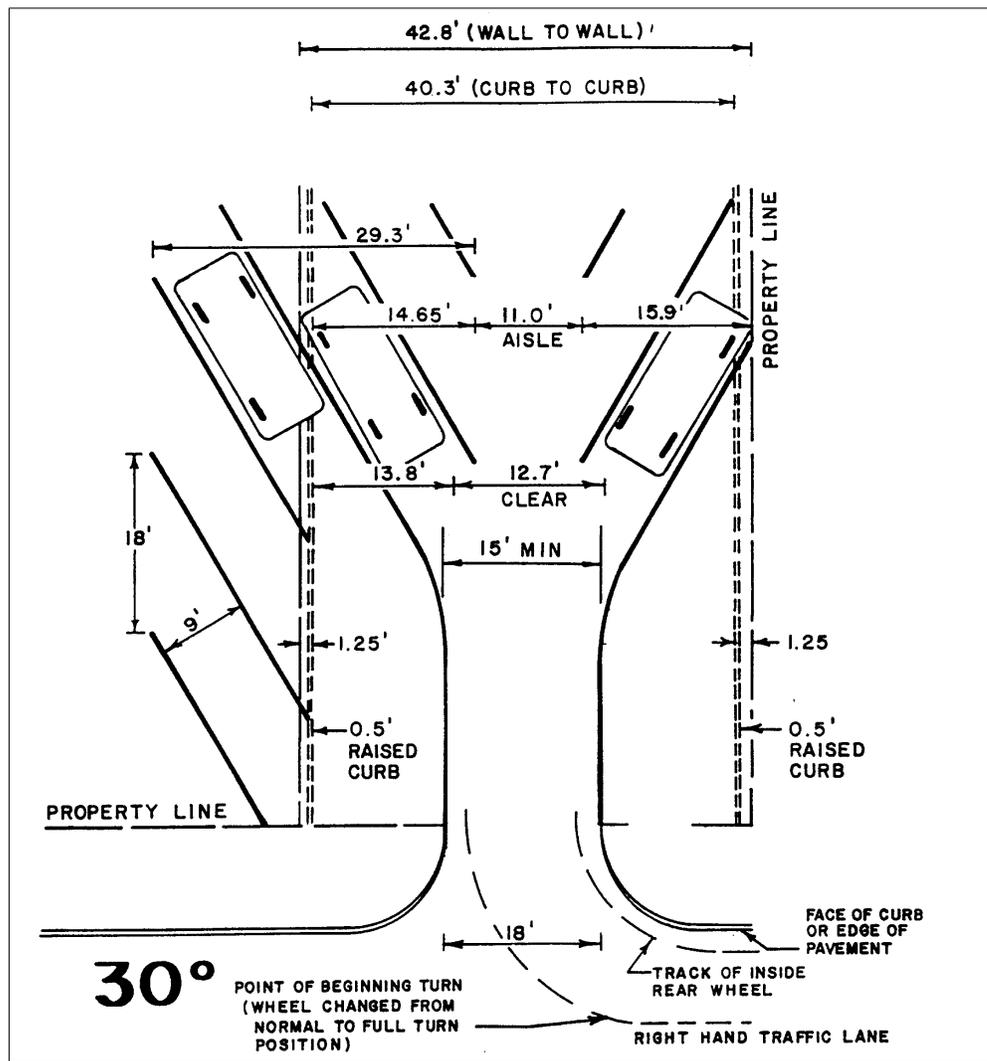


FIGURE 13
ANGLE PARKING REQUIREMENTS

Manager of the City of Plano, or his designee(s). (Ordinance No. 97-12-1)

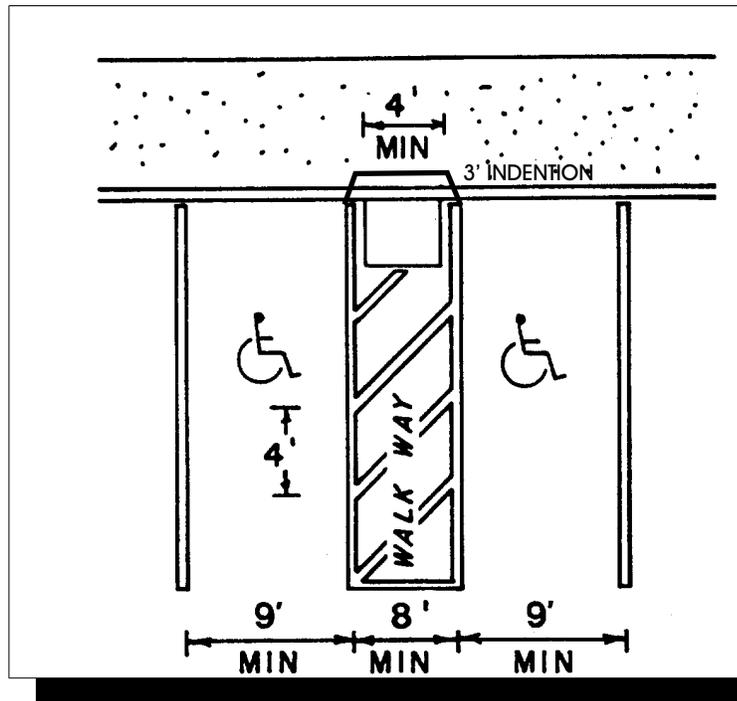


FIGURE 14 (a)
HANDICAPPED PARKING STANDARDS
Head-in or Angle parking Dimensions

All charges shall bear interest at the rate of ten (10%) percent per annum from the date the City incurs the expense. The City may bring suit to collect the charges, institute foreclosure proceedings, or both. The statement, as provided herein, or certified copy thereof, shall be prima facie evidence of

the City's claim for charges or right to foreclose the lien. The owner or any other person responsible as provided herein, shall be jointly and severally liable for the charges.

(Ordinance No. 97-12-1)

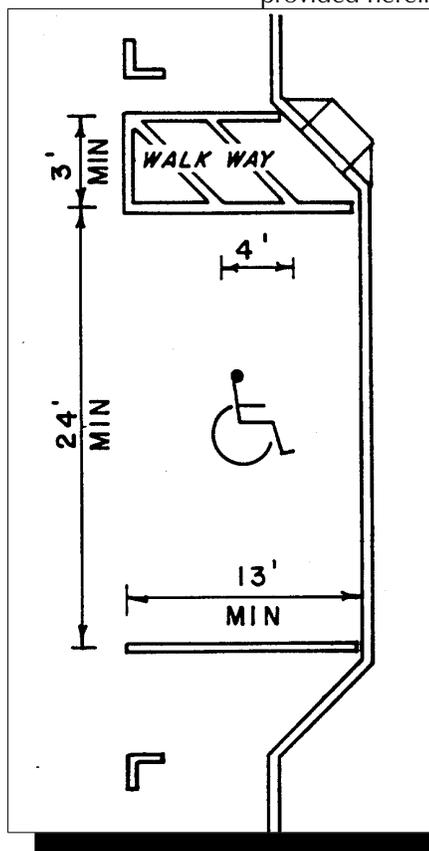


FIGURE 14 (b)
HANDICAPPED PARKING STANDARDS
Parallel parking Dimensions

(5)

The provisions of this section shall be enforced by the City Manager of the City of Plano or his designee(s). It shall be unlawful for any person to interfere with the City Manager of the City of Plano, or his designee(s), or any inspector in the exercise of their duties under this section. (Ordinance No. 97-12-1)

(6)

If the violation requires immediate abatement to

protect the public safety or health, the owner or occupant, if available at the premises, shall be given verbal notice to immediately remove the obstruction causing the violation. Should the owner or occupant not take immediate action, the City may remove the obstruction to abate the violation, at the expense of the owner or occupant; however, the City shall not be entitled to file a lien for expenses incurred by the City under this Section. (Ordinance No. 97-12-1)

E. Preservation of existing laws. Nothing contained in this Section shall be construed so as to amend, alter, change or repeal any provision or regulation of the Comprehensive Zoning Ordinance of the City or the sign ordinance of the City. (Ordinance No. 97-12-1)

SECTION VII OFF STREET REQUIREMENTS

A. Stacking Space for Drive-up Windows. - The minimum stacking space for the first vehicle stop for commercial drive-throughs shall be 100 feet, and 40 feet thereafter, for any other stops.

B. Parking Lot Layout

1. Space Dimensions. Parking dimensions for 90 degree angle parking will be in accordance with the general definition as shown in 3-1104 of the Comprehensive Zoning Ordinance and partially reinstated herein:

Size Of Space. Each standard off-street parking space shall contain not less than 180 square feet and measure not less than 9 feet by 20 feet, exclusive of access drives and aisles, and shall be of usable shape and condition.

2. The width for two-way aisles shall be 24 feet.

Other acceptable angles of parking are parallel, 60 , 45 , and 30 as shown in Figure 13.

Note: The drawing for 30 is for one directional travel.

3. Parking Overhang. No parking stall shall be situated so as to allow vehicle overhang into public right-of-way or required landscape edge. Curb or parking stops shall be installed so that the distance between the face of the curb or car stop is a minimum of 2 feet from the public right-of-way.
4. Handicapped Parking. Where handicapped parking is required or installed, the design shall be as in Figure 14 (a) & 14 (b).
5. Movements in Public Right-of-Ways. No parking stall shall be so designed as to allow any movement into or out of the stall, upon public right-of-way.

*Street and sidewalk standards are covered in several City documents including the Comprehensive Plan, Comprehensive Zoning Ordinance, Subdivision and Platting Ordinance, and the Thoroughfare Standards Rules & Regulations.

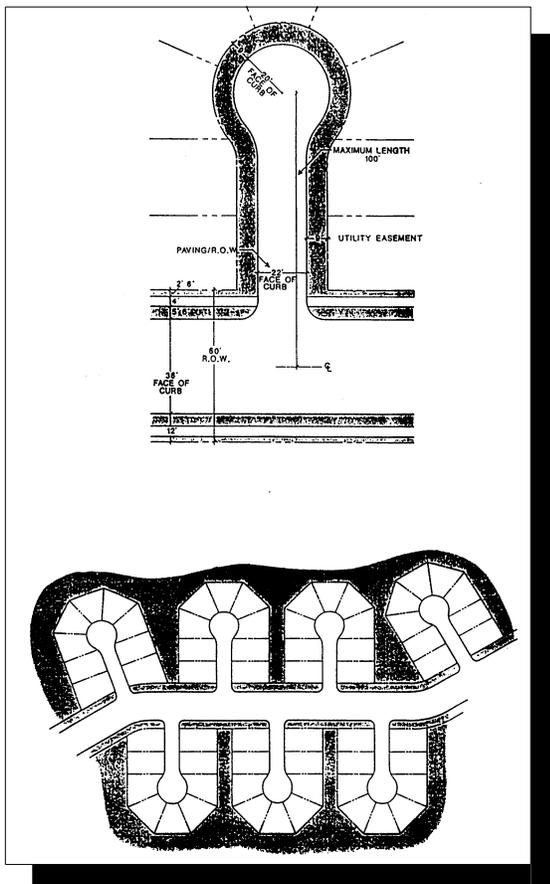


FIGURE 15 CUL-DE-SAC / COURT

SECTION VIII ALTERNATIVE SUBDIVISION STREET & SIDEWALK STANDARDS FOR MEDIUM DENSITY HOUSING

A. Introduction - General subdivision street and sidewalk standards are not always appropriate for some types of medium density housing where:

1. The clustering of units and provision of common open space create a difference in scale and context;
2. The size and layout of individual lots does not permit the normal frontage and access to streets and/or alleys; and
3. The subdivision layout and street pattern are designed to encourage pedestrian movement and to limit through vehicular traffic.

Alternative standards are needed for medium density residential developments if, when applied, the standards result in subdivisions that:

- (I) Are more efficient and cost effective while maintaining proper access and safe movement for pedestrians, personal vehicles, emergency vehicles, and service vehicles;
- (II) Are commensurate with the scale and character of the proposed product and/or development type; and
- (III) Include innovative and/or affordable housing that could not be constructed under the general subdivision standards.

B. Applicable Development Types - The alternative subdivision street and sidewalk standards are proposed for medium density, single-family detached and/or attached homes, generally placed on individually platted lots, but arranged in development patterns different from typical single-family subdivisions. They are specifically intended for housing with characteristics that make normal subdivision standards inappropriate. They are not recommended for typical low density subdivisions or for medium density

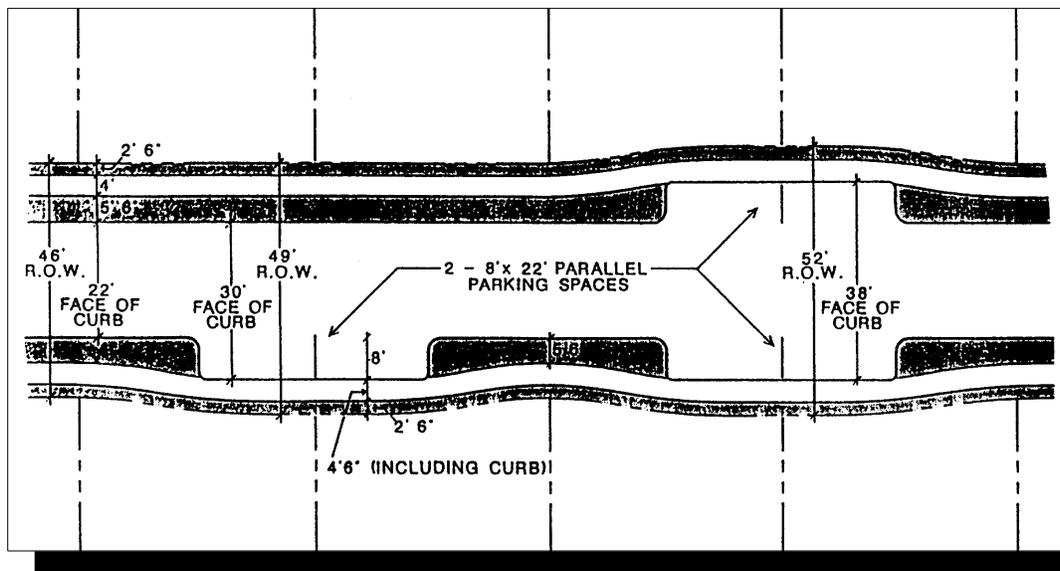
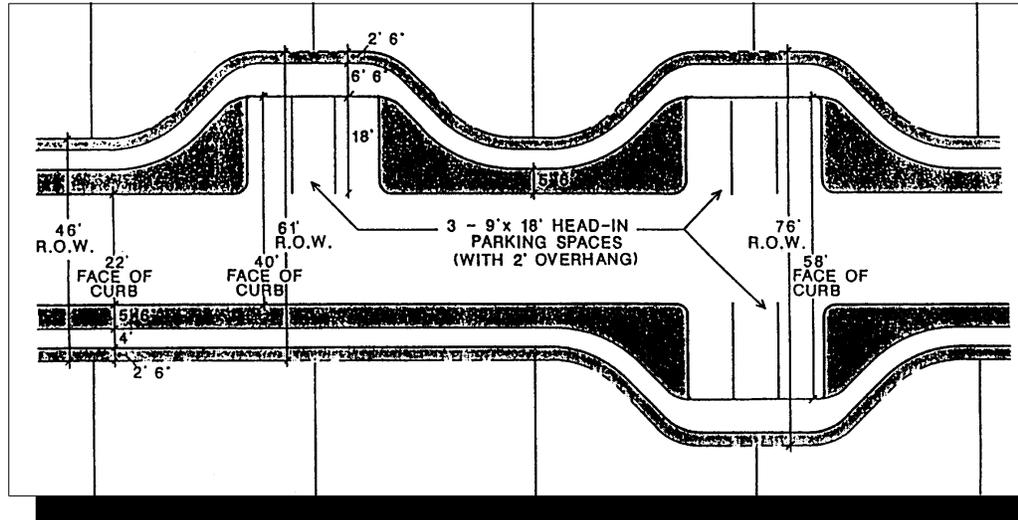


FIGURE 16

**STREET
WITH
PARALLEL
PARKING
INSERTS**

subdivisions that can be readily developed under current standards. Development characteristics include:

FIGURE 17
STREET WITH HEAD-IN PARKING INSERTS

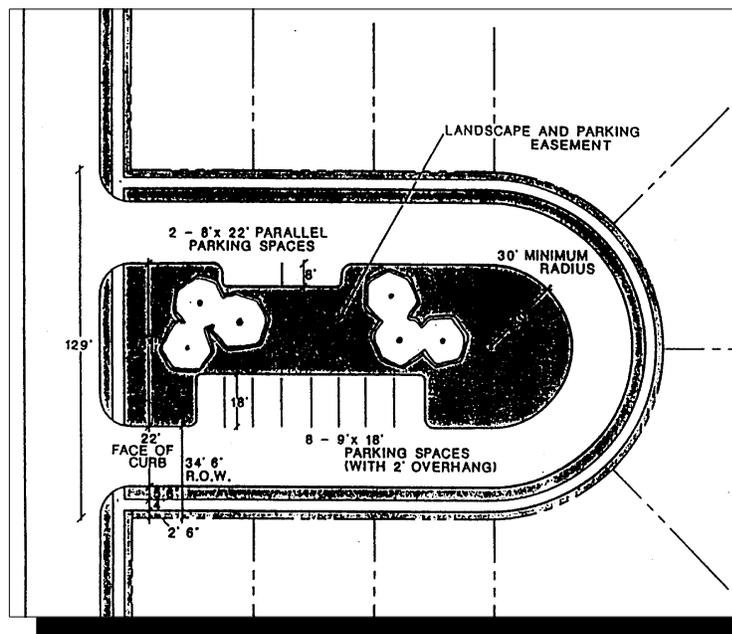


1. Lot Size - Less than 6000 square feet;
2. Density - 5 to 12 units per acre;
3. House Types - Garden homes, patio homes, town houses, cluster housing and tri- and four-plex multi-family units; and
4. Zoning Categories - Planned Residential Developments (PRDs), Patio Homes (PH), Single-Family Attached (SF-A).

C. Current Applicable Standards - Existing City street and sidewalk standards* are designed to accommodate typical single-family subdivisions, as built throughout the Metroplex. These subdivisions are low density developments of less than five units per acre. Generally, they do not contain special pedestrian linkages, common open space, shared visitor parking areas, or clustered housing arrangements. The application of existing street and sidewalk standards may impose unnecessary cost or inappropriate

design on newer forms of development.

FIGURE 18
DIVIDED CUL-DE-SAC WITH INTERIOR PARKING/OPEN SPACE



There are also instances where street standards for medium density developments need to be more stringent than those for low density uses. Higher densities may increase requirements for access, parking, and services.

Current standards requiring evaluation and possible modification for certain types of development include:

1. Street Width
 - a. Residential street - 26 feet of paving (face of curb to face of curb), 50 feet of right-of-way; and
 - b. Collection street - 36 feet of paving (face of curb to face of curb), 60 feet of right-of-way.
2. Cul-de-sac
 - a. Maximum street length - 600 feet (from centerline of intersecting street to center of bulb); and
 - b. Bulb radius - 38 feet of paving (face of curb to face of curb), 50 feet of right-of-way.
3. Sidewalks
 - a. 4-feet wide; and
 - b. 2-feet 6-inches from property line (leaves 5-feet 6-inches of parkway between curb and sidewalk).
4. Curbs
 - a. 6-inch vertical curbs; and
 - b. No rolled or mountable curbs.

D. Proposed Alternatives - Street Width - The existing residential street width standard of 26 feet is generally adequate for both on-street parking and access in low density developments. Since cars are rarely parked continuously along low density residential streets, there are sufficient gaps for one vehicle to pull over and allow another to pass. In medium density subdivisions with narrower lot widths and more units, the demand for on-street parking is greater. Therefore, the gaps between parked cars are shorter and less frequent and two-way access is more limited.

1. Courts. A design that has proven successful in this area involves the use of short cul-de-sacs, or courts, intersecting a wider street (see Figure 15). Because of the length of the courts and the small number of units along each, it is possible to eliminate on-street parking and provide for a much narrower street. The shortened street length and elimination of on-street parking makes it possible to reduce the radius of the cul-de-sac bulb. A system of courts can only be effective if adequate parking is provided via an intersecting spine road and/or by nearby off-street parking lots. Otherwise, parking will greatly restrict the flow of traffic.

The reduced width design of courts will adequately serve passenger vehicles; however, the mobility of safety and service vehicles may be somewhat reduced. Particularly affected are fire engines and moving vans. Adequate access for these larger vehicles can generally be provided if the courts are short and free of on-street parking. However, garbage pick-up for all units on the court should be consolidated into a single location along the spine road unless alley access is provided. Additional precautions such as fire sprinklers for individual housing units should also be considered.

*All substitute parking should be within 200 feet of the housing unit which it serves

- a. Street width - 22 feet (face of curb to face of curb), 23 feet of right-of-way (to include curbs);
 - b. 9 foot utility easements on each side of curb;
 - c. Right-of-way - Same as street dimensions;
 - d. Maximum street length - 100 feet;
 - e. Minimum cul-de-sac bulb radius - 20 feet;
 - f. Maximum dwelling units - 10;
 - g. Must intersect with a 36 foot wide spine road providing on-street parking for visitors. No units should face the spine road; and
 - h. The court should be platted and permanently striped as a fire lane.
2. Streets with Parking Inserts - Another way to provide for on-street parking without using the standard 26-foot pavement width is to construct two through lanes for traffic with periodic inserts for parallel or "head-in" parking for visitors (see Figures 16 and 17). This allows for reduced rights-of-way and paving along portions of a street which can be expanded as needed to provide visitor parking. Specific design standards include:
- a. Street width - 22 feet (face of curb to face of curb), 46 feet of right-of-way;
 - b. Parallel parking stalls - 8 feet x 22 feet of paving, additional right-of-way needed - 3 feet (see Figure 16);
 - c. Head-in parking stalls - 9 feet x 18 feet (plus two feet for overhang), additional right-of-way needed - 15 feet (see Figure 17);
 - d. Maximum street length - 400 feet for cul-de-sac (as measured from center of bulb to centerline of intersecting street.) and 800 feet for looped streets (measured to centerline of street of origin);
 - e. Parking inserts are not permitted on any block face (either side of the street) where standard on-street parking is also permitted.
3. Divided Cul-de-sacs. Instead of ending in a bulb, divided cul-de-sacs loop around an enlarged median and return to the original intersecting street. They can be an effective way to create special open space and parking areas in some types of medium density housing developments, while still providing safe vehicular and pedestrian access (see Figure 18). Applicable standards for divided cul-de-sacs are:
- a. Minimum paving width - 22 feet (face of curb to face of curb), 34 feet 6-inches of right-of-way;
 - b. Maximum street length - 600 feet;
 - c. Minimum inside turn radius - 30 feet;
 - d. Interior areas are limited to open space and/or parking, no residences should be placed within them;

*7.6 Trips per day represents the average between 10 ADT for low density single-family and 5.2 ADT for condominiums.

- e. Interior areas should be dedicated to a homeowners' association for upkeep and maintenance; and
- f. The street should be platted and permanently striped as a fire lane.

*7.6 Trips per day represents the average between 10 ADT for low density single-family and 5.2 ADT for condominiums.

E. Proposed Alternatives - On-Street Parking - On-street parking is generally taken for granted in low density residential subdivisions. However, it becomes a critical issue in many medium density proposals. As lot widths are narrowed, the curb space available for parking per unit is also reduced. As a result, the number and length of gaps between parked vehicles is reduced, limiting the ability of one vehicle to pull over and allow another to pass.

This loss of mobility must be addressed by the alternative standards. Under the existing standards, a typical block in an SF-6 subdivision (60-foot lot width) would have 60% of its curb space free for pull-over traffic. (This assumes that two on-site spaces are available per unit, and that at least one on-street space is used per unit.) In medium density developments a certain loss of mobility is to be expected. However, in order to maintain reasonable access and circulation, it is recommended that a minimum of 50% of curb space along either side of the block be available for pull-over traffic.

To facilitate the allowance for passing vehicles, the following options are recommended:

1. Widening of the roadway to 36 feet of pavement to permit two-way traffic and parking;
2. The placement of off-street parking lots in proximity to the affected units; and
3. The connection of the street in question to a 36-foot wide spine road or collector street with available on-street parking.

Based on the 50% mobility factor, a typical patio home (40-foot lot width) would need five additional spaces to be accommodated by one of the above. A typical townhouse block (27-foot lot width) requires 22 additional spaces.

The recommended mobility criteria are as follows:

1. Mobility factor - 50% based on:
 - a. 50-foot setback at each end for intersecting streets (for cul-de-sacs, also subtract 50 feet from bulb); and
 - b. Two off-street spaces per unit on back lot plus one on-street space per unit (about 22 feet in length per space).
2. Substitute Parking* - Additional spaces needed to maintain 50% mobility on the street should be provided by one of the following:

FIGURE 20

CUL-DE-SAC WITH EXPANDED

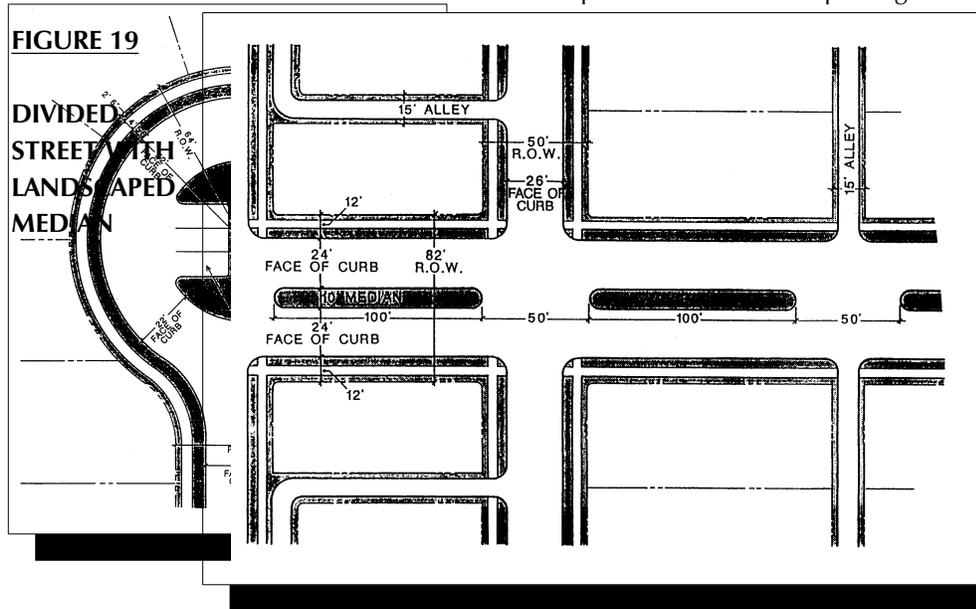
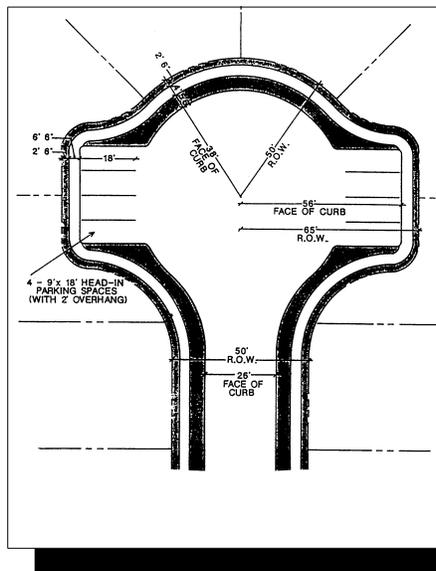


FIGURE 21

CUL-DE-SAC WITH HEAD-IN



- a. Widening the roadway to 36 feet of pavement, providing two outside lanes of parking and two through-traffic lanes;
- b. The provision of off-street parking for each required space lost to the mobility factor; and

to the mobility factor; and

The connection of the street to a 36-foot wide street (paved section, face of curb to face of curb) which can provide the required parking to meet the total of one space per unit, without affecting its own parking

requirements.

F. Proposed Alternatives - Divided Streets -

Divided streets with landscaped medians can provide an attractive setting in residential areas (see Figure 19). Because of maintenance costs and circulation characteristics of such streets, they should generally be limited to main entrances and collector streets. The median width should be adequate to support trees and other landscape materials, and to provide sufficient turnaround. Applicable standards for divided streets, not identified as major or secondary thoroughfares on the Thoroughfare Plan, include:

1. Two 24-foot wide pavement sections (face of curb to face of curb), 82 feet of right-of-way;
2. Minimum median width - ten feet;
3. Minimum separation between median openings - 100 feet;
4. Divided streets are limited to siding lots only;
5. Maximum distance of divided street section - 1,200 feet; and
6. All street and alley intersections must align with median openings.

G. Proposed Alternatives - Cul-de-Sac Length - Cul-de-sacs are especially common in medium density developments because they create opportunities for clustering units. The use of cul-de-sacs in medium density developments restricts through traffic movement and allows for special open space areas and pedestrian pathways (see Figure 18).

In determining the maximum length of cul-de-sacs, the Institute of Traffic Engineers (ITE) recommends a maximum of 200 Average Daily Trips (ADT). (See "Recommended Guidelines for Subdivision Streets", Washington, D.C.: ITE, 1984.) The 600' maximum cul-de-sac length, specified in the Subdivision Ordinance, is appropriate for low density single-family developments, but shorter lengths should apply for most medium density developments. However, the decrease in maximum length for higher densities is not directly proportional to the increase in the number of units because the number of trips per unit decreases as density increases. Medium density units typically have fewer occupants, and therefore a lower trip demand.

Using ITE's Trip Generations Handbook as a guide, recommended cul-de-sac lengths are:

1. Patio Homes (based on 7.6* ADT per unit and 40-foot average lot width) - 500 feet; and
2. Townhouses/Condominiums (based on 5.2 ADT per unit and 27-foot average lot width) - 500 feet.

H. Proposed Alternatives - Maximum Block Length - To ensure adequate access and circulation in neighborhoods, the Subdivision and Planning Ordinance recommends a maximum block length of 1,200 feet. This results in an effective system of options and outlets when traveling residential streets.

In medium density subdivisions, a shorter block length is needed to offset the increase in traffic volumes. The existing standards would accommodate an SF-6 (Single Family, 6,000 square foot lot size) development with an ADT (average daily trip) level of 400 per block. Using the same ADT level, both patio home and townhouse block lengths should be reduced to 1,000 feet, depending on the actual lot widths of a particular development.

Using ITE's Trip Generations Handbook as a guide, the recommended block lengths are:

1. Patio Homes (based on 7.6* ADT per unit and 40-foot average lot width) - 1,000 feet;
2. Townhouse/Condominiums (based on 5.2 ADT per unit and 27-foot average lot width) - 1,000 feet; and
3. 1,200-foot maximum block length would be acceptable where homes are located on only one side of the street.

I. Proposed Alternatives - Cul-de-Sac Bulb Design - On medium density developments where higher densities are likely to produce more on-street parking, the standard bulb design may be inadequate to provide turnaround access for emergency and sanitation vehicles. The standard cul-de-sac bulb has a 38-foot radius with a 50-foot right-of-way radius. The outside of the bulb is often used for head-in parking, preventing the smooth turnaround movements for which it was intended.

Two alternatives are offered which would provide both necessary access and parking. The first expands the radius and provides for parking and landscaping in the center, while keeping the outside of the bulb clear for traffic. The second design provides for the standard bulb radius, but with an extension of the paving to permit small head-in parking areas that would not block access. By aligning two head-in parking sections on opposite sides of the bulb, a portion of the bulb can be kept clear for backing and turning larger vehicles.

The recommended standards for these alternatives are:

1. Expanded radius design (see Figures 22 & 23):
 - a. Average lot widths of 50 feet or less;
 - b. 52-foot pavement radius, 64-foot right-of-way;
 - c. 22-foot wide, two-way traffic aisle along the outside edge of the pavement with a 30-foot interior radius (the interior radius can provide six to eight parking spaces and landscaping); and
 - d. Plat and stripe the bulb portion of the cul-de-sac as a fire lane.
2. Exterior parking area design (see Figure 21):
 - a. Average lot widths of 50 feet or less;
 - b. Rear entry lots only;
 - c. Standard bulb radius 38 feet, 50-foot right-of-way; and
 - d. 18 feet of extended paving on either side of the cul-de-sac (plus two feet for overhang), 15 feet of additional right-of-way, per side.

J. Proposed Alternatives - Sidewalk Placement - The City's Thoroughfare Standards Rules & Regulations requires a 4-foot sidewalk, separated from the street by a 5-foot 6-inch parkway for all zoning classifications except Agriculture. The sidewalk is required to be within the right-of-way, 2 feet 6-inches from the property line. Exceptions may be granted for meandering sidewalks and similar alternatives which cannot be constructed within the standard right-of-way. Five-foot sidewalks may be placed adjacent to the curb if special circumstances prevent the use of the normal parkway.

No provisions are made, however, for the deletion of standard sidewalks where reasonable pedestrian alternatives exist or where the number of trips and distance of travel make sidewalks non-essential. There may be other circumstances where a sidewalk could be placed immediately adjacent to the curb and not create a safety problem. In these instances, a four-foot sidewalk adjacent to the curb may be appropriate.

Since most medium density subdivisions will have common open space areas, pedestrian access to and from these areas is important. Greenbelts can be integrated into subdivisions to provide open space and access to individual residences. Since residential lots often back or side onto greenbelts, fences generally line both sides. To maintain adequate visibility and security, fences should generally be no greater than four feet in height or

should have regularly spaced openings. Gates into individual lots should also be provided to encourage the use of greenbelts by residents.

Alternatives to the standard sidewalk placement and their appropriate criteria include:

1. Deletion of sidewalks from one or both sides of streets may be approved if one or more of the following conditions exist:
 - a. 100-foot maximum length court described in Section IV; and
 - b. 600-foot maximum length cul-de-sac or 800-foot maximum length loop street(s) with other pedestrian pathways accessible to each lot and which connect directly to standard sidewalks along a connecting street, with right-of-way reduction of 7-feet 6-inches per side (i.e., typical 26-foot street requires 37 feet of right-of-way instead of 50 feet).
2. Placement of sidewalks along the curb may be approved if one or more of these conditions exist:
 - a. 400-foot maximum length for street ending in cul-de-sac, or 800 feet for looped street(s);
 - b. Rear entry lots with no driveways onto the street;
 - c. No rolled or mountable curbs; and
 - d. Front yard setback is 15 feet or less.

K. Proposed Alternatives - Curb Design - The City of Plano requires 6-inch vertical curbs along either side of a public street to facilitate drainage and to separate vehicular and pedestrian traffic. Vertical curbs are appropriate for most forms of residential development. In some medium density developments, however, the number of driveway openings increases and the distance between them decreases making vertical curbs impractical. This is especially true of townhouses and some types of patio homes. To avoid numerous curb cuts, rolled or mountable curbs may be more appropriate. Standards for the use of mountable curbs include:

1. Short courts with no sidewalks (as described in Section IV); and
2. Residential streets (other than collectors or spine roads) with front entry lots with average lot width of 35 feet or less (sidewalks cannot be adjacent to the curb).

L. OTHER RECOMMENDATIONS - Additional design considerations must be addressed for medium density developments. These same aspects may exist in low density developments, but the impacts are much less. Issues of access, storage, and visibility become more pertinent as density increases and typical subdivision design is altered. The following recommendations are intended to improve the operation and design of medium density residential subdivisions.

1. House and Driveway Layouts Typical house and driveway layouts should be required as part of the submittal for preliminary plat and preliminary development plan review of medium density projects. The clustering of units often produces a different driveway and parking

arrangement for the individual units than that of low density projects. Narrow frontage, particularly along cul-de-sacs, may result in shared access between two or more lots and/or garages and parking areas at angles to the street making access design more critical. A review of typical layouts would help ensure that safe, functional access is provided while maintaining the character of the development.

2. Maximum Driveway Backing Distance Establish 30 feet as general maximum backing distance in the design of individual driveways.
3. Alley Visibility Easements Require a six foot by six foot visibility easement from the adjacent lot in rear entry patio home and townhouse developments where the side yard is less than six feet and the average lot width is less than 60 feet. This is to prevent fences from blocking visibility on both sides of driveways along alleys.
4. Storage of Recreational Vehicles Because of the smaller lots, it is often impractical or inappropriate to store boats, trailers, and motor homes on residential lots in medium density developments. Therefore, lots within the subdivision may be designated for the storage of recreational vehicles. Precautions should be taken to ensure that these storage areas do not detract from the neighborhood but still provide adequate visibility for security purposes. Landscaping and screening plans should be submitted with final plats and development plans.

M. Definition of Terms

1. Cluster Housing A subdivision design using reduced lot sizes and setbacks to group homes closer together while providing for areas of common open space and recreation.
2. Court A short, narrow cul-de-sac designed to provide access to no more than ten residences in a cluster housing development.
3. Cul-De-Sac A street ending in a bulb or loop turnaround design which returns approximately to the point of original entry.
4. Looped Street(s) One or more streets forming a connection back to the original intersecting street.
5. Multi-Family (tri-plex and four-plex) A single structure containing three or four dwelling units. The units may be either stacked or side-by-side.
6. Patio or Garden Home A type of single-family detached house on a smaller lot than traditional single-family development. The home may be centered on the lot, or one side yard may be reduced to zero to create a zero-lot-line home. Patio and garden homes are often constructed in a cluster arrangement permitting common open space areas.
7. Spine Road A roadway serving as the primary access to a series of short non-connecting streets.
8. Townhouse A type of housing in which one- and two-story units are placed side-by-side but not stacked on top of one another. Units can be for rent or owned fee simple or as condominiums. Plano's Single-Family Attached district is designed for townhouses on individually platted lots with frontage onto a public street.