

Land Development Manual Technical Standards City of Tuscaloosa, AL

**Latest Revision 12/03/06
Adopted June 19, 2007**

Chapter 2

Storm Drainage Technical Standards

Drainage Standards – Technical

Pipe Requirements:

- A. All pipes will be reinforced concrete, corrugated aluminum or aluminized steel, type II meeting AASHTO specifications.
- B. All joints in any piped section must be properly belled and mortared or rubber gasketed (for concrete) or wrapped and banded (for metal pipe).
- C. All curb inlets shall be ALDOT single or double wing “S” type inlets unless the submitting engineer demonstrates to the satisfaction of the City Engineer that a modification of “s” inlet design is necessary.

Easements: All storm drainage easements that are required to be dedicated to the City of Tuscaloosa must be accepted by the City and will be a minimum of 20 feet wide. Access easements to the storm drainage easement must be a minimum 20 feet wide and be approximately 300 feet apart. Storm drainage easements and access easements will be kept clear of any buildings, fences, trees, shrubs or any other structure or hindrance. Before acceptance by the City, all easements must allow travel upon and to the drainage infrastructure from a public right of way.

Ditches:

- A. All ditches must have a stand of grass established, or be rip rap lined or be concrete lined in accordance with velocities specified below.
- B. Ditches lined with rip-rap will be lined with erosion control matting and the rocks placed at a maximum of a 2 to 1 slope (not steeper than 2:1).
- C. Ditches that are not rip-rap or concrete lined will be sloped at a maximum of 4 to 1 (not steeper than 4:1).

Velocity Requirements:

- A. Minimum velocity for piped and open channel flow structures is two feet per second (2 fps).
- B. Maximum velocity for metal pipe is ten feet per second (10 fps). There is no maximum velocity for concrete pipe.
- C. Maximum velocity for rip rap cross-sections is dependent on the average size of stone. The maximum velocity is fourteen and one half feet per second (14.5 fps). The latest edition of the National Stone Association guidelines must be used to determine stone sizes for velocities less than 14.5 fps.

- D. Maximum velocities for open channel flow are dependent on the ground cover used. The maximum velocity is six feet per second (6 fps) for Bermuda grass. The latest edition of the Design Charts for Open Channel Flow (Federal Highway Administration HD3) will be used to determine the maximum velocity for different grasses.

Detention Facilities:

- A. Detention facilities shall be considered to consist of the area within the maximum design ponding limits, the dam (if utilized), including all embankment slopes and wall footings (if applicable), the primary and emergency spillways and other provisions intended for the control of storm water run-off.
- B. Detention facilities shall be designed and located to promote interception of run-off from the proposed land use.
- C. Detention facilities shall be designed and constructed in conformance with all local, state and federal regulations including but not limited to Section 6-11 of the Code of Tuscaloosa entitled "Construction specifications and permits for dams or the impoundment of waters".
- D. Detention facilities may be constructed within recreation areas if title to the area is to be held by a property owners association, homeowners association or private entity and the design will not interfere with the intended use of the area.
- E. Detention facilities will be required to have fences, railings, walls, bolt down lids or other structures to limit access. The City Engineer may consider a waiver of this requirement upon written request from the developer.
- F. Detention facilities may be incorporated into lake or pond designs. All such facilities shall be designed and constructed in conformity with applicable city, state and federal regulations.
- G. Plans for detention facilities shall be prepared showing existing and proposed contours (basin type facilities) with a contour interval not greater than two feet. The plans shall include sufficient information indicating positive drainage (dry basins), top of wall or dam to insure adequate freeboard for the 100 year peak stage (minimum one foot), width of dam crest, limits of ponding, maximum ponding elevation, location of facility with respect to property lines, public rights-of-way, easements, and details of the outlet device, dam or wall and other provisions needed to insure the safe, proper and continued function of the facility. Peak flows of existing conditions must be determined for storms of two (2) years, ten (10) years and a hundred (100) year return frequency. The submitting engineer must demonstrate that after the development, the detention basin will not permit outflows in excess of existing peak outflows for the corresponding return frequency. The Rational Method cannot be used to size detention facilities. A design methodology that generates a peak volume must be utilized.
- H. Parking lot detention areas shall be located so as to restrict ponding to areas other than parking spaces near buildings and to not encroach upon entrance/exit drives. The maximum depth of detention ponding in a parking lot, except at a flow control structure, shall be six (6) inches for a 25 year storm and nine (9) inches for a 100 year

storm. In truck parking areas, the maximum depth of ponding shall be twelve (12) inches for the 25 year storm. Detention ponding areas are to be drained within 30 minutes after the peak inflow occurs.

- I. If the outlet device utilizes a low flow orifice opening, a trash rack protecting the orifice from blockage from debris may be required.
- J. It shall be unlawful to allow a permitted detention facility to function improperly.

Design Requirements for Best Management Practices (BMP's)

A. Facilities shall be designed to reduce the discharge of pollutants to the Municipal Separate Storm Sewer System (MS4) to the "maximum extent practicable" to protect water quality and to satisfy the appropriate water quality requirements of the Clean Water Act. Grading, erosion control practices, sediment control practices, and waterway crossings shall be adequate to prevent transportation of sediment from the site to the satisfaction of the City Engineer. BMP's shall meet the requirements of the latest erosion control ordinance and storm water ordinance.

B. Clearing and Grading.

(1) Clearing techniques that retain natural vegetation and retain natural drainage patterns are encouraged as part of a well designed BMP Plan.

(2) Clearing, except that necessary to establish sediment control devices, shall not begin until all sediment control devices have been installed and have been stabilized.

(3) Cut and fill slopes shall be no greater than 3:1, except as approved by the City Engineer to meet other community or environmental objectives.

C. Erosion Control

(1) Soil must be stabilized within fourteen (14) days of clearing or inactivity during construction.

(2) If vegetative erosion control methods, such as seeding, have not become established within two weeks, the City Engineer may require that the site be reseeded, or that a non-vegetative erosion control option be employed.

(3) On steep slopes or in drainage ways, special techniques that meet the design criteria outlined in this Manual shall be used to ensure stabilization.

(4) Soil stockpiles must be stabilized or covered at the end of each work day.

(5) Techniques shall be employed to prevent the blowing of dust or sediment from the site.

(6) Techniques that divert upland runoff past disturbed slopes shall be employed.

D. Sediment Controls

(1) Sediment controls shall be provided in the form of settling basins or sediment traps or tanks, and perimeter controls.

(2) Where possible, settling basins shall be designed in a manner that allows adaptation to provide long term storm water management.

(3) Adjacent properties shall be protected by the use of a vegetated buffer strip, in combination with perimeter controls.

E. Waterways and Watercourses

(1) When a wet watercourse must be crossed regularly during construction, a temporary stream crossing shall be provided, and an approval obtained from the appropriate agency.

(2) When in-channel work is conducted, the channel shall be stabilized before, during and after work.

(3) All on-site storm water conveyance channels shall be designed according to the criteria outlined in this Technical Manual.

(4) Stabilization adequate to prevent erosion must be provided at the outlets of all pipes and paved channels.

(5) The preservation or establishment of permanent vegetated buffer strips along natural watercourses is strongly encouraged.

F. Construction Site Access

(1) A properly designed construction entrance shall be provided at all sites.

(2) Other measures may be required at the discretion of the City Engineer in order to ensure that sediment is not tracked onto public streets by construction vehicles or washed into storm drains.

Erosion Control for the Drainage Plan:

A. Sedimentation facilities shall be installed in conjunction with the initial earth change operations and be maintained throughout the development and construction process and until the ground is stabilized to remove sediment from

runoff waters draining land under development. These facilities shall be maintained by the developer, property owner and/or contractor to assure functional operation during all phases of construction with periodic maintenance activities.

- B. Land which has been cleared and upon which construction has not commenced within two weeks (14 days) of the initial clearing, shall be protected from erosion and consequent sedimentation by appropriate vegetation and land covering techniques such as seeding, sodding, ground cover installation or other vegetative or earth covering techniques as approved.
- C. No earth change shall cause any sedimentation to be placed in or upon any public right of way, easement, natural waterways or their floodplains.

Other Design and Construction Standards: Refer to City of Tuscaloosa Erosion Control and City of Tuscaloosa Storm Water Ordinance for additional requirements.

Inspection During and After Construction: The City Engineer may inspect the construction of the drainage facilities.

Exemptions: The above provisions hereof shall not be required for the following activities:

- A. Emergency repairs of a temporary nature made on public or private property which are necessary for the preservation of life, health or property and which are made under such circumstances where it would be impossible or impracticable to provide a drainage plan.
- B. Temporary excavation for the purpose of installing, maintaining or repairing any public street, public utility facility or any utility service lines.
- C. Agricultural activities

Chapter 3

Driveway Technical Standards

General Requirements and Regulations Governing All Driveway Approaches

A. No new curb shall be built or any existing curb removed for a driveway approach except in conformity with the requirements of this Chapter.

B. There shall be no curb opening for the purpose of motor vehicular access to abutting property on the radius or curved portion of the curb at any curbed street intersection or alley junction nor shall there be motor vehicular access to abutting property on the curved portion of the roadway at any uncurbed street intersection or alley junction.

C. Removal of existing curb and/or gutter shall be achieved only by use of one of the following procedures:

1. Vertical saw cut at the points where driveway approach radii intersect the street curb line; also, vertical saw cut along the gutter invert and parallel to the curb when only curb removal is required. The depth of the cut shall be sufficient to achieve a clean, uniform break.
2. Removal to the first joint beyond the points where driveway approach radii intersect the street curb line and repouring this tangent curb and gutter during construction of the driveway approach.

D. Removal of existing sidewalk shall be achieved only by perpendicular saw cut at the points where warping/ramping of the sidewalk to meet drainage/handicapped requirements return to original grade or the sidewalk removed and repoured to the first joint beyond these return to grade points.

E. During construction, reconstruction, alterations, removal or replacement of driveway approaches, including the cutting of curbs and/or gutters, warning signs, lights and barricades and other necessary similar devices shall be placed and maintained by the permittee in accordance with the standards of the latest edition of the Federal Manual On Uniform Traffic-Control Devices or as the City Engineer may direct.

F. No driveway approach shall be permitted which will interfere with any existing traffic-control devices, plantings, cables, poles, guys, water lines, gas lines or other public utilities when a relocation of the proposed driveway approach can be made in conformance with the provisions of this Chapter. When relocation cannot be made and the City Engineer determines that the desired location of the driveway approach is such that it may interfere with any of the items listed above, the permittee shall pay for the cost of relocating said item. No part of any driveway

approach may be located within four (4) feet of a curb inlet or located within two (2) feet of an above ground utility structure. It shall be the responsibility of the applicant to inform the City Engineer, or his designated representative, that the proposed construction will interfere with one or more of the facilities indicated above.

G. The completed permit application shall contain an anticipated date work is to commence. If work is not completed within six (6) months from the date of issuance, the permit shall become void. All work shall be completed within sixty (60) days from the day it commences with provision for one extension not to exceed thirty (30) days with the approval of the City Engineer.

H. No driveway approach shall be permitted which allows gutter storm water to be diverted from said gutter and flow onto the parcel of land to be served by the driveway approach. No driveway approach surface shall be used to direct storm water runoff onto the street from parcels of land containing a sum of one (1) or more acres of impervious surfaces in the watershed contributing to the said storm water runoff.

I. Joint driveway approaches shall be permitted only if there is a perpetual mutual access agreement approved by the City Attorney and filed of record in the Tuscaloosa County Probate Office. A copy of the recorded agreement shall be attached to the application.

J. It shall be the duty of the permittee, after all work has been completed, to remove all rubbish, waste and excess materials and to restore immediately the street area to a neat, clean and safe condition.

K. Median openings may not be permitted on any street where a three hundred (300) feet minimum spacing between existing and proposed openings cannot be achieved. The location and design of all median openings and/or associated turn lanes shall be approved by the City Engineer.

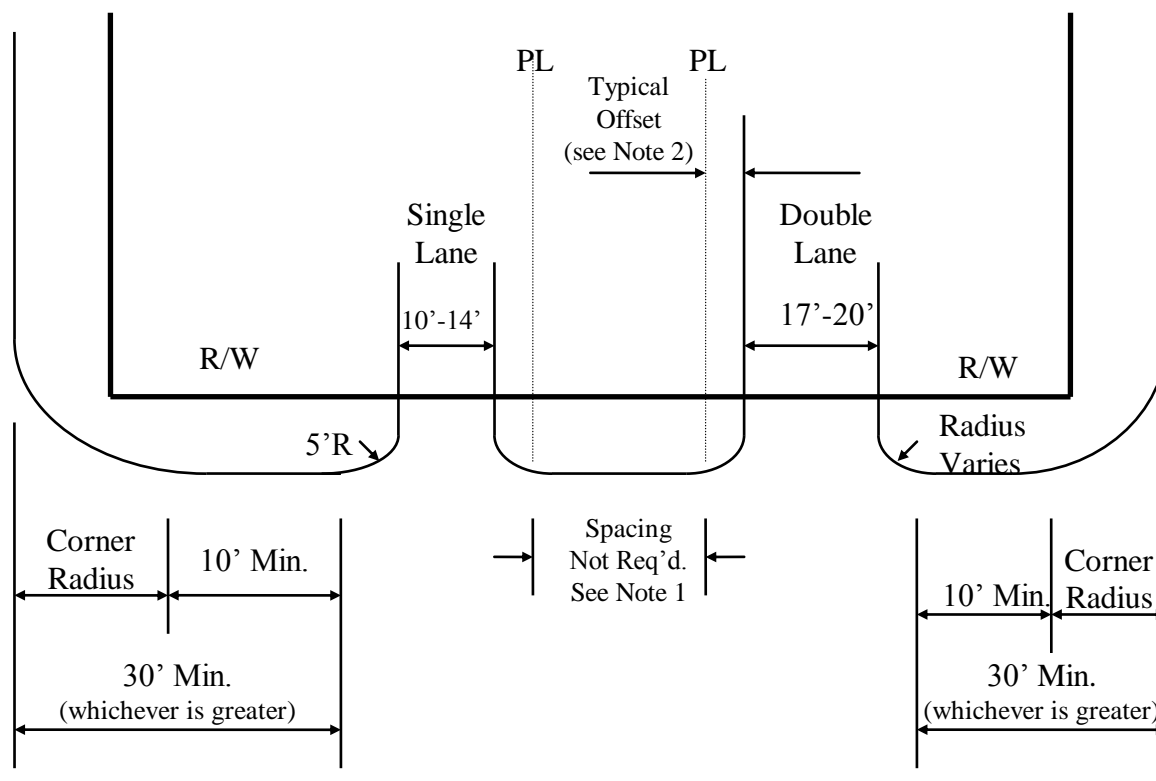
L. When a concrete driveway approach is constructed, a transverse expansion joint shall be located to connect the points on the radii where the curbs feather out or the point at which the approach surface elevation equals the top of street curb elevation or at the right-of-way line, whichever is applicable at the particular location of the driveway approach and the design being constructed.

M. Material specifications for construction of driveway approaches may be designated by the applicant and presented to the City Engineer for approval based on the size, weight and volume of vehicles expected to use the proposed driveway approaches.

RESIDENTIAL DRIVEWAYS

LOCATION STANDARDS

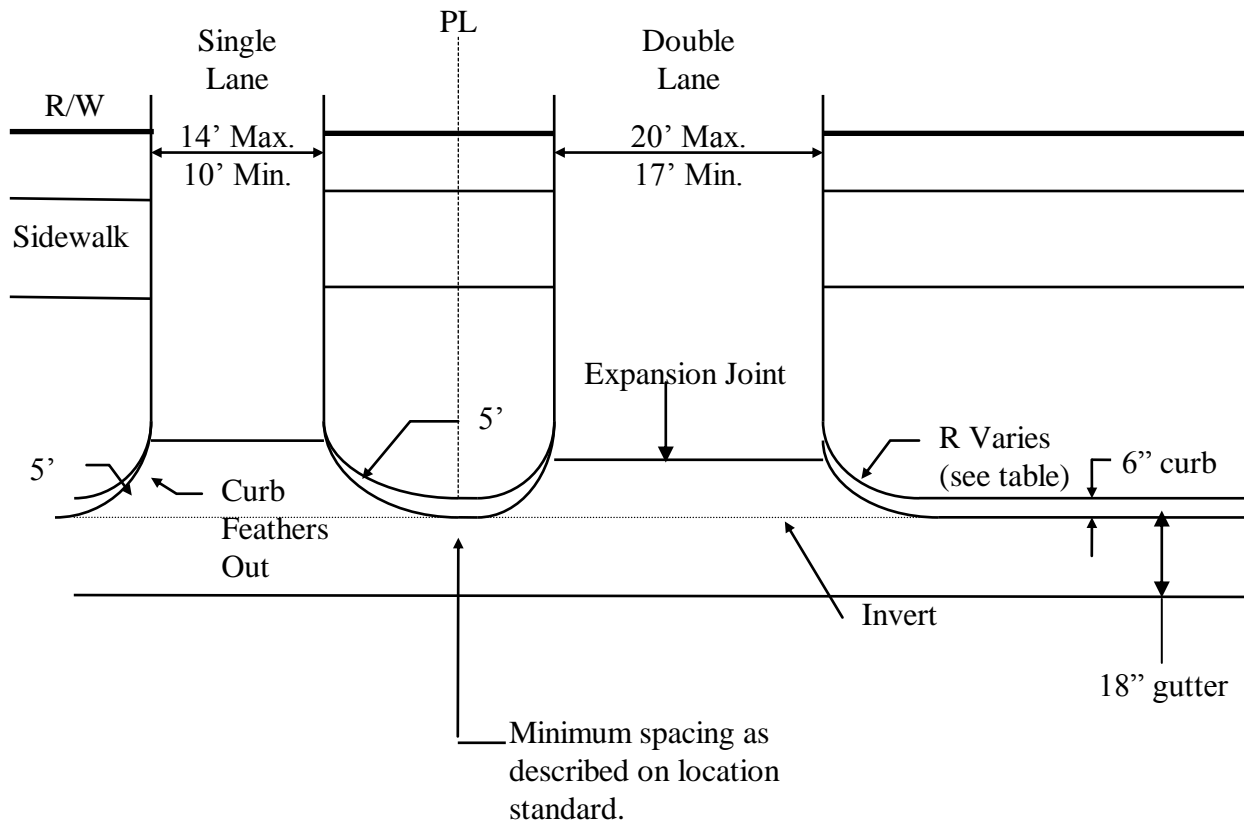
LOCAL STREETS



NOTES:

- 1.) Minimum spacing between driveway approaches serving adjacent lots requires only that adjacent driveway approach radii intersect at the street curb line.
- 2.) Typical property line offset equal to driveway approach radius.
- 3.) Driveway approaches to lots fronting more than one street shall be located on the street, which provides the better conformance to these standards when full compliance is not possible on any of the fronting streets.
- 4.) Lots with street frontage less than 100' shall have one driveway approach. Lots with street frontage greater than or equal to 100' may be permitted two driveway approaches where a circle drive is proposed. In the latter case, minimum spacing between adjacent driveway approach radii is 30' measured along the street curb line.
- 5.) 110' minimum sight distance (horizontal and vertical) measured along the street centerline is required on all local streets.
- 6.) Single-family driveway approaches, when approved on collector or higher classification streets, shall meet location standards specified on streets so classified.
- 7.) Single-family driveway approaches, when approved on collector or higher classification streets, shall include a turn out on private property to permit vehicles to turn around and drive into, instead of backing into, the street.

DESIGN STANDARDS
SINGLE FAMILY
RESIDENTIAL DRIVEWAY
PLAN

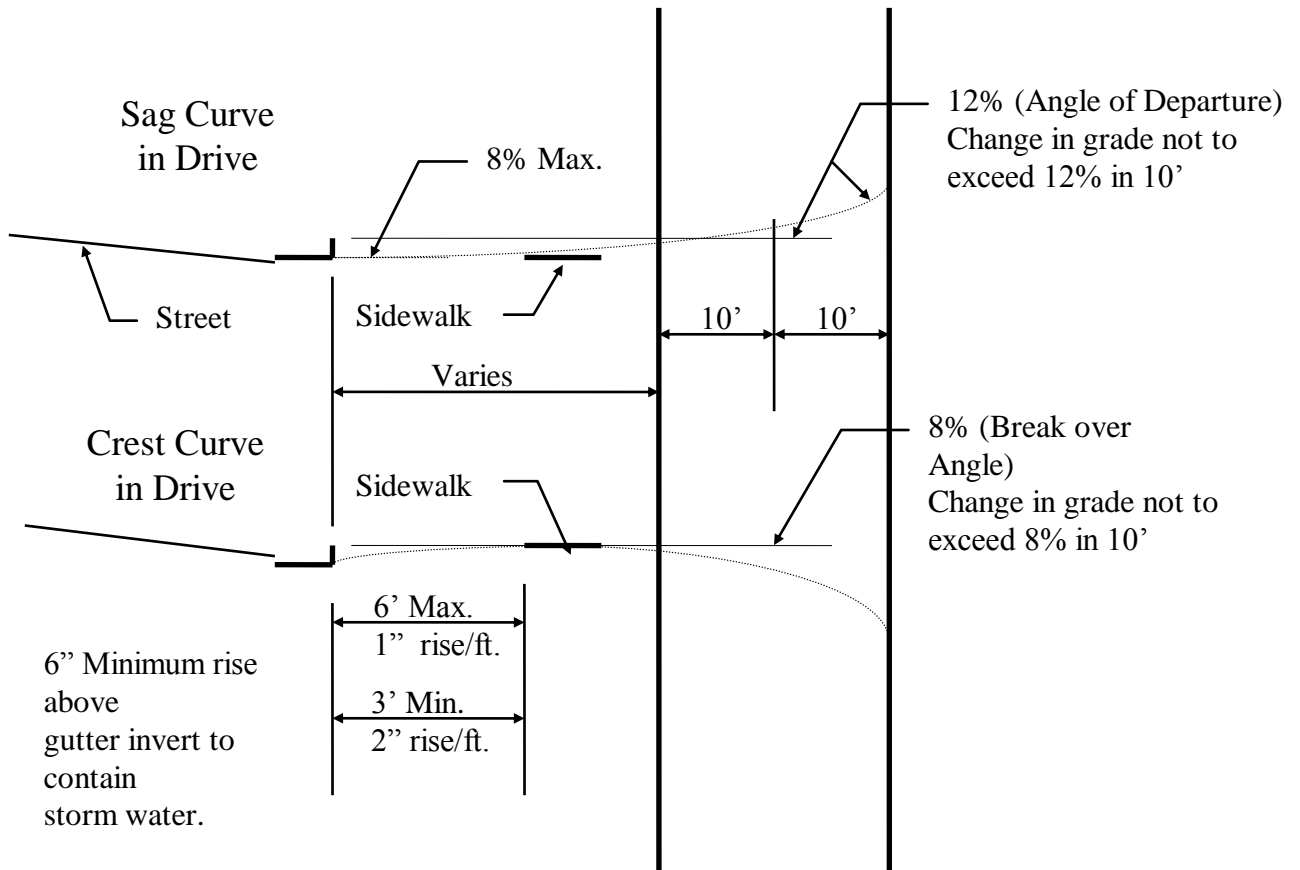


	SINGLE LANE	DOUBLE LANE			
WIDTH	14' 0" Max 10" - 0" Min.	17' - 0" Min.	18' - 0"	19' - 0"	20' - 0" Max.
RADIUS	5' - 0"	4' - 0"	3' - 6"	3 - 0"	2 - 0"

NOTES

- 1.) An alternate design using flair rather than radius may be used so long as operational characteristics of the radius designs specified above are met.
- 2.) Driveway approaches constructed with 3000# concrete minimum 4" thick on curbed streets.
- 3.) Driveway approaches should intersect the street at a 90 degree angle or as near 90 degrees as practical.
- 4.) When present, warp/ramp sidewalks to match driveway approach grade; 1"/ft. maximum longitudinal slope, 4' minimum width and cross (perpendicular) slope not to exceed 1/4" /ft (see ADA requirements).

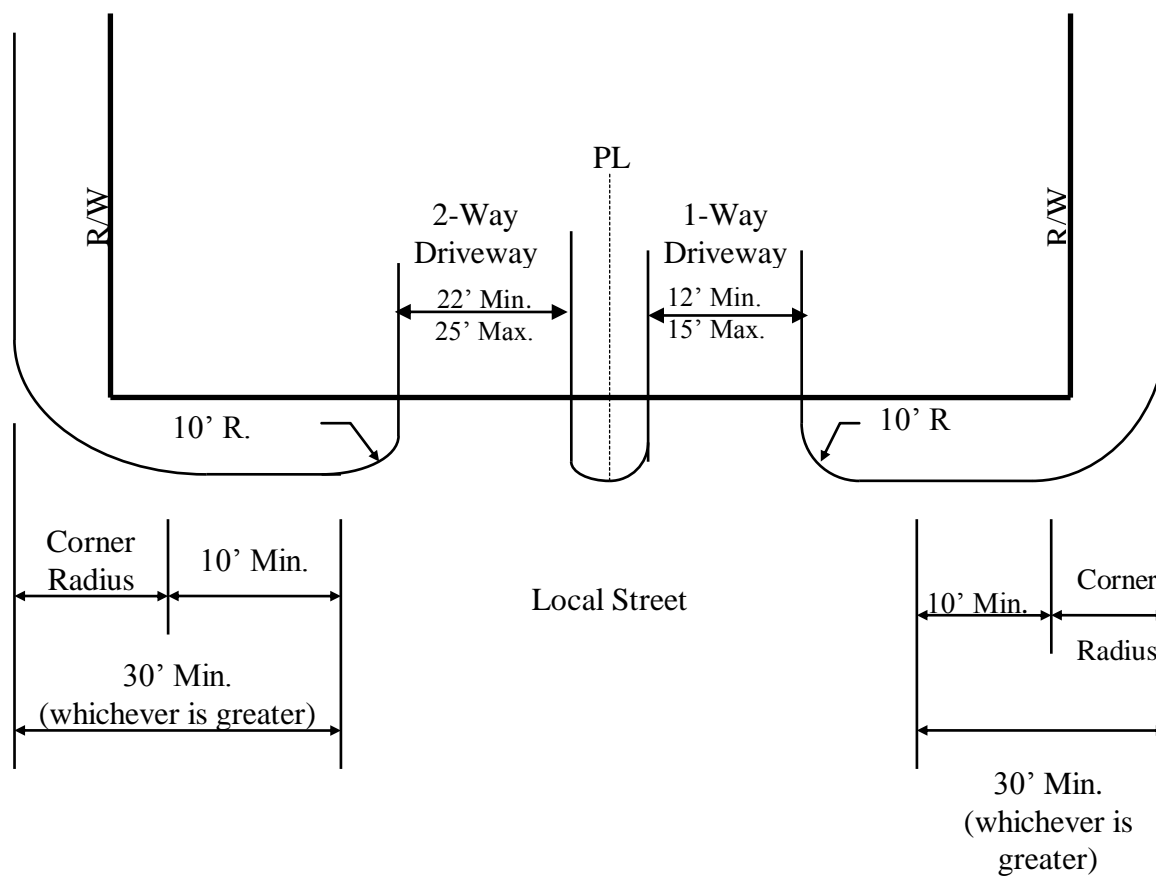
DESIGN STANDARD
SINGLE FAMILY
RESIDENTIAL DRIVEWAY
PROFILE



NOTES

- 1.) An alternate design using flair rather than radius may be used so long as operational characteristics of the radius designs specified above are met.
- 2.) Driveway approaches constructed with 3000# concrete minimum 4" thick on curbed streets.
- 3.) Driveway approaches should intersect the street at a 90 degree angle or as near 90 degrees as practical.
- 4.) When present, warp/ramp sidewalks to match driveway approach grade; 1"/ft. maximum longitudinal slope, 4' minimum width and cross (perpendicular) slope not to exceed 1/4"/ft (see ADA requirements).

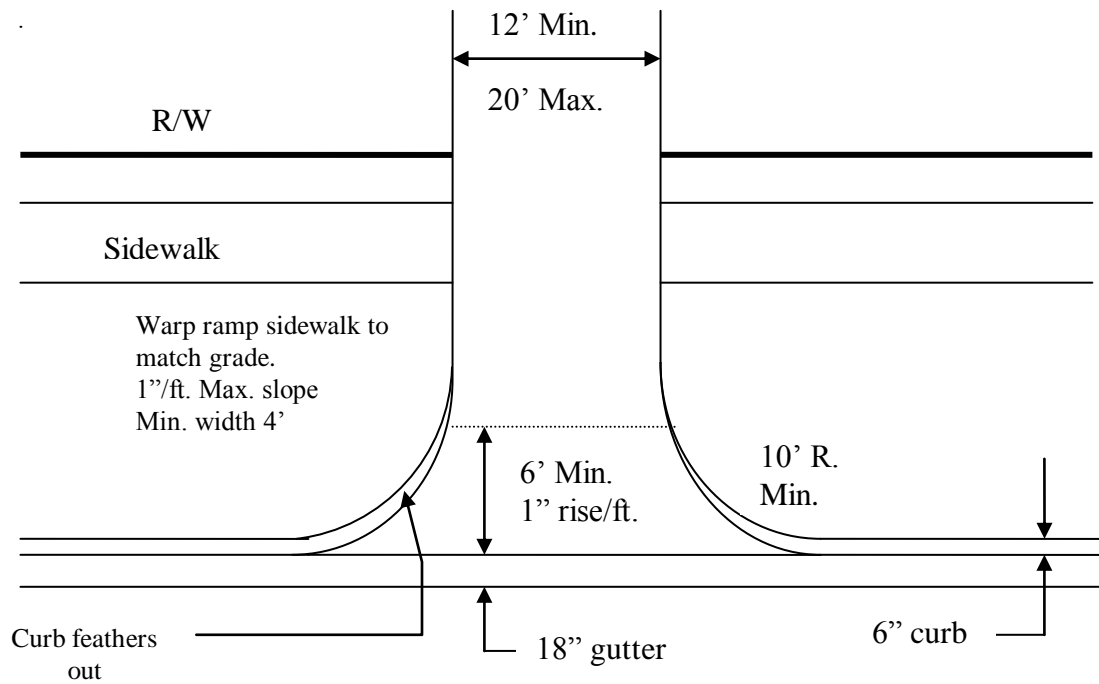
COMMERICAL
PARKING LOT DRIVEWAYS
LOCATION STANDARDS
LOCAL STREETS



NOTES:

- 1.) Minimum spacing between one-way driveway radii serving the same property shall be 30 feet (not shown).
- 2.) Parcels of land with street frontage less than 84' should have only one driveway approach unless on site parking can be improved significantly with the use of more than one.
- 3.) 110' minimum sight distance (horizontal and vertical) measured along the street centerline is required on all local streets.
- 4.) Parking lot driveway approaches, when located on collector or higher classification streets, shall meet location standards specified on streets so classified.

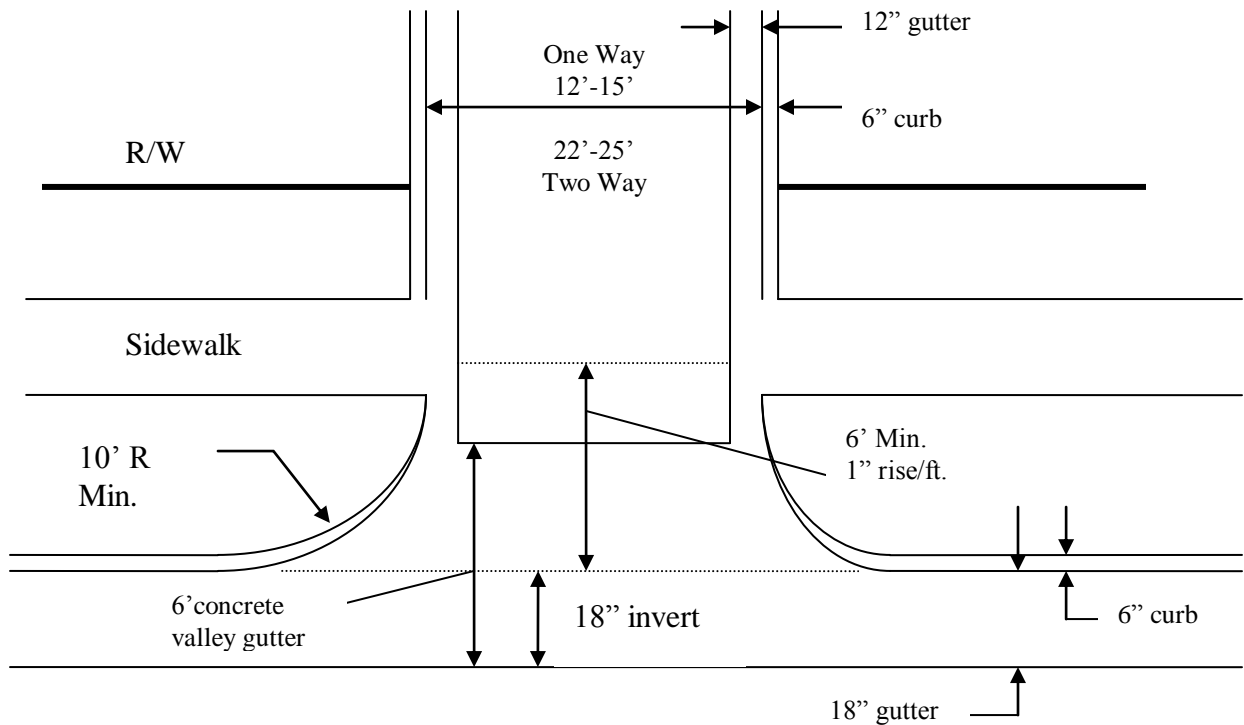
DESIGN STANDARD
RESIDENTIAL PARKING LOT DRIVEWAY



NOTES:

- 1.) Driveway approach constructed with 3000# concrete, minimum 6" thick.
- 2.) This design permitted only when the number of dwelling units ≤ 4 and located on curbed streets classified as local.
- 3.) When length of the driveway exceeds 200 ft. or sight distance along the driveway is < 110 ft., a width of 20' shall be required.

DESIGN STANDARD
COMMERCIAL PARKING LOT DRIVEWAY



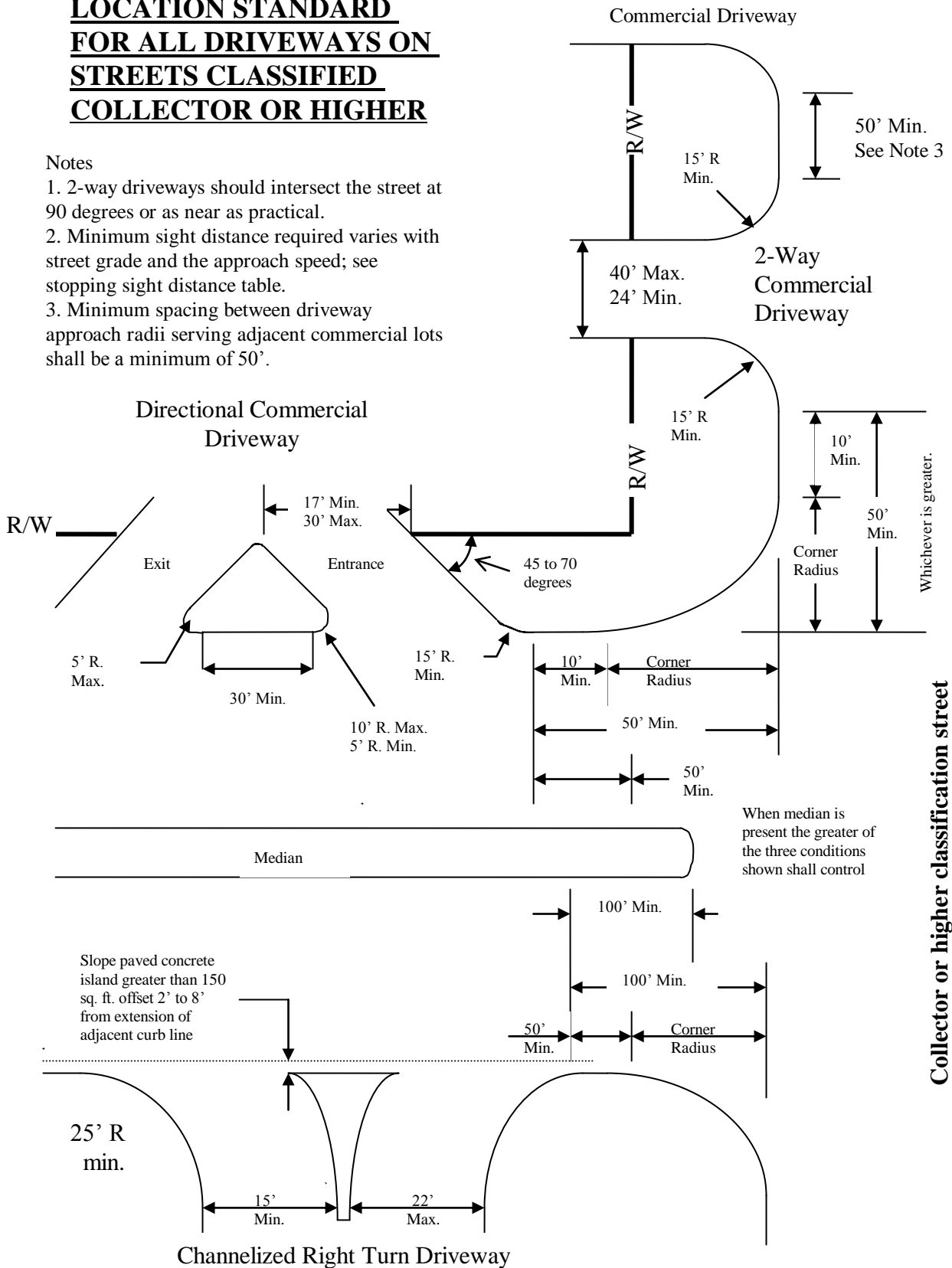
NOTES:

- 1.) 3000# concrete, 6" thick curb & gutter with paved asphalt driveway approach, (as shown) or curbed concrete driveway approach acceptable.
- 2.) Warp ramp/sidewalk to match driveway approach grade. (1" /ft. max. slope, min. width 4')
- 3.) Storm water shall not be allowed to drain onto sidewalk from the driveway approach.
- 4.) This design required for multi-family residential when number of dwelling units is greater than 4.
- 5.) Passenger car parking lot design; small percent trucks

LOCATION STANDARD
FOR ALL DRIVEWAYS ON
STREETS CLASSIFIED
COLLECTOR OR HIGHER

Notes

1. 2-way driveways should intersect the street at 90 degrees or as near as practical.
2. Minimum sight distance required varies with street grade and the approach speed; see stopping sight distance table.
3. Minimum spacing between driveway approach radii serving adjacent commercial lots shall be a minimum of 50'.



Collector or higher classification street

TABLE A

Stopping Sight Distance (level grade)

Speed (mph)	Reaction Distance (ft)	Coefficient of Friction	Braking Distance on Level (ft)	Stopping	Sight Distance
				Computed (ft)	Rounded for Design (ft)
20	73.3	.40	33.3	106.7	110
25	91.7	.38	54.8	146.5	150
30	110.0	.35	85.7	195.7	200
35	128.3	.34	120.1	248.4	250
40	146.7	.32	166.7	313.3	320
45	165.0	.31	217.7	382.7	390
50	183.3	.30	277.8	461.1	470
55	201.7	.30	336.1	537.8	540
60	220.0	.29	413.8	633.8	640

Stopping sight distance measurements should be made using an object height of six (6) inches and a driver eye height of three (3) feet six (6) inches.

Table B below should be referenced to adjust the figures taken from Table A when street grades equal or exceed 3%.

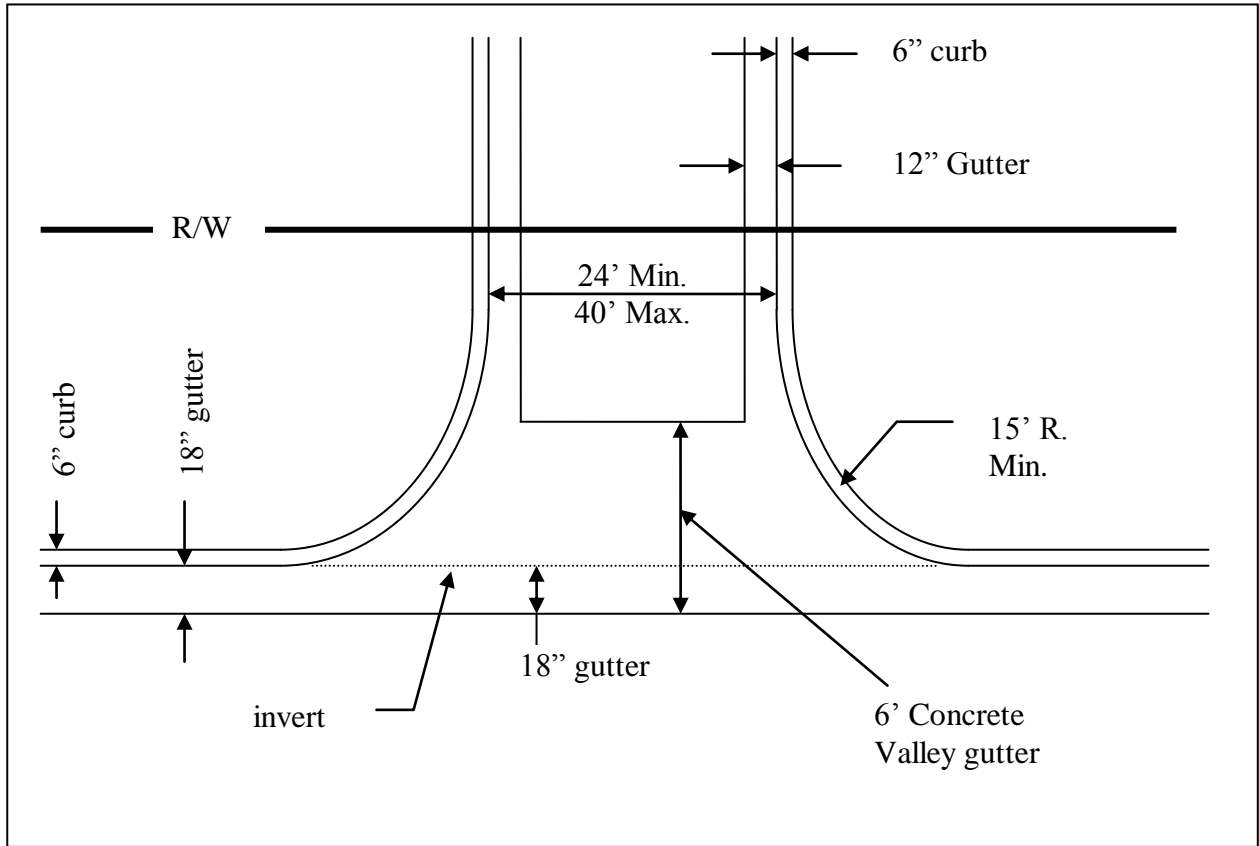
TABLE B

Effect of Grade on Stopping Sight Distance

Speed (mph)	Increase for Downgrades			Decrease for Upgrades		
	Correction in feet			Correction in feet		
	3%	6%	9%	3%	6%	9%
30	10	20	30	-	10	20
35	15	30	50	5	15	25
40	20	40	70	10	20	30
45	25	55	100	15	25	40
50	30	70	130	20	30	50
55	40	90	150	25	40	55
60	50	110	-	30	50	60

COMMERICAL TWO-WAY DRIVEWAY

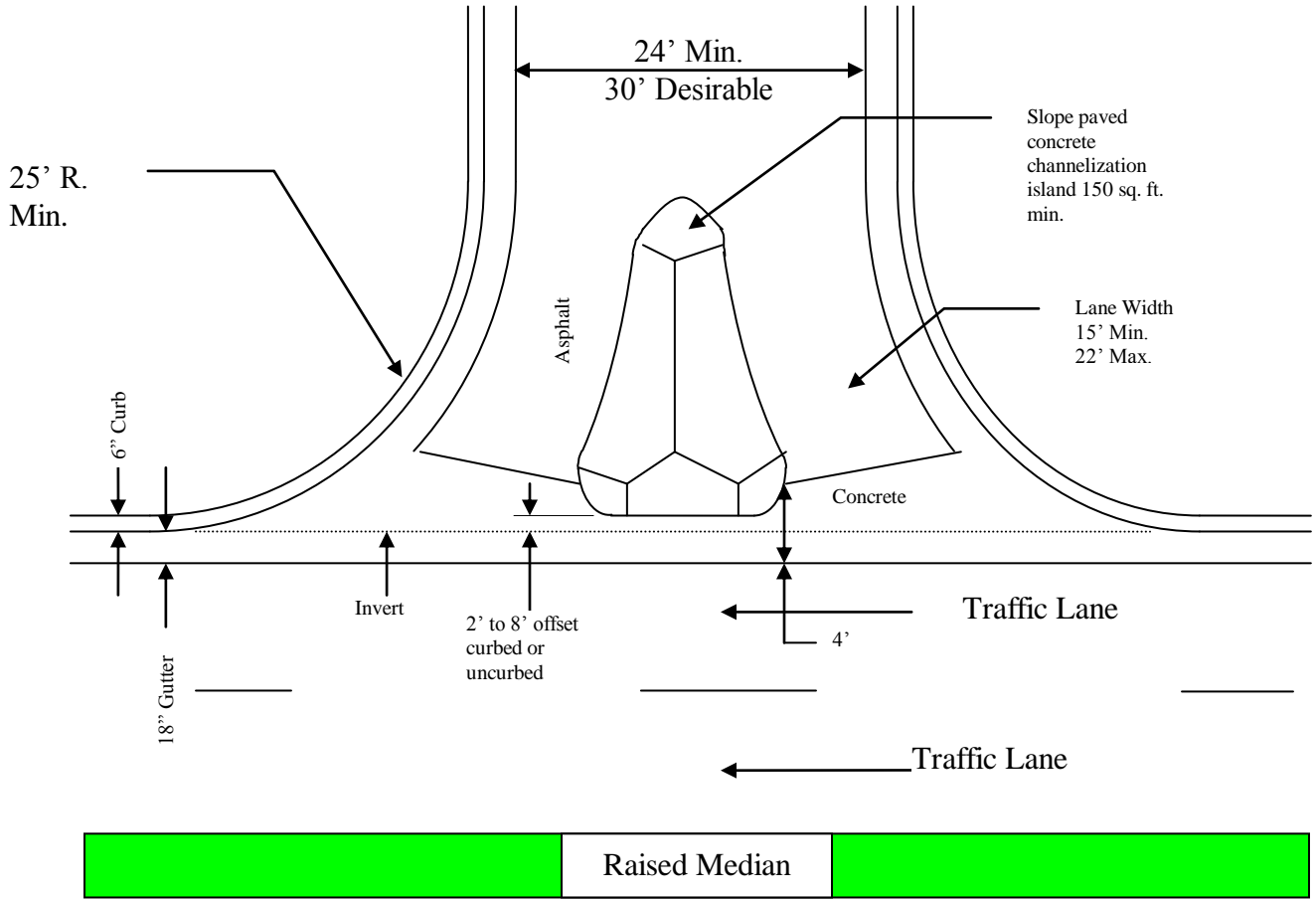
DESIGN STANDARD



NOTES:

- 1.) This design may be permitted on undivided streets and on divided streets where median opening location and design has the approval of the City Engineer.
- 2.) Driveway approach grade less than or equal to 5% desired, 8% maximum.
- 3.) Warp/ramp sidewalk as required (not shown); 1"/ft. maximum slope, 4' minimum width.
- 4.) Curbed asphalt approach surface with concrete valley gutter (shown) or curbed concrete approach surface acceptable.
- 5.) High traffic volume with significant percent trucks required for maximum width of 40'.

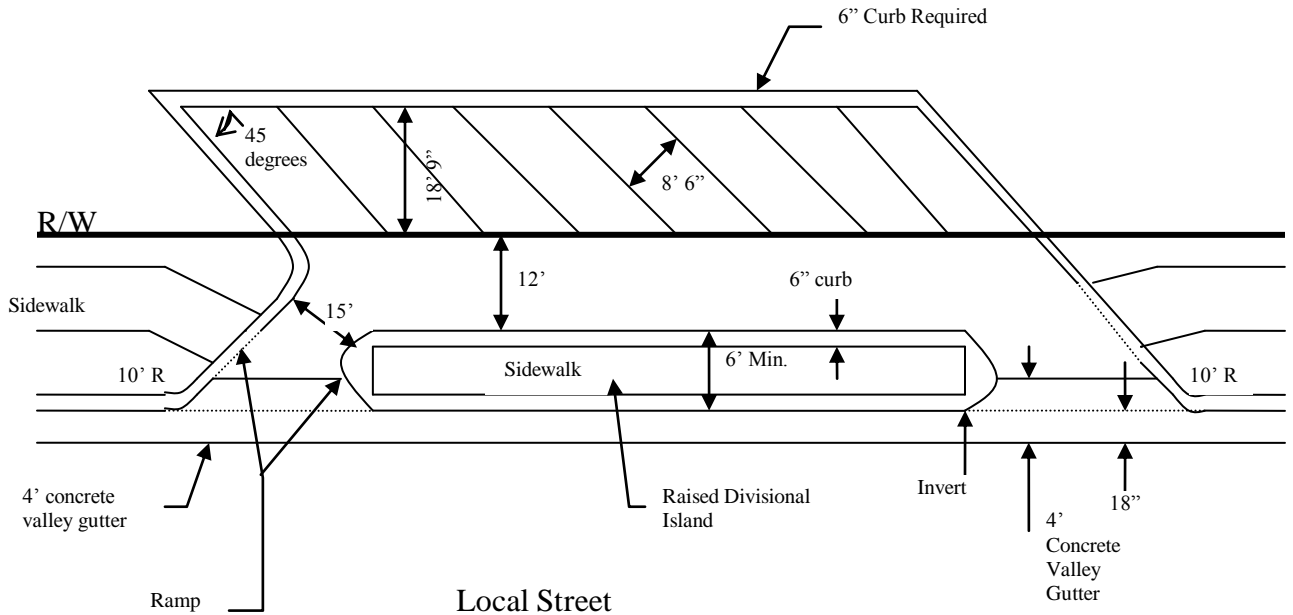
DESIGN STANDARD
COMMERCIAL CHANNELIZED RIGHT TURN DRIVEWAY



NOTES:

- 1.) Median crossover (cut) not permitted.
- 2.) See Detail on Concrete Island – Alabama Department of Transportation Specifications
- 3.) Pavement markings may be required. Traffic control signing may be required. See Federal MUTCD
- 4.) Driveway approach grade less than or equal to 5% desired, 8% maximum.
- 5.) Warp/ramp sidewalk as required (not shown) 1"/ft. maximum slope, 4' minimum width.
- 6.) 3-centered compound curve with appropriate offset design on right turn radii acceptable.
- 7.) Acceleration and/or deceleration lane may be required, specified by the City Engineer.

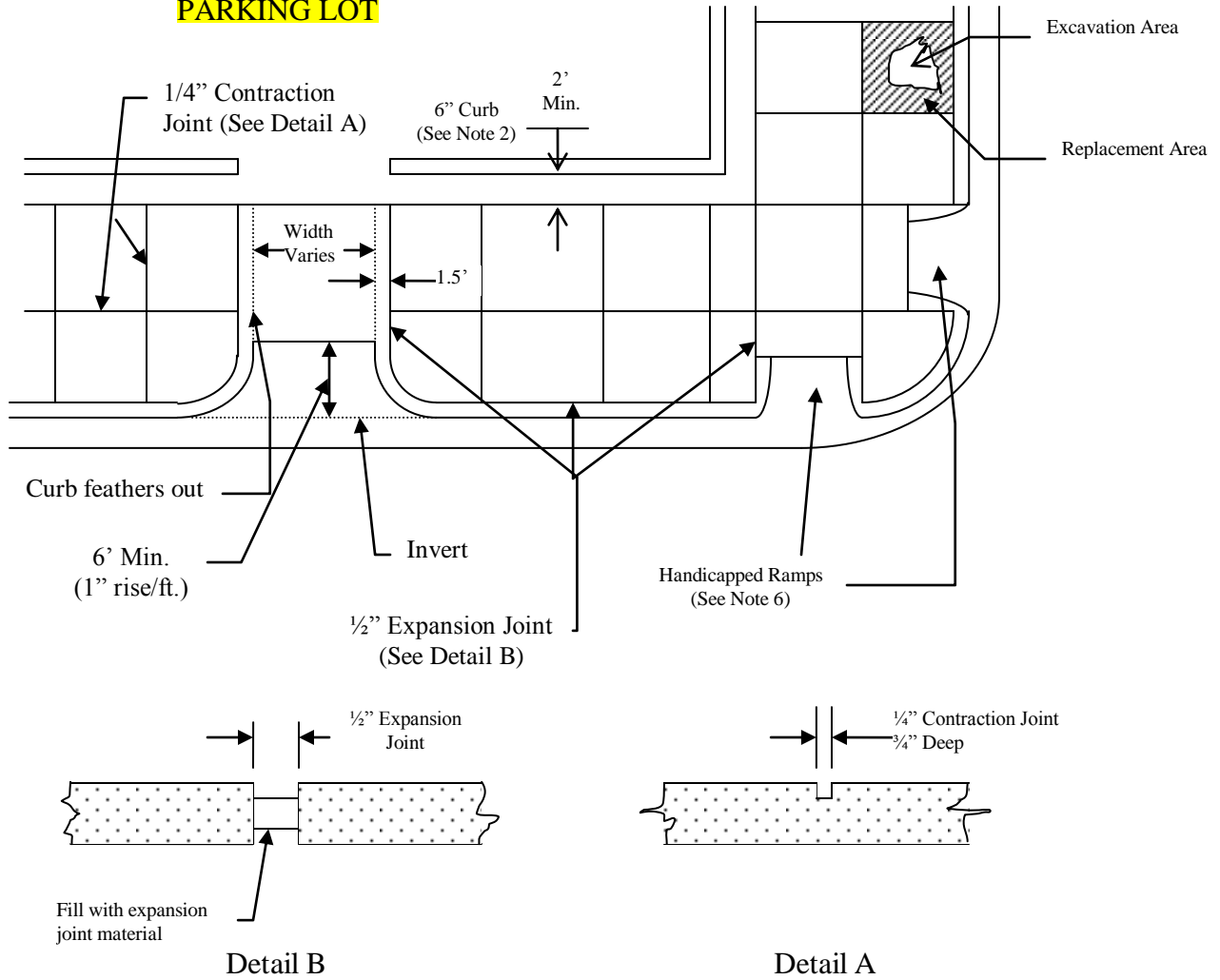
BAY PARKING MINIMUM DESIGN STANDARD



NOTES:

- 1.) Applicable in all locations where sidewalk is present or proposed regardless of parkway width.
- 2.) Bay parking shall not be considered when the number of parking spaces proposed is less than 5.
- 3.) Location of bay parking shall not infringe on corner sight distance requirements at adjacent intersections; specified by the City Engineer.
- 4.) Utility poles and other above ground utility structures shall not be permitted within divisional island.
- 5.) 110' minimum sight distance (horizontal and vertical) measured along the street centerline required on all local streets.
- 6.) Curbed asphalt bay with concrete valley gutter (shown) or curbed concrete bay accepted.
- 7.) Construction of curb and gutter along the entire street frontage shall be required on uncurbed streets.
- 8.) Raised divisional island shall not exceed 300 feet in length.
- 9.) Angle of parking bay may be increased up to 90 degrees with the appropriate increases in aisle width and driveway width specified by the City Engineer.

PARKING LOT



Detail A

Maximum spacing of 1/4 inch contraction joints shall be ten (10) feet in both transverse and longitudinal directions. Contraction joints may be achieved by saw cutting.

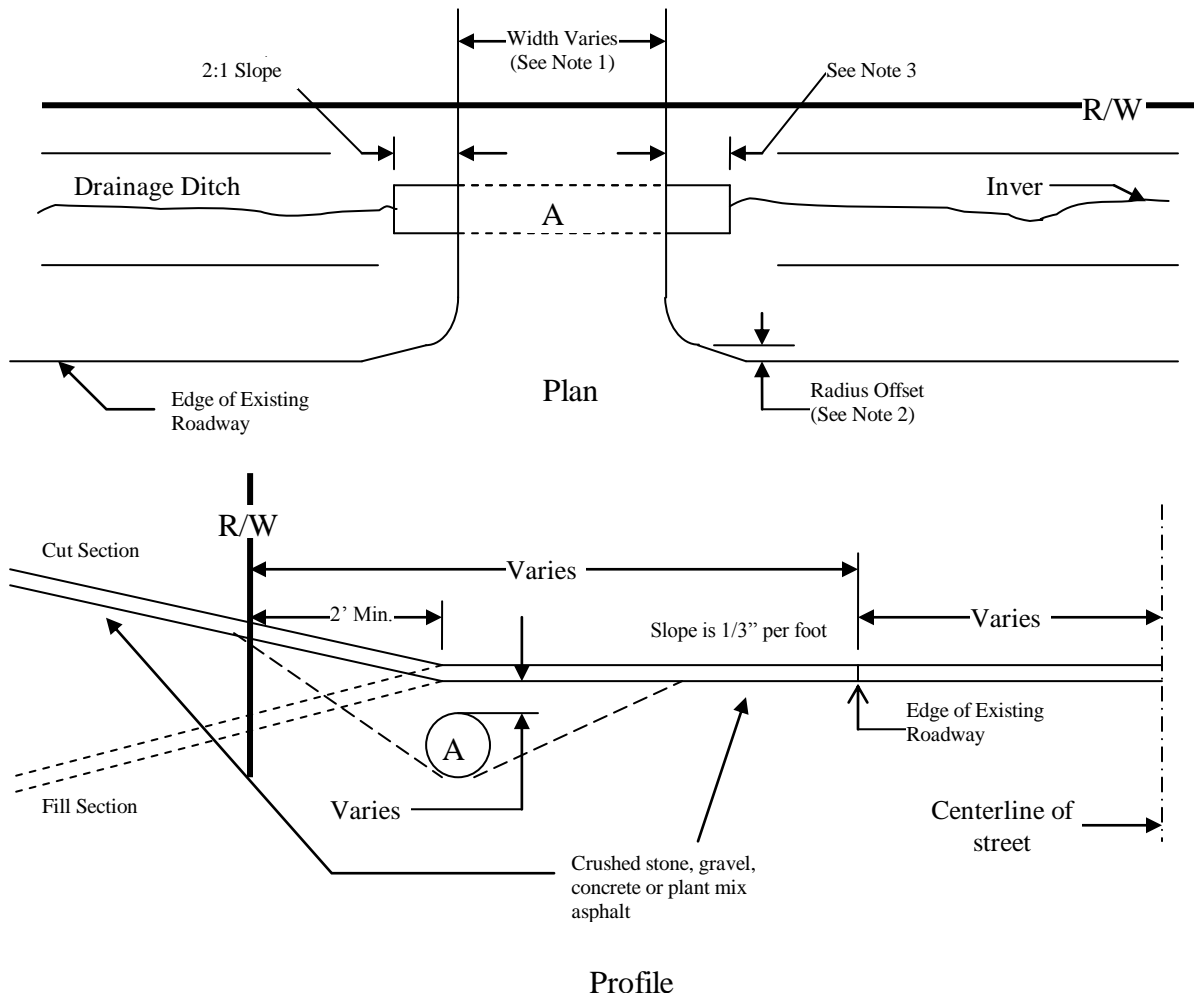
Detail B

Expansion joints shall be provided between sidewalks and curbs; between changes in concrete thickness; in the sidewalk parallel to and 1 1/2 feet either side of drives and at the property line on all drives. Maximum spacing of all transverse expansion joints shall be forth forty (40) feet.

NOTES:

- 1.) Range of driveway approach width permitted – based on adjacent land use. See appropriate driveway location and design standards.
- 2.) See Zoning Ordinance for on site permanent curbing requirements.
- 3.) When sidewalk excavations are necessary, repairs shall include replacement of all sidewalks within the confines of the existing adjacent contraction and/or expansion joints; matching surface texture and color of adjacent sidewalk.
- 4.) Minimum sidewalk material: 4” plain 3000 # concrete.
- 5.) Minimum driveway approach material: 6” plain 3000 # concrete.
- 6.) See Handicapped Ramp Design Standard for details.

STANDARD FOR DESIGN AND DRAINAGE OF DRIVEWAYS ON ALL UNCURBED STREETS



NOTES:

- 1.) See appropriate driveway design standards for range of permitted widths.
- 2.) Radius offset dependent on roadway width; specified by the City Engineer.
- 3.) Size, type, location, and grade of drainage structures shall be approved by the City Engineer. The length of the drainage structure shall be the permitted driveway width plus length required to achieve 2:1 earth sloped fill to the structure ends unless a pipe end treatment is proposed.
- 4.) Driveways located in fill sections shall be crowned in such a manner as to direct storm water runoff from the roadway into the drainage ditch before it reaches the right-of-way line.
- 5.) Minimum erosion control shall be the solid sodding of the disturbed area within the drainage ditch and 2:1 sloped earth fill at the drainage structure ends. The Engineer may require more than minimum control or approve alternate methods which provide protection equal to or greater than the specified minimum.