

CHAPTER 7

DRIVEWAYS

7.0 INTRODUCTION

It is in the public interest to regulate the location, design, construction, maintenance and drainage of access driveways, local roads and other property within State highway right-of-way for the purpose of security, economy of maintenance, preservation of proper roadway drainage, and safe and reasonable access for both vehicles and pedestrians crossing driveways. Driveways allow vehicles to ingress and egress streets at approved locations. In many locations, driveways will be required to cross pedestrian sidewalks within the roadway right-of-way. Driveways serve the same basic purpose for vehicles as curb ramps serve for pedestrians. Driveway crossings must be designed so that both drivers and pedestrians are able to use them effectively.

The requirements and regulations for driveways must meet the requirements of the latest edition of the Pennsylvania Code, Title 67 - Transportation, Chapter 441 entitled "Access to and Occupancy of Highways by Driveways and Local Roads" (67 PA Code § 441). No driveway must be constructed or altered within State highway right-of-way without first obtaining a highway occupancy permit from the Department.

The provisions of 67 PA Code § 441 contain the general conditions that apply to highway occupancy permit application procedures, fees, and permit issuance, general driveway design requirements and the general rules for penalties or revocation of permits based on violations pursuant to 67 PA Code § 441.

The Americans with Disabilities Act (ADA) of 1990 also requires that all pedestrians including persons with disabilities be able to safely use sidewalks that cross driveways.

This Chapter will provide various driveway design criteria presented in 67 PA Code § 441 and general driveway design guidelines presented in ADA accessibility provisions and best practice design guides for driveways presented in Chapter 5 of FHWA publication, *Designing Sidewalks and Trails for Access, Part II: Best Practices Design Guide*, September 2001.

7.1 DEFINITIONS

The following definitions must be used in conjunction with the criteria described in this Chapter.

1. **Access.** A driveway, street, or other means of vehicle passage between the highway and abutting property, including acceleration and deceleration lanes and such drainage structures as may be necessary for the proper construction and maintenance of the roadway system.
2. **Curblin.** A line formed by the face of a curb or in its absence the outer edge of the shoulder, along which curbing is or may be located.
3. **Driveway.** Every entrance or exit used by vehicular traffic to or from properties abutting a highway. The term includes proposed streets, lanes, alleys, courts, and other vehicular travel ways.
4. **Driveway Crossing.** The area where a driveway crosses a pedestrian walkway such as a sidewalk. This area generally extends in width from the curblin to the back edge of the sidewalk.
5. **Driveway Entrance.** The beginning of the driveway where vehicles ingress or egress the roadway.
6. **Driveway Ramp.** The sloped portion of a driveway usually beginning at the curblin.
7. **Driveway Width.** The narrowest width of a driveway measured perpendicular to the centerline of the driveway.

8. Egress. The exit of traffic from abutting properties to a highway.
9. Frontage Width. The distance along the right-of-way line in front of an abutting property.
10. Highway. A highway or bridge on the system of State highways and bridges, including the entire width between right-of-way lines, over which the Department has assumed or has been legislatively given jurisdiction.
11. Ingress. The entrance of traffic to abutting properties from a highway.
12. Joint-Use Driveway. A driveway shared by and constructed to provide access to two or three properties.
13. Limited Access Highway. A highway to which property owners or occupants of abutting lands or other persons have no legal right of access except at points and in the manner determined by the Department.
14. Local Road. Every public highway other than a State highway. The term includes existing or proposed streets, lanes, alleys, courts, or vehicular travel ways.
15. Pavement Edge. The edge of the main traveled portion of any highway exclusive of shoulder.
16. Permanent Curbing. Plain or reinforced cement concrete curb which meets Publication 72M, *Roadway Construction Standards*.
17. Permit. A highway occupancy permit issued by an Engineering District office pursuant to 67 PA Code § 441.
18. Property Line Clearance. The distance measured along the pavement edge or curb between the property frontage boundary line and the near edge of the driveway.
19. Returned Curb. A portion of a curb line that is formed by a turn or bend in the curb, usually perpendicular to the roadway curb line, and allows for adjusting heights of abutting surfaces from one elevation to another.
20. Right-of-Way. The area which has been acquired by the Department for highway transportation purposes.
21. Roadway. That portion of a highway improved, designed, or ordinarily used for vehicular travel, exclusive of the sidewalk or shoulder.
22. Roadway Construction Standards. Publication 72M, *Roadway Construction Standards*, containing the Department's design standards for roadway construction.
23. Setback. The lateral distance between the right-of-way line and a building, liquid fuel pump island, display stand, or other object, that will result in a space for vehicles to stop or park between the objects and the right-of-way line.
24. Shoulder. A section of a roadway system adjacent to the traveled way that may be shared by motorized vehicles, horse drawn vehicles, bicycles, and pedestrians. The shoulder facilitates drainage, supports the roadway and provides a buffer between vehicles and pedestrians.
25. Shoulder Line. The intersection of the shoulder slope with the side slope, drainage swale, or ditch slope.
26. Side-Flare. A paved, sloped portion of a driveway or curb ramp edge leading from one elevation to another and provides a surface that can generally be crossed by a vehicle or pedestrian.
27. Sidewalk. A portion of a roadway between curb lines or the lateral line of a roadway and the adjacent property line or easement of private property that is paved or improved and intended for use by pedestrians.
28. Travel Way. The portion of the roadway for the movement of vehicles exclusive of shoulders and auxiliary lanes.

29. Traffic Control Device. Any sign, signal, pavement marking, or device used to regulate, warn, or guide vehicular traffic and pedestrians that is placed on, over, or adjacent to a street, highway, pedestrian facility, or shared-use path by authority of a public agency having jurisdiction.

30. Turning Radius. The radius of an arc which approximates the turning path of the exterior corner of a vehicle.

7.2 GENERAL DRIVEWAY REQUIREMENTS

A. Design Features. Design features of driveways include the following items:

- Driveway width
- Turning radii and other points of curvature
- Driveway gradient, cross slope, and driveway profile
- Angle of driveway intersection with the roadway
- Driveway surface material and traffic island materials
- Depressed access curb type, side-flares, and return curb
- Sidewalk width, location, cross slope, and proposed surface material
- Appropriate property and highway right-of-way lines
- Location of all required traffic control devices
- Roadway curbs, gutters, shoulders, drainage features, and roadway surface material
- Appropriate adjacent building locations
- Adjacent above ground and subsurface utilities and other site features such as service lines, poles, hydrants, sign posts, street parking, grass or tree lawns, street trees, etc.

B. General Driveway Design Criteria.

1. Driveways must be located and designed in such a manner as not to interfere or be inconsistent with the design, function, drainage, or maintenance of the adjoining roadway. Driveway work must be done at such a time and in such manner to be consistent with the safety of the public and must conform to all requirements and standards of the Department. See 67 PA Code § 441 for driveway classifications based on traffic volumes and land use examples.

2. The ability of a driveway to safely and efficiently function as an integral component of a highway system requires that its design and construction be based on the amount and type of traffic that it is expected to serve and the type and character of roadway that it accesses. The driveway must be designed using values appropriate for the posted speed of the roadway being accessed. See 67 PA Code § 441.

3. Access driveways must be permitted at locations in which:

- a.** Sight distance is adequate to safely allow each permitted movement to be made into or out of the access driveway.
- b.** The free movement of normal highway traffic is not impaired.
- c.** The driveway will not create a hazard.
- d.** The driveway will not create an area of undue traffic congestion on the highway.

4. Specific driveway location restrictions must include the following:

- a.** Access driveways may not be located at interchanges, ramps, or locations that would interfere with the placement and proper functioning of highway signs, signals, detectors, lighting, or other traffic control devices.

- b.** The location of a driveway near a signalized intersection may include a requirement that the permittee provide, in cooperation with the local government, new or relocated detectors, signal heads, controller, etc. for the control of traffic movements from the driveway.
- c.** Access to a property which abuts two or more intersecting streets or highways may be restricted to only one driveway entrance that can more safely accommodate its traffic.
- d.** The Department may require the permittee to locate an access driveway directly across from a highway, local road, or access driveway on the opposite side of the roadway if it is judged that offset driveways will not permit left turns to be made safely or that access across the roadway from one access to the other will create a safety hazard.
- e.** An access intended to serve more than three properties or to act as a connecting link between two or more roadways must be, for the purpose of this Chapter, considered a local road and not a driveway regardless of its ownership. The access design must be in accordance with the Department's current standards governing the design of local roads. All other requirements of this Chapter must be complied with before the local road will be allowed access onto a State highway.
- f.** The number and location of entrances that may be granted will be based on usage, interior and exterior traffic patterns, and the current design policy of the Department.
 - (1)** Normally, only one driveway will be permitted for a residential property and not more than two driveways will be permitted for a nonresidential property.
 - (2)** If the property frontage exceeds 180 m (600 ft), the permit may authorize an additional driveway.
 - (3)** Regardless of frontage, a development may be restricted to a single entrance / exit driveway, served by an internal collector road separated from the traveled way.

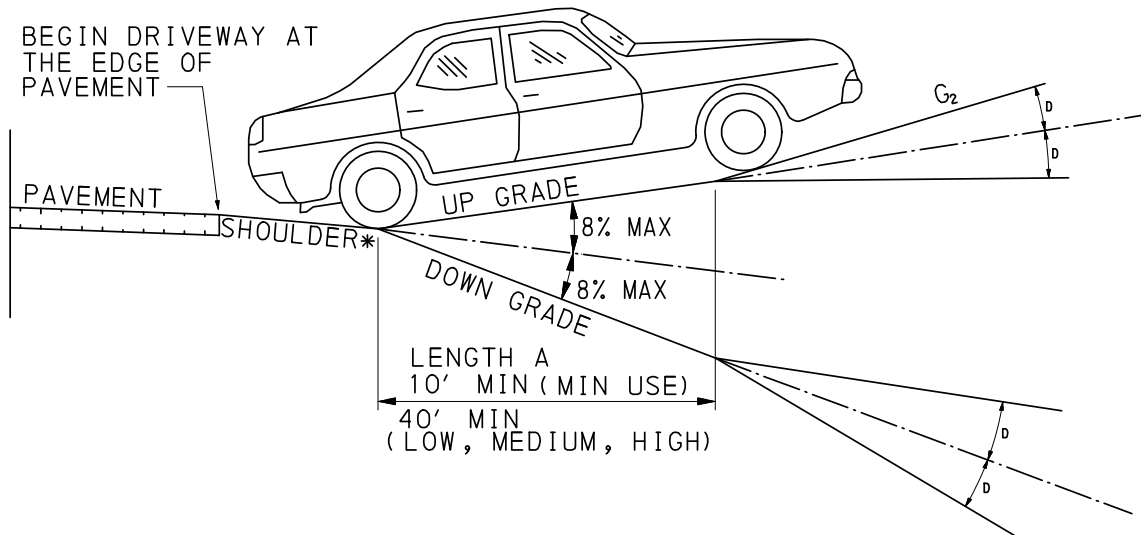
5. Driveway approaches must conform to the following criteria:

- a.** The location and angle of an access driveway approach in relation to the highway intersection must be such that a vehicle entering or leaving the driveway may do so in an orderly and safe manner and with a minimum of interference to highway traffic.
- b.** Where the access driveway approach and highway pavement meet, flaring of the approach may be necessary to allow safe and easy turning of any vehicular traffic.
- c.** Where the highway is curbed, a depressed curb driveway approach must be installed adjacent to the highway, shoulder, or gutter grade to maintain proper drainage along the curb. See Publication 72M, *Roadway Construction Standards*, Drawings RC-64M and RC-67M for cement concrete depressed driveway curbs and driveway apron details.
- d.** The angle of access driveway approach must include the following:
 - (1)** Access driveway approaches used for two-way operation must be positioned at right angles (90°) to the highway or as near to perpendicular as site conditions allow.
 - (2)** When two access driveways are constructed on the same property frontage and used for one-way operation, each of these driveways may be placed at an angle less than a right angle, but not less than 45° to the highway, except that along divided highways where no openings are allowed in the median, the minimum angle of an exit driveway may be 30°.

- 6. Driveways Adjacent to Intersections.** Driveways serving properties located adjacent to a highway intersection must be subject to the following:
- a.** There must be a minimum 3 m (10 ft) tangent distance between the intersecting highway radius and the radius of the first permitted driveway.
 - b.** The distance from the edge of pavement of the intersecting highway to the radius of the first permitted driveway must be a minimum of 6 m (20 ft) on curbed highways and 9 m (30 ft) on uncurbed highways.
 - c.** Paragraphs a and b of this subsection may be waived only if the intersecting highway radius extends along the property frontage to the extent that compliance is physically impossible.
- 7. Property Line Clearance.** Except for joint-use driveways, no portion of any access must be located outside of the property frontage boundary line.
- 8. Multiple Driveways.** Multiple driveways serving the same property must be separated by a minimum distance of 4.6 m (15 ft) measured along the right-of-way line and 6 m (20 ft) measured along the shoulder, swale or ditch line, or curb. When the distance between multiple driveways is 15 m (50 ft) or less measured along the shoulder, swale or ditch line, the area between must be clearly defined by permanent curbing. This curb must be placed in line with existing curb or 610 mm (2 ft) back of the shoulder, swale or ditch line on uncurbed highways. It must be extended around the driveway radii to the right-of-way line.
- 9. Curb.** Requirements for curbs must conform with the following:
- a.** Provide curbing wherever it is required to control access or drainage. All curbing must be permanent curbing.
 - b.** Where property abutting the right-of-way line could be used as parking area, provide curbing, permanent guide rail, or fencing to be along the right-of-way line to prohibit vehicle encroachment upon the sidewalk or shoulder area.
 - c.** When curb exists adjacent to the proposed driveway, the line and grade of the existing curb must be matched.
- 10. Grade for Access Driveway.** The grade for access driveway must be constructed in the following manner:
- a.** All driveways must be constructed so as not to impair drainage within the right-of-way, alter the stability of the improved area, or change the drainage of adjacent areas.
 - b.** Drainage pipe installed under driveways must be at least 380 mm (15 in) in diameter.
 - c.** The side slopes for driveway embankments within the right-of-way must not be steeper than 1V:10H (10.00%).
 - d.** Driveway grade requirements within the right-of-way must conform to [Figure 7.1](#).
 - (1)** The difference between the cross slope of the roadway and the upward grade of the driveway entrance approach must not exceed 8.00%.
 - (2)** When a grass or tree lawn area exists between the roadway curb and the sidewalk and this area is wide enough to maintain a maximum 8.00% change in grade between the roadway surface and the driveway grade, construct a Type 1 or 2 Driveway Apron as shown in [Figures 7.2](#) and [7.4](#). The sidewalk portion crossing the driveway must maintain a maximum 1V:50H (2.00%) cross slope.

- (3) When a wide sidewalk parallels and abuts the curb, construct a Type 1A or Type 2A Driveway Apron, as shown in [Figures 7.3](#) and [7.5](#). The sidewalk portion crossing the driveway must maintain a maximum 1V:50H (2.00%) cross slope.
- (4) When sidewalk is directly behind and parallels the curb, a Type 3 or Type 3A Driveway Apron as shown in [Figures 7.6](#) and [7.7](#) can be used. This driveway and sidewalk configuration depresses the sidewalk crossing. Certain site conditions may require constructing an additional cheek wall curbing to install this type of crossing.
- (5) When a narrow sidewalk is directly behind and parallels the curb, a Type 4 Driveway Apron as shown in [Figure 7.8](#) can be used. This driveway and sidewalk configuration positions the sidewalk crossing further away from the curb in order to maintain the desired sidewalk accessibility. The sidewalk portion crossing the driveway must maintain a maximum 1V:50H (2.00%) cross slope.
- (6) All depressed curb side-flare height adjustments must be as indicated.

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* THE SHOULDER SLOPE USUALLY VARIES FROM 4% TO 6%. HOWEVER, THE SHOULDER SLOPE SHOULD BE MAINTAINED WHEN CONSTRUCTING THE DRIVEWAY.

FOR GRADE CHANGES GREATER THAN THOSE INDICATED ABOVE, VERTICAL CURVES AT LEAST 3 m (10 ft) LONG MUST BE CONSTRUCTED AND LENGTH "A" MUST BE INCREASED.

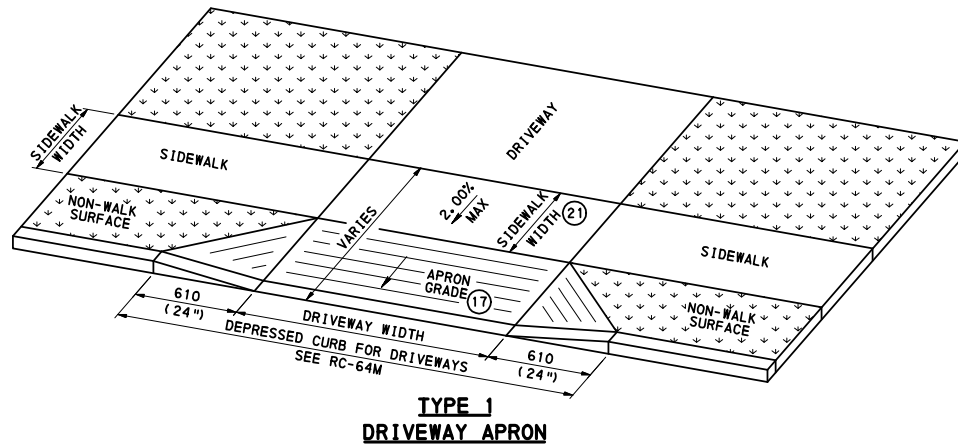
G₂ GRADES MUST BE LIMITED TO 15% FOR MINIMUM USE DRIVEWAYS AND 5% TO 8% FOR LOW, MEDIUM, OR HIGH VOLUME DRIVEWAYS WITHIN THE RIGHT-OF-WAY.

	MAXIMUM GRADE CHANGE (D)	
	<u>DESIRABLE</u>	<u>MAXIMUM</u>
HIGH VOLUME DRIVEWAY	0%	+/-3%
MEDIUM VOLUME DRIVEWAY	+/-3%	+/-6%
LOW VOLUME DRIVEWAY	+/-6%	CONTROLLED BY VEHICLE CLEARANCE

FIGURE 7.1
Driveway Apron Grades

7.3 ADA DRIVEWAY AND PEDESTRIAN GUIDELINES

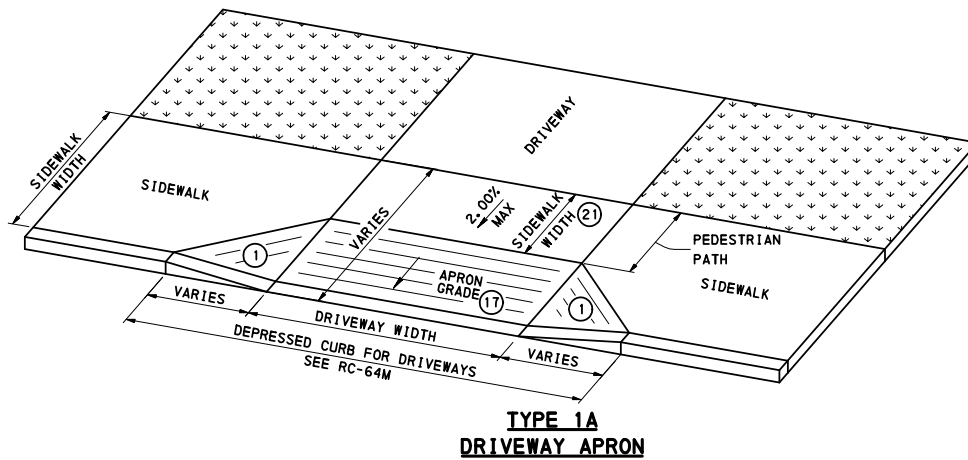
1. Figures 7.2 through 7.8 illustrate minimum design requirements and acceptable design considerations described for driveway crossings of sidewalks. Although site conditions may not permit strict adherence to the dimensions indicated, every effort must be made to design and construct the safest and most efficient driveways leading onto State highways while ensuring that these facilities remain accessible to the public crossing them.
2. Driveway crossings without a continuous sidewalk cross slope 1V:50H (2.00%) forces pedestrians to travel across the driveway side-flare that can compromise balance and wheelchair stability. Driveways constructed with a return curb at the driveway crossing are also inaccessible to wheelchair users. Existing driveways not meeting these criteria should be replaced to meet new accessibility guidelines. Driveway crossings with steep side-flare connections to adjacent sidewalk (steeper than 10.00%) are not allowed under current design criteria.
3. Driveway crossings should be wide enough to accommodate both the driveway ramp and a level pedestrian sidewalk landing zone. See Figure 7.2 through Figure 7.5 (Types 1, 1A, 2, and 2A Driveway Aprons). These apron types can be constructed on wide parallel sidewalk corridors where either the entire sidewalk zone that abuts the curblines is paved or a non-walk (planting strip) surface is created. As indicated on RC-67M, the minimum sidewalk width is 1525 mm (5 ft). The minimum sidewalk width may be reduced to 1220 mm (4 ft) where 1525 mm × 1525 mm (5 ft × 5 ft) passing areas are provided every 61 m (200 ft).
4. Type 1 and 2 Driveway Aprons (Figures 7.2 and 7.4). Used when a planting strip abutting the curblines separates the sidewalk and curb. If the driveway ramp is not part of the pedestrian sidewalk, a returned curb is better for roadway drainage and has the added affect of slowing traffic due to the tighter turning radius needed to negotiate the driveway entrance approach.
5. Type 1A and 2A Driveway Aprons (Figures 7.3 and 7.5). Used for driveway crossings where a wide sidewalk parallels and abuts the street curb line. These driveway aprons combine sloped side-flares or a curbed return, with a sidewalk landing.
6. Type 3 and 3A Driveway Aprons (Figures 7.6 and 7.7). Sidewalk corridors abutting the street curb line can also be depressed at the driveway entrance apron in many situations to provide a crossing with a maximum landing slope of 2.00% to help prevent poor drainage and ponding along the curb. The driveway ramp begins at the rear edge of the sidewalk landing. The sidewalk is sloped (maximum slope of 1V:12H (8.33%)) along each side of the driveway to meet the higher adjacent sidewalk elevations. This type of driveway apron is not as desirable as a level jogged crossing since pedestrians are forced to travel down one ramp and then up another ramp. These crossings can also confuse visually impaired pedestrians since they may believe that they are about to cross a street intersection at a curb ramp. A narrow driveway apron is also desirable to slow down traffic using this type of driveway entrance.
7. Type 4 Driveway Apron (Figure 7.8). Securing additional easement or right-of-way from the adjacent property is recommended for creating a level jogged pedestrian sidewalk crossing for narrow sidewalks.
8. Gradually sloped driveway crossings constructed with flat side-flares under 1V:20H (5.00%) are beneficial for people with mobility impairments but can also become a problem for visually impaired pedestrians unless there is a detectable difference in the slope at the edge of the street. Without a steeper slope to trigger the awareness of a ramp condition, a visually impaired person could inadvertently veer into the street.
9. Built-up driveway entrances that project across the curb and into the street can hinder or obstruct roadway drainage at the curb and are not recommended.



- (17) 8% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY
- (21) MINIMUM SIDEWALK WIDTH 1525 (5'-0")

DRIVEWAY CROSSINGS FOR SIDEWALKS ABUTTING PLANTING STRIPS CAN BE DESIGNED WITH A LEVEL LANDING USING SLOPED SIDE-FLARES THAT EASE VEHICLE TURNS.

**FIGURE 7.2
Type 1 Driveway Apron**

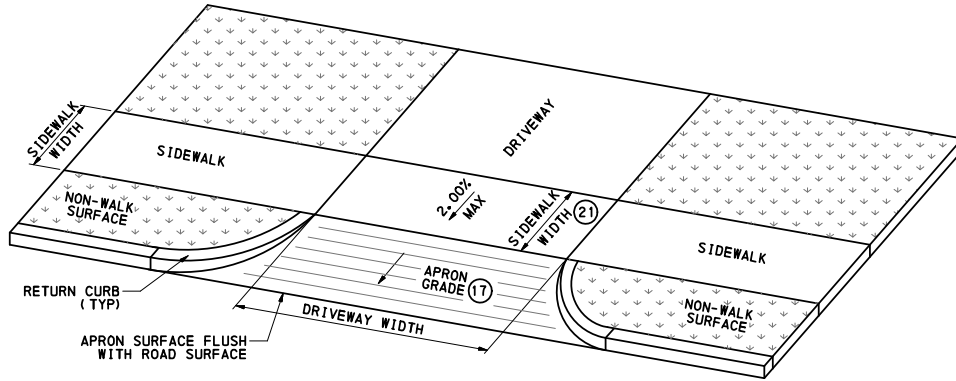


DRIVEWAY CROSSINGS ON A WIDE SIDEWALK CORRIDOR SHOULD BE DESIGNED TO INCLUDE A CONTINUOUS SIDEWALK WIDTH WITH A 2.00% CROSS SLOPE

- (1) SIDE FLARES 10.00% MAX SLOPE
- (17) 8% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY
- (21) MINIMUM SIDEWALK WIDTH 1525 (5'-0")

WIDE SIDEWALK ZONES ALLOW MORE DESIGN CONFIGURATIONS. THIS CONFIGURATION IS MORE PEDESTRIAN FRIENDLY WITH A CONTINUOUS SIDEWALK AND A SIDE-FLARE WITH A MAXIMUM SLOPE OF 1V:10H (10.00%).

**FIGURE 7.3
Type 1A Driveway Apron**



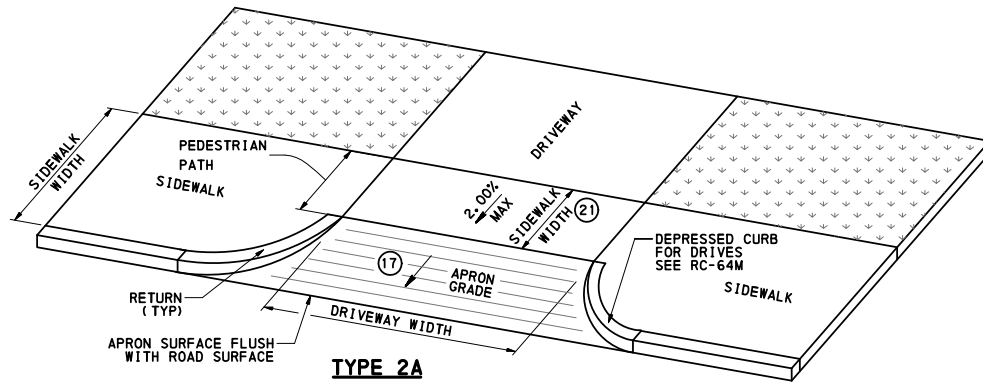
**TYPE 2
DRIVEWAY APRON**

DRIVEWAY CROSSINGS ON SIDEWALKS WITH PLANTING SHOULD BE DESIGNED TO INCLUDE A CONTINUOUS SIDEWALK WIDTH WITH A 2.00% CROSS SLOPE AND RETURNED CURBS INSTEAD OF FLARES.

- (17) 8% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY
- (21) MINIMUM SIDEWALK WIDTH 1525 (5' - 0")

DRIVEWAY CROSSINGS FOR SIDEWALKS ABUTTING PLANTING STRIPS CAN ALSO BE DESIGNED WITH RETURNED CURBS. THIS CONFIGURATION FORCES MOTORISTS TO ENTER THE DRIVEWAY CROSSING AT MORE OF A RIGHT ANGLE AND AT A LOWER SPEED.

**FIGURE 7.4
Type 2 Driveway Apron**



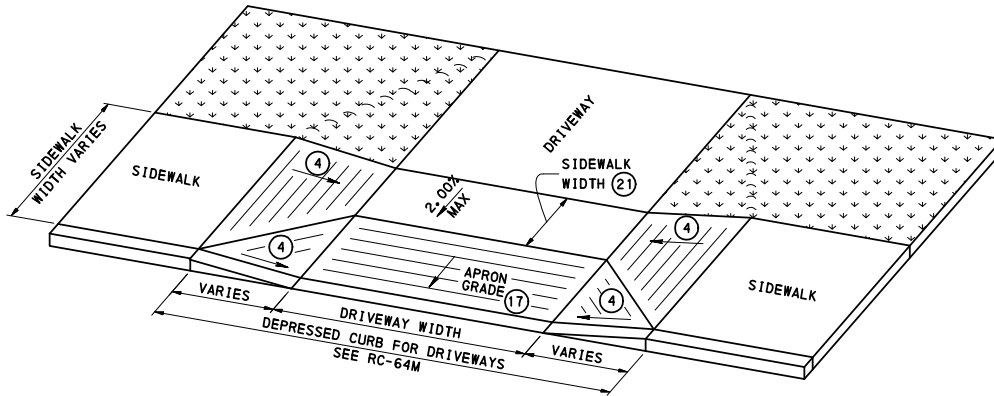
**TYPE 2A
DRIVEWAY APRON**

DRIVEWAY CROSSINGS ON SIDEWALKS WITH PLANTING SHOULD BE DESIGNED TO INCLUDE A CONTINUOUS SIDEWALK WIDTH WITH A 2.00% CROSS SLOPE AND RETURNED CURBS INSTEAD OF FLARES.

- (17) 8% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY
- (21) MINIMUM SIDEWALK WIDTH 1525 (5' - 0")

DRIVEWAY CROSSINGS FOR WIDE SIDEWALK ZONES CAN BE DESIGNED WITH RETURNED CURBS. THIS CONFIGURATION FORCES MOTORISTS TO ENTER THE DRIVEWAY CROSSING AT MORE OF A RIGHT ANGLE AND AT A LOWER SPEED BUT IS LESS PEDESTRIAN FRIENDLY SINCE A CURB IS INTRODUCED INTO THE WIDE PEDESTRIAN PATHWAY.

**FIGURE 7.5
Type 2A Driveway Apron**

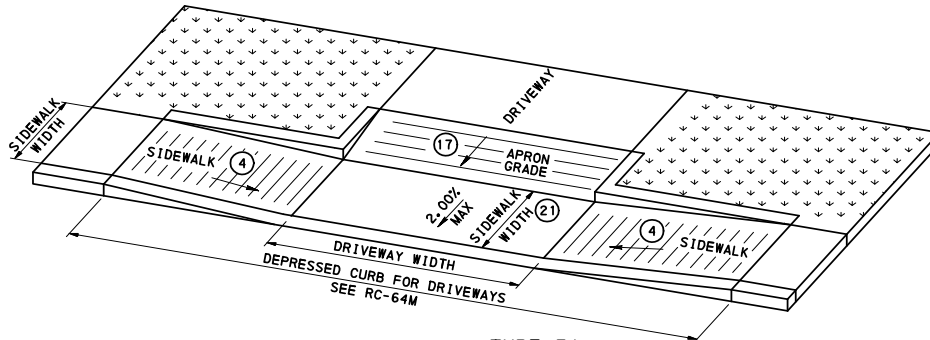


**TYPE 3
DRIVEWAY APRON**

- ④ 8.33% MAX SLOPE
- ⑰ 8% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY
- ⑳ MINIMUM SIDEWALK WIDTH 1525 (5'-0")

DEPRESSED, LEVEL SIDEWALK CROSSINGS ENHANCE PEDESTRIAN ACCESS AT DRIVEWAY CROSSINGS WHERE SPACE IS LIMITED. THIS IS LESS PREFERRED DUE TO THE CHANGE IN SLOPE FOR THE PEDESTRIAN.

**FIGURE 7.6
Type 3 Driveway Apron**



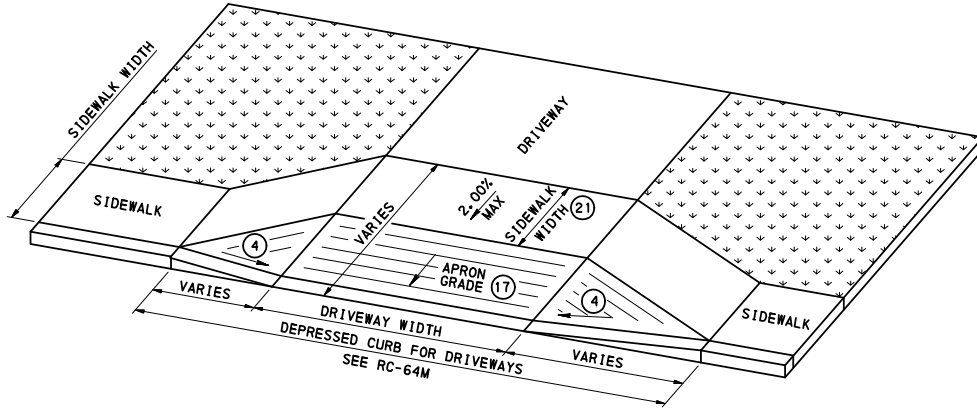
**TYPE 3A
DRIVEWAY APRON**

PARALLEL DRIVEWAY CROSSINGS ENHANCE PEDESTRIAN ACCESS AT A DRIVEWAY CROSSING WHEN THERE IS NO ROOM TO TRANSITION THE GRADES AND PROVIDE A CONTINUOUS SIDEWALK WIDTH WITH A 2.00% CROSS SLOPE. PARALLEL DRIVEWAY CROSSINGS ARE NOT AS DESIRABLE AS OTHER ACCESSIBLE DRIVEWAY CROSSINGS BECAUSE USERS ARE FORCED TO NEGOTIATE TWO RAMPS INSTEAD OF A LEVEL SURFACE.

- ④ 8.33% MAX SLOPE
- ⑰ 8% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY
- ⑳ MINIMUM SIDEWALK WIDTH 1525 (5'-0")

NOTE: CERTAIN SITE CONDITIONS MAY REQUIRE CONSTRUCTING ADDITIONAL CHEEK WALL CURBING TO INSTALL THIS TYPE OF CROSSING. THIS IS LESS PREFERRED DUE TO THE CHANGE IN SLOPE FOR THE PEDESTRIAN.

**FIGURE 7.7
Type 3A Driveway Apron**



**TYPE 4
DRIVEWAY APRON**

- ④ 8.33% MAX SLOPE
- ⑰ 8% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY
- ② MINIMUM SIDEWALK WIDTH 1525 (5'-0")

NOTE: SHIFT SIDEWALK AWAY FROM CURB TO GAIN APPROPRIATE APRON GRADE.

**FIGURE 7.8
Type 4 Driveway Apron**