

# RULES AND REGULATIONS

<b>DEPARTMENT OF PUBLIC SERVICE CITY OF COLUMBUS, OHIO</b>
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<b>SUBJECT:</b> Wheelchair Ramp Requirements	<b>EFFECTIVE DATE:</b> March 5, 2011
<b>PAGES:</b> 36	<b>By:</b> Division of Mobility Options

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### I. AUTHORITY

Pursuant to the authority granted under Ordinance 1987-2008 passed December 15, 2008 (Section 2105.125 of the Columbus City Codes, 1959, as amended), the Director of Public Service hereby adopts, establishes, and publishes these rules and regulations to be effective at the earliest time allowed by law. These rules supersede rules previously promulgated in 1999.

### II. APPLICATION

This policy shall be applicable to all wheelchair ramps installed within right-of-way controlled by the City of Columbus. This policy shall also replace and supersede the following General Policies and Procedure:

- “Location of Pedestrian Pushbuttons” – Effective Date October 1, 2005
- “Wheelchair Ramps – Detectable Warnings” – Effective March 1, 2004
- “Non-Paired Wheelchair Ramps and At-Grade Sidewalk Transitions - Effective November 15, 2006

### III. EFFECTIVE DATE

This policy shall be effective March 5, 2011 and shall supersede all previous applicable policies and standards. All site plans, permits and capital improvement plans submitted for review following the effective date shall comply with these rules and regulations.

#### IV. BACKGROUND

The Americans with Disabilities Act (ADA) of 1990 established that it is discriminatory and a violation of a disabled person's civil rights to deny access to various public and privately owned facilities and resources that are accessible to able-bodied persons. Title II of ADA applies to state and local governments. Among the items listed in Title II that shall be made accessible are pedestrian facilities and routes along public rights-of-way. Responsibility for making these facilities compliant is the responsibility of the Department of Public Services, Division of Mobility Options (DOMO).

In order to provide a practical framework for determination of accessibility, the Access Board, an agency established by the Federal Government to create guidelines, developed the concept of the **Pedestrian Accessible Route**, or **PAR**. This is in essence a path through and contained within a pedestrian facility that has slope, grade, surface characteristic, and other features that make it usable by persons having certain mobility and sensory impairment conditions. The PAR must be an unbroken route that will provide access to any destination along a given right-of-way that can otherwise be reached by an able-bodied pedestrian. It may extend the entire width of a sidewalk or walkway, or it may consist of only a specified width of the overall walkway or path.

Wheelchair ramps, also known as curb ramps, are essential elements of a PAR and they are required when the route requires a change in elevation. This usually occurs at curbs at intersections, where an individual must travel from a sidewalk, down onto street level in order to negotiate a crosswalk, and then return to the sidewalk on the opposite side. However, curb ramps may be constructed any time a change in elevation is necessary.

Wheelchair ramps are constructed at curbed intersections, if a sidewalk is present. A variation of a curb ramp, blended transitions, may be constructed where sidewalk is present, but no curbs. Curb ramps may also be required when no sidewalk is present, but access is needed to pedestrian call buttons located off the roadway. In most cases, however, curb ramps do not need to be built where there is no sidewalk, since, by definition, the pedestrian route will be along the roadway pavement.

#### V. DEFINITIONS

The following words, terms and phrases, when used in these rules and regulations, shall have the meanings ascribed to them, except when the context clearly indicates a different meaning:

- A. **ADA** means Americans with Disabilities Act of 1990, and all subsequent amendments.
- B. **ADAAG** means ADA Accessibility Guidelines for Buildings and Facilities.
- C. **Alley** means a thoroughfare typically located in the middle of a block that allows access to the rear of buildings. ORC The legal definition of an alley used by the City of Columbus can be found in ORC 4511.01(XX).
- D. **Alteration** means a change to a facility that affects or could affect the usability of the facility or part thereof. Alterations include, but are not limited to, remodeling, renovation, rehabilitation, reconstruction, historic restoration, resurfacing of circulation paths or vehicular ways, or changes or rearrangement of the structural parts or elements. Normal maintenance is not considered an alteration unless it affects the usability of the facility.
- E. **Addition** means an expansion, extension or increase in the area of a facility. Additions are treated as new construction as defined in ADA.

- F. **Blended Transition** means a section of sidewalk constructed, within standards, to allow passage from one section of a PAR to another. These are not to be confused with curb ramps, and are not reimbursable as a separate unit item. Blended transitions are typically used in areas where no curb is in place.
- G. **“Columbus Pedestrian Thoroughfare Plan Handbook”** means a document prepared by the Division of Mobility Options that establishes standards for pedestrian walkways located throughout the City. It is referenced in order to establish pedestrian traffic and needs.
- H. **Consent Decree** means the First Amended Settlement Agreement between the Ohio Statewide Independent Living Council (OSILC) and the City of Columbus, dated December 20, 2000. Among other things, this document establishes that the City of Columbus must construct curb ramps where needed when road resurfacing is conducted.
- I. **Crosswalk** means (1) That part of a roadway at intersections ordinarily included within the real or projected promulgation of property lines and curb lines or, in the absence of curbs, the edges of the traversable roadway. (2) Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface. (COC Code 900.04). All crosswalks are required to be compliant. (ADAAG)
- J. **Curb Ramp** means a short ramp cutting through a curb or running up to it. (ADAAG F106.5). This is the primary means of providing an accessible route from sidewalks to crosswalks. The accessible portion of the curb ramp typically includes an upper landing, a lower landing, and a sloped ramp. Flares placed on either side of the sloped ramp are considered to be a part of the inaccessible portion of the ramp. The term “Wheelchair Ramp” has identical meaning.
- K. **Detectable Warning Unit** means a standardized surface feature built on or applied to walking surfaces or other elements to warn visually impaired people of hazards on a circulation path. These units are typically used in instances where pedestrians are passing from dedicated walking areas onto areas having vehicular traffic.
- L. **Developer** means, for the purposes of this document, the party initiating a project or process that will involve changes in the City right-of-way.
- M. **Intersection** means the area embraced within the prolongation or connection of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways of two highways which join one another at, or approximately at, right angles, or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict. (ORC 4511.01 KK)
- N. **Landing** means a relatively flat area (slope less than 1:48 or 2.08% in any direction) used by disabled individuals to move from one sloped area to another.
- O. **Long Flare** means the area adjacent to sloped portion of ramp that provides a transition from the sloped portion of the ramp to the existing surface. It is not designed to be part of an accessible route; however it is designed to be walked upon by able-bodied pedestrians.
- P. **New Build Projects** means a type of project that provides facilities in an area that had previously been unused and undeveloped. New build projects are subject to a higher level of compliance than the levels for additions or alterations.
- Q. **Orphan Ramp** - Also known as unmatched ramp. This means a ramp which provides access to a legal crosswalk for which there is no corresponding ramp on the opposite end that allows a disabled pedestrian to exit the crosswalk and access an existing sidewalk.

- R. **PROWAG** means the Proposed Right of Way Access Guidelines (Latest version: 2005)
- S. **PAR** means Pedestrian Accessible Route (For definition and explanation, see Section IV of this document.)
- T. **Resurfacing** means removal and replacement of a roadway surface curb-to-curb. This process is considered to be an alteration, therefore triggering ADA compliance.
- U. **Short Flare** means the area adjacent to sloped portion of ramp that provides a transition from the sloped portion of the ramp to the existing surface. It is not designed to be part of an accessible route. Unlike a long flare, it is not designed to be traversed by able-bodied individuals. This flare is only to be used when a ramp is adjacent to a non-walkable surface.

## VI. STANDARDS AND REFERENCES: DESCRIPTIONS AND HIERARCHY

- A. **Enforceable Standards:** The Access Board initially issued the Americans with Disabilities Act Accessibility Guidelines (ADAAG) in 1991 (*36 CFR 1191, Appendix A*). ADAAG consists of general sections (ADAAG 1 to 4) that apply to all types of buildings and facilities, and special sections (ADAAG 5 to 12, and 15) that contain additional requirements for certain types of buildings and facilities. This document has been amended a number of times. The most recent version was released in July of 2004, and is the current standard. Whatever is the most recent version of “*ADA Accessibility Guidelines for Buildings and Facilities*” is commonly referred to as the ADAAG. It contains scoping and technical requirements for accessibility to buildings and facilities by individuals with disabilities under the Americans with Disabilities Act (ADA) of 1990. **These scoping and technical requirements are to be applied during the design, construction, and alteration of buildings and facilities covered by titles II and III of the ADA to the extent required by regulations issued by Federal agencies, including the Department of Justice and the Department of Transportation, under the ADA.** Until such time when more detailed Right-of-Way standards are approved, these are the legal, enforceable standards that constitute the ultimate authority regarding ADA issues until Title II and Title III.
- B. **Rights-of-Way:** The publication, “*Accessible Rights-of-Way: A Design Guide*,” was released in November, 1999 by the U.S. Access Board in cooperation with the Federal Highway Administration in order to provide advisory information until guidelines for public rights-of-way are developed. The document was created by the Public Rights of Way Access Advisory Committee (PROWAAC). This group of transportation professionals wrote the design guide in an effort to address specific challenges involved in construction work in rights-of-way, built on ADAAG standards. The 148-page guide shows how existing ADA standards for pedestrian routes on sites can be adapted for application to sidewalks and street crossings. It provides best practices recommendations, along with the rationale behind them, for the design, construction, alteration, and retrofit of public pedestrian facilities. Although final standards for the design and construction of accessible pedestrian facilities in the public right-of-way have not yet been published, existing ADA standards developed for pedestrian routes on sites can be adapted for application to sidewalks and street crossings.

Draft Right-Of-Way Guidelines Published. On June 17, 2002, the Board released another document, "Draft Guidelines for Accessible Public Rights-of-Way," that was available for public comment until October 28, 2002. Another revision was made in 2005. In 2008, after the expiration of a 60 day comment period, the board announced its intention of implementing approval of this document in 2010. These guidelines focus more on specific issues related to pedestrian access to sidewalks and streets, including crosswalks, curb ramps, street furnishings, parking, and other components of public rights-of-way. The new provisions will supplement the Board's ADA and ABA accessibility guidelines by adding a new chapter specific to public rights-of-ways. Until the final approval of these guidelines, the ADAAG will be the ultimate authority in ADA issues.

- C. City of Columbus Standards:** Communities are required to develop local standards that meet the standards and guidelines issued under the ADA. Columbus has developed standards to conform to federal regulations and guidelines, to adapt these guidelines to local conditions, and to supplement and clarify items that may not be addressed at the federal level. Columbus has adopted a position of following "best practice" wherever possible, rather than meeting only minimum enforceable standards.
- D. Hierarchy of Reference Documents:** Standards for the design and construction of items affecting the Pedestrian Access Route (PAR) within public right-of-way shall follow the order of precedence listed below (1-6). When standards are not addressed at one level, then the applicable standard from the next lower level shall govern.
1. "General Policy and Procedure - Wheelchair Ramp Requirements", City of Columbus, Ohio, Department of Public Service.
  2. City of Columbus, Ohio standard drawings (notably #2319).
  3. City of Columbus, Ohio construction and materials specifications.
  4. City of Columbus Supplemental Specifications "1550 – Curb Ramps" and "1551 – Detectable Warnings."
  5. "ADA and ABA Accessibility Guidelines for Buildings and Facilities", U.S. Access Board, July 23, 2004. (ADAAG)
  6. First Amended Settlement Agreement, Ohio Statewide Independent Living Council, et al vs. City of Columbus, December 21, 2000.
  7. "Draft Guidelines for Accessible Public Rights-of-Way" U.S. Access Board, 2005.
  8. "Accessible Rights-of-Way: A Design Guide", U.S. Access Board and Federal Highway Administration, 2005

Note: Item # 7 "Draft Guidelines for Accessible Public Rights-of-Way" will supersede item #5 "ADAAG" at such time that the ROW guidelines complete the final approval process by the Federal government, which is expected to occur in July, 2010.

Example: Current and proposed ADAAG standards generally specify a 36-inch minimum width for accessible routes, including curb ramps, on sites. The proposed guidelines for public rights-of-way recommend a 48-inch minimum pedestrian pathway. Columbus requires a 48-inch pedestrian access route.

Example: Current and proposed ADAAG standards generally allow single, diagonal, dual-direction ramps at the apex of a corner. Although the Access Board Advisory Committee recognized that providing two separate compliant curb ramps might not always be practicable, particularly in alterations, the “Draft Guidelines” strongly discourage the use of such ramps for reasons of pedestrian safety. Accordingly, Columbus does not permit construction of these diagonal or “shared” ramps in new construction, and only under very rare circumstances for retrofit of existing construction. When used in alterations, they shall receive prior written approval.

## VII. CURB RAMP CONSTRUCTION: CONDITIONS AND SCOPING

### A. General Scoping Requirements:

1. **New Construction and Additions:** All new construction having no pre-existing outside constraints located outside the scope of the project is subject to the full extent of PROWAG requirements. Examples of these types of projects include roadway extensions, construction of new sidewalks in undeveloped areas, new subdivisions, and other new developments.
2. **Alterations:** This work consists of making changes to existing facilities or by constructing new facilities or structures within existing rights-of-way. Compliance requirements are less strict than for new construction in that it is limited to work that is “technically feasible”; that is, work that is possible given the constraints imposed by the existing conditions. Compliance is required to be made to the maximum extent possible, given these constraints.

### B. Specific Conditions:

1. **Roadways - New Construction or Addition.** New construction is subject to full compliance with PROWAG. Curb ramp styles designed to be used in alterations may not be used on these projects.
2. **Roadways – Alteration.** Curb ramps shall be constructed any time a curbed roadway undergoes an alternation and sidewalk is present. Roadway improvements that trigger installation of curb ramps include, but are not limited to, the following:
  - a. Improvements to the geometry of the intersection, such as installation of new turn lanes, or widening of existing lanes.
  - b. Signal Improvements
  - c. Grade elevation changes
  - d. Crosswalk striping improvements
  - e. Resurfacing
  - f. Streetscape improvements
3. **Corners.** In addition, all corners of all intersections affected by a given project, contained within the scope of said project, shall be made compliant. Even if road improvements were made that include only one part of an intersection, Title II requires that all PARs passing through that intersection shall be made compliant. Responsibility for this varies depending on the type of project. See following sections for more information.

Maintenance and repair work that does not “alter” existing elements of the pedestrian pathway triggers no obligation to provide accessible features. Examples of this work include but are not limited to the following:

- a. Spot patching and pothole repair
- b. Reseating of disturbed curbing
- c. Restriping of existing markings in place
- d. Thincoat sealing
- e. Microsurfacing
- f. Crack sealing
- g. Trenching for underground utility construction

- 4. **Sidewalks – New Build or Addition.** Full compliance is required for projects involving construction of new sidewalks in areas previously having no sidewalk facilities.
- 5. **Sidewalks – Alteration.** Curb ramps or blended transitions in appropriate locations shall be installed when new sidewalks are constructed in existing rights-of-way, or when existing sidewalks are rebuilt. This also includes any location where the new sidewalk crosses private drives or access points. Selection of the exact means of constructing the installation is left to the property owner. However, an unbroken, compliant PAR shall be installed that crosses the path of private drives and other access points wherever there is a public sidewalk in the right-of-way or in a dedicated easement.

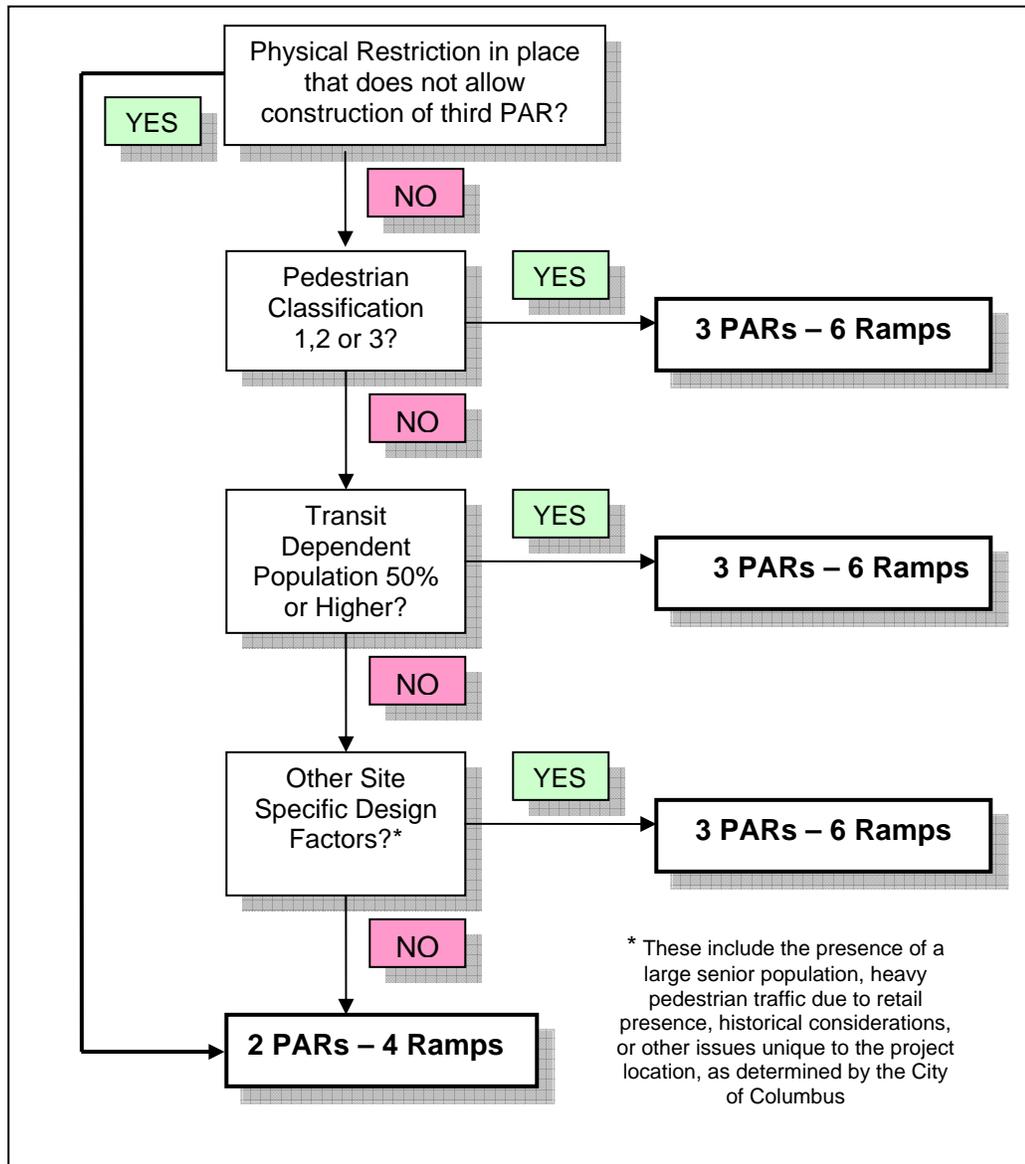
**C. Responsibilities:**

- 1. **Resurfacing.** Resurfacing is defined as milling and filling or overlay of a roadway surface, from edge to edge of pavement of uncurbed roadways, or face of curb to face of curb, across the entire width of that roadway, extending any given length along the roadway. As such, it is considered an alteration, and compliance is required to the maximum extent possible. The scope for any resurfacing project that includes roadway having curbs and sidewalk shall include compliant curb ramps. Further, curb ramps shall be constructed prior to or contemporaneously with such time that actual resurfacing activities are initiated. Any intersections completely or partially affected by resurfacing efforts shall be made compliant. Note: trenching activities which involve partial removal and replacement of pavement over underground construction, without an improvement to the pavement, and without disturbing the curb or PAR, will not require ADA compliance within the project scope.
- 2. **Roadway Improvements – Capital Improvement Projects.** If these projects are scoped within existing rights-of-way, they are considered to be an alteration. If additional right-of-way is obtained, they are considered new build or addition, and are subject to full compliance. Scoping for any Capital Improvement Project (CIP) initiated within the limits of the corporate boundary of the City of Columbus that includes curb and sidewalk shall include curb ramps. In addition, any intersections completely or partially affected by CIP work that result in improvements shall be made compliant.

3. **Utility Improvements – Capital Improvement Projects.** If resurfacing (as defined previously in this section) of the roadway results from utility improvements, then curb ramps shall be installed in required locations along the extent of the roadway replacement, as this will be considered an addition or alteration of the existing pavement. These shall be included in the scope of the utility project. If corners of intersections beyond the edge of any curb present (i.e.: outside of the paved area) are disturbed as a result of utility construction activities, affected corners shall be rebuilt compliant. This will include the installation of curb ramps if required. If this results in an “orphan ramp” situation, the utility shall abide by requirements in Section VIII.F of this policy.
4. **Roadway Improvements – Privately Funded.** Any roadway improvements generated as a result of private development projects, such as new turn lanes, new signals, or pavement improvements, shall include as part of the project scope all work that will make any affected intersections compliant. Ultimate responsibility for making these intersections compliant will rest with the developer. This includes the installation of curb ramps and pedestrian accessible controls for walk signals as determined by the Department of Public Service where needed. If this results in an “orphan ramp” situation, the developer shall abide by requirements in Section VIII.F of this policy.
5. **Privately Funded Property Improvements.** In the event that a developer makes improvements to a parcel that occupies one corner of an intersection, the scope for the project shall include construction required to make the corner he or she owns or controls compliant, as well as opposing ramps as needed in order to avoid an “orphan ramp” situation, as determined by the Department of Public Service. Refer to Section VIII.F for requirements pertaining to “orphan ramps.”

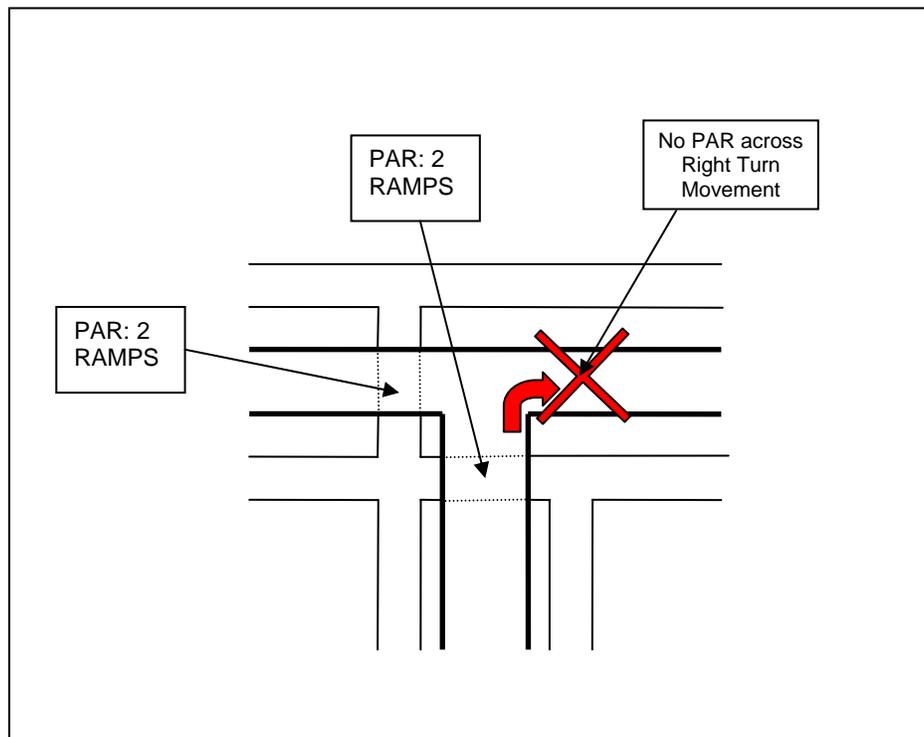
## VIII. CURB RAMP CONSTRUCTION SCENARIOS

- A. **4-Way Intersections.** All corners at all 4-way intersections that have sidewalks shall be made compliant, except as noted in Section VI.
- B. **3-Way (“Tee”) Intersections.** The decision whether to construct 4 ramps (two pedestrian accessible routes or PARs) or 6 ramps (three PARs) will be based on the following conditions:
  1. Physical constraints are present that would preclude construction of a desired ramp at a given location, as removal or relocation of these obstructions will be prohibitively expensive or would not be practical from a constructability standpoint. These constraints include but are not limited to driveways, utilities, storm structures, mailboxes, or other permanent street furniture. Analysis and final determination of these constraints will be made by the Division of Mobility Options.
  2. Pedestrian traffic volume, based on estimates calculated by the City of Columbus’ “Columbus Pedestrian Thoroughfare Plan Handbook.” In it, roadways have been classified on the basis of predicted pedestrian use, rating from 1 (highest use) to 5 (lowest use). The City is divided into areas that reflect the amount of transit dependent population. This information will be used to decide whether a given intersection will be built with four or six ramps. This criterion is illustrated in Figure 8-1.



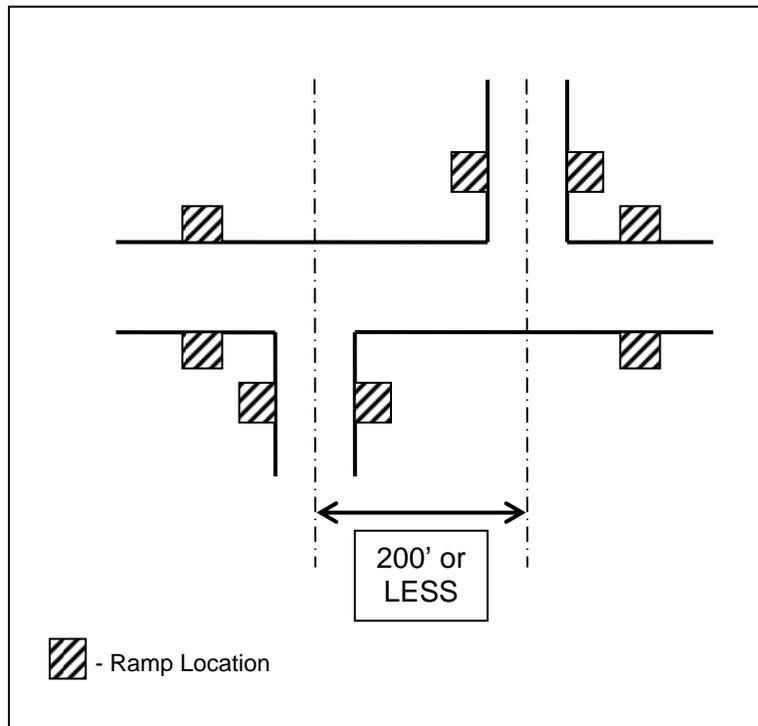
**Figure 8-1**

3. In the event that four ramps are required, and there is a choice of locations for ramps accessing the PARs crossing the through street, preference will be given for the PAR that does not cross the right-turn movement of the intersecting street, as illustrated in Figure 8-2.

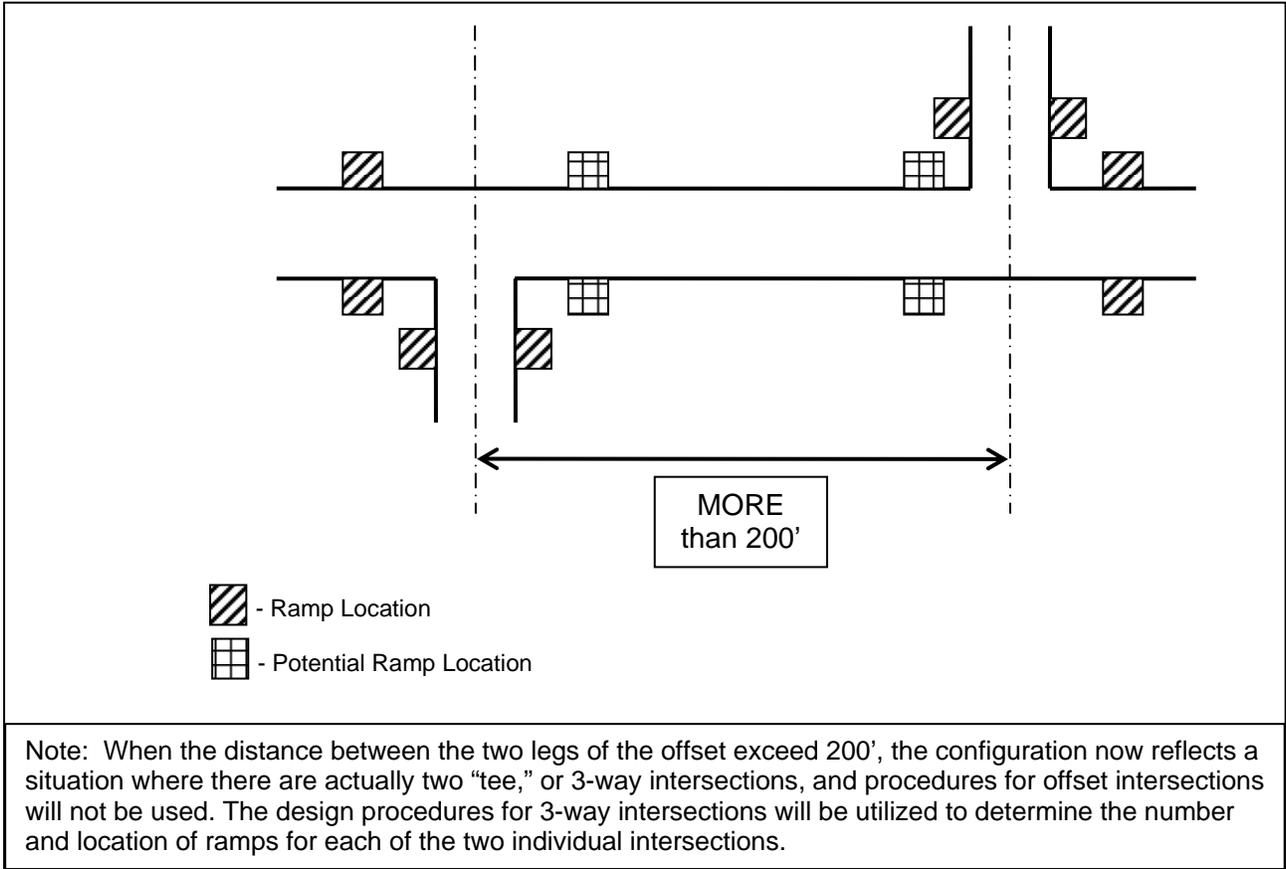


**Figure 8-2**

4. Removal of Existing PARs - Under certain circumstances, sidewalk may be in place that will allow a crossing at the third leg of an intersection, despite the fact that there is no demonstrated need, either due to pedestrian traffic volumes or to demographic considerations, for a third PAR to be in place. Removal of concrete walk in order to restrict access using this PAR will not be permitted. Instead, six (6) ramps will be constructed.
- C. Offset Streets Scenario.** Under some conditions, an intersection may be “offset”; that is, the centerline of one leg of an intersection may be shifted a significant distance from the centerline of its opposing side. If the offset is 200 feet or less, the intersection shall be treated as a single 4-way intersection, and ramps do not have to be installed within the interior of the offset. Refer to Figure 8-3. If the offset exceeds 200 feet, the intersection shall be treated as two separate “tee” intersections, and, if required under the conditions of the “tee” intersection policy above, all corners shall have ramps. Refer to Figure 8-4.

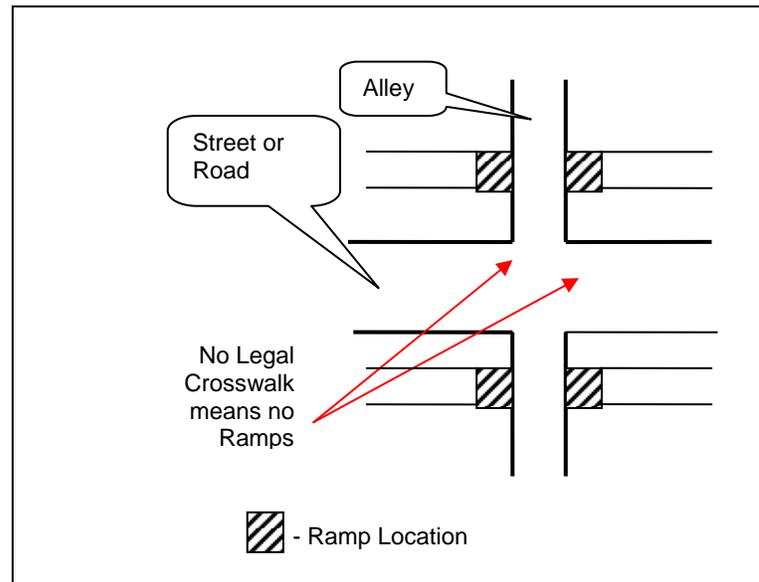


**Figure 8-3**



**Figure 8-4**

- D. Curb Ramps at Alleys.** An alley is a specialized, limited use roadway that provides limited access to the rear of specific properties in a neighborhood or central business district. An intersection of an alley with a street, according to ORC 4511.01 (KK) (3), is not an intersection. This in turn means that there are no legal crosswalks in place that will traverse the street. And, therefore, no PAR crosses the larger street. A PAR does, however, cross the alley, as this entails crossing a City of Columbus right-of-way. Refer to Figure 8-5.



**Figure 8-5**

- 1. Definitions of Alleys:** According to City of Columbus Code 2101.03, “Alley” means street or highway intended to provide access to the rear or side of lots or buildings in the city and not intended for the purpose of through vehicular traffic, and includes any street or highway that has been declared an “alley” by City Council. This definition is based on ORC 4511.01(XX). Alleys also typically do not serve as the primary frontage for properties along them - any roadway that has buildings that front on that roadway that do not have an alternate primary frontage (i.e., use the alley as the basis for its address) cannot be defined as an alley, even if it has been declared an alley by code or by name.

Curb ramps allowing pedestrians to traverse the major roadway shall be constructed at intersections of alleys and roadways if marked crosswalks are in place traversing that main roadway.

- E. Curb Ramps at Private Driveways.** Unless expressly stated otherwise, construction of curb ramps or blended transitions at privately owned driveways is the responsibility of the property owner or developer, and not the City. Curb ramps and blended transitions in areas having sidewalks will be constructed as part of pavement repair work, and will be triggered when the property owner requests a ROW permit or submits construction plans for review. The property owner will be required to construct all features of the approach located in the city right-of-way according to City of Columbus standards and to ensure that a compliant PAR is constructed across the width of the drive, as stated in City of Columbus and ADA.

Detectable warning units are not required at approaches to driveways serving single family residential units or to duplex residential units. They are required at approaches to driveways providing access to publicly accessible parking areas serving multi-family residential and commercial establishments if the intersection is signalized or has marked crosswalks.

- F. Non-Paired or “Orphan” Ramps.** It is considered best practice to install ramps in pairs, that is, when a ramp is constructed on one side of a street, a ramp will be constructed on the opposite side of the street. This creates a continuous PAR throughout the length of the legal crosswalk, and is done so to prevent stranding disabled persons within the roadway. City of Columbus policy is to prohibit unpaired ramps, and require that, when construction activities affect an intersection, all corners with sidewalks that are impacted by the construction shall have compliant curb ramps installed. No break in a PAR is permitted within a legal crosswalk. Refer to Figure 8-6.

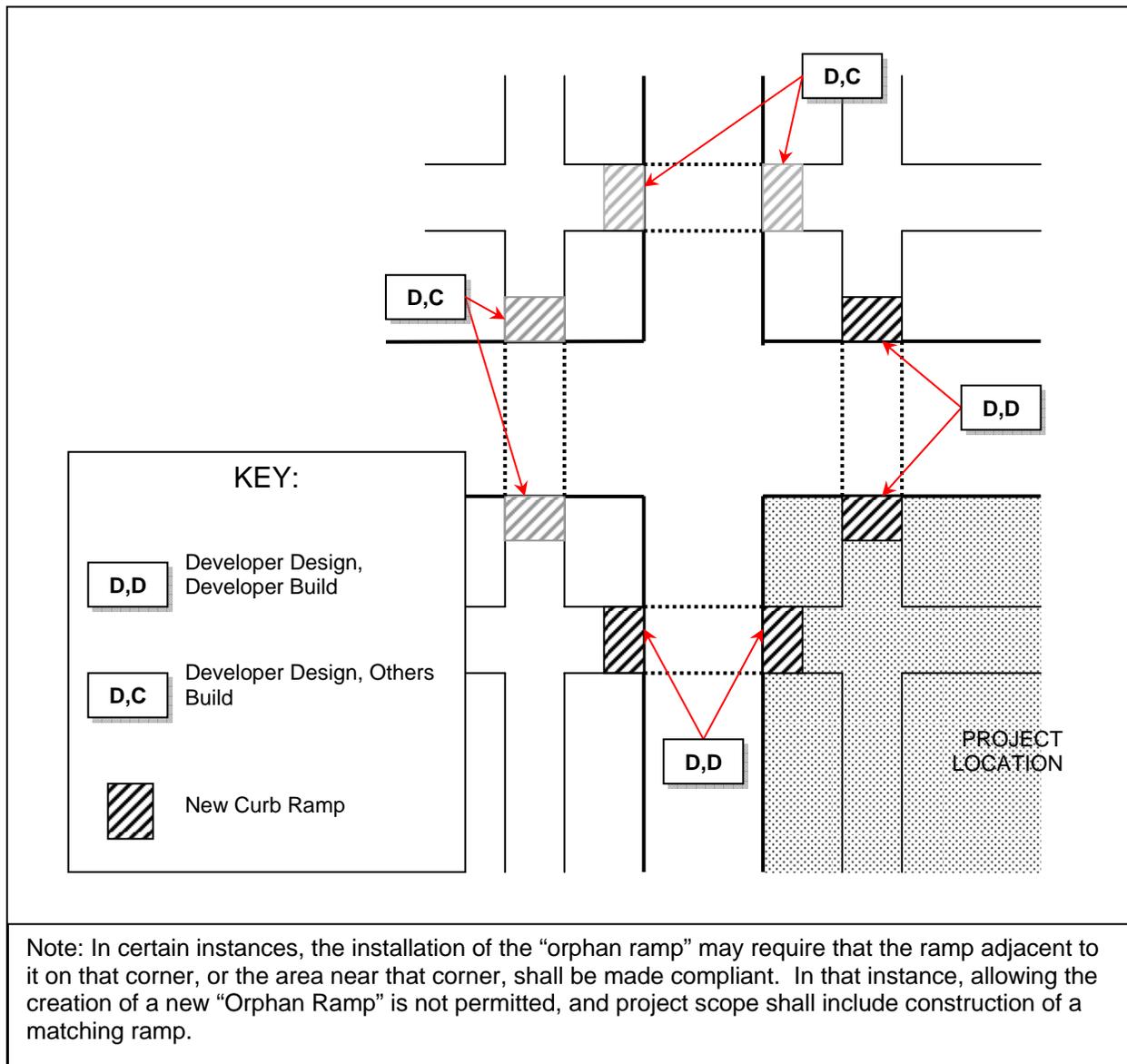
In the event that a construction project impacts one or more corners of an intersection, the scope of the project shall include the following to create a compliant PAR from each corner impacted by construction:

1. Ramp Design: The developer or agency responsible for the project shall provide the complete design of all curb ramps at each intersection impacted by construction. This requirement is necessary to ensure that curb ramps installed with the project are properly designed and located accounting for future curb ramp installations on corners not impacted by the project. The City will maintain the design for future use. At signalized intersections, the design may also include separate pedestrian pushbutton devices. Reasonable costs to design opposing curb ramps and pedestrian pushbuttons may be eligible for reimbursement as described below.
2. Ramp Construction: The developer or agency responsible for the project impacting an intersection shall be responsible for constructing compliant curb ramps and pedestrian pushbuttons to restore all impacted PARs under the following conditions:
  - a) **Non-existent curb ramps on undisturbed opposing corners:** Where a sidewalk is present, but no ramp exists at the opposite end of each crosswalk at intersection corners impacted by the project, the developer or agency shall be responsible for the construction of those ramps, in addition to the curb ramps at the intersection corner(s) disturbed by the project. The developer or public agency may request reimbursement for the reasonable cost of construction, bonding and design of non-paired ramps according to Section VIII.F.3.
  - b) **Non-compliant curb ramps on undisturbed opposing corners:** Where a non-compliant curb ramp exists at the opposite end of each crosswalk at intersection corners impacted by the project, the City shall be responsible for the cost of constructing the replacement of the non-compliant curb ramps. The developer or agency shall be responsible for the construction of compliant ramps at the intersection corner(s) disturbed by the project and the design of opposing ramps to ensure that the ramps

to be built by the developer or agency shall be properly located. At its discretion, the City may establish a design and construction reimbursement from any future developers of the property abutting the non-compliant ramps for up to ten (10) years following replacement of the non-compliant ramps.

Reimbursement: The cost of designing, constructing and bonding curb ramps and pedestrian pushbuttons on opposing corners constructed according to Section VIII.F.2 may be eligible for reimbursement. The developer or public agency responsible for these eligible curb ramps shall request in writing on forms provided by the Division of Mobility Options Administrator reimbursement of reasonable design and construction costs for the eligible curb ramps and pedestrian pushbuttons at the time of site plan approval for the project. If development or redevelopment of a property abutting an eligible curb ramp occurs within ten (10) years after final acceptance of the eligible curb ramps, the developer of the property shall reimburse the reasonable design, bonding and construction cost to the developer or public agency responsible for the construction of the eligible curb ramp and pedestrian pushbuttons. Development or redevelopment shall constitute either the construction of new building(s), or the expansion of existing building(s) by more than 50 percent, or any construction activity that disturbs the intersection corner at which an eligible ramp is located. The Department of Public Service shall be responsible for administering the reimbursement program.

- 3.** Appeals: The Division of Mobility Options Administrator reserves the right to disallow requests for reimbursement of curb ramp construction costs, dependent on circumstances unique to a given project. If the Division of Mobility Options Administrator disapproves a request for reimbursement, the developer or public agency has the right to appeal the decision as follows:
  - a.** Request a hearing of the Transportation and Pedestrian Commission (T&PC) at the next scheduled meeting date, in writing, within 14 days of receipt of the disapproval or denial.
  - b.** The Division of Mobility Options Administrator will forward his/her denial along with the recommendation of the T&PC to the Director of Public Service for review.
  - c.** The Director of Public Service will render a final decision within 14 days of the T&PC hearing.



**Figure 8-6**

**IX. RAMP REQUEST DOCUMENTATION AND RATING SYSTEM**

**A. General Guidelines.** Ramp priorities are documented based on a two digit numbering system:

**XY**

The “X” numeral refers to the **TYPE** of ramp request:

- 1. Requests from individuals, usually via 311 calls**
- 2. Unmatched or “Orphan” Ramps**
- 3. Maintenance generated issues.**

The “Y” numeral refers to the **RELATIVE PRIORITY** of each request, with “1” being the most critical and “3” being the least. A detailed description for each type and priority follows:

1. **Requests for Ramps from Individuals (311 calls).** The City of Columbus receives requests for curb ramp installations at various locations throughout the City. These are typically handled through the 311 system, and the information is recorded by the Division of Mobility Options ADA Coordinator. These ramp requests are categorized on the basis of a priority system, as follows:
  - a. **Priority 1 – Ramp Code 11** - Request is for a ramp that is necessary in order to immediately meet Federal guidelines, or is mandated by the terms of the City’s consent decree. Examples of these ramps would be those that provide access to government buildings or facilities, or those that should have been done as part of repaving projects, but were missed.
  - b. **Priority 2 – Ramp Code 12** - The ramp request is made by or in behalf of a disabled individual or individuals who will directly benefit from installation of a particular ramp.
  - c. **Priority 3 – Ramp Code 13** - All other ramp requests.

These ramps will be constructed as part of repaving projects, CIP projects, or as part of annual “On Call” ramp construction projects.

2. **Unmatched or “Orphan” Ramps.** These ramp needs are described in Section VI. Priorities are as follows:
  - a. **Priority 1 – Ramp Code 21 - High Priority** – Ramp needed to complete passage through a legal crosswalk, either marked or unmarked. Also: dangerous condition or site where accidents have occurred and have been documented.
  - b. **Priority 2 – Ramp Code 22 - Medium Priority** – Ramp not needed to complete crosswalk, yet is needed to complete all required ramps at a given intersection. There is no history of accidents, but the location is not scheduled for a resurfacing or CIP project that would address the missing companion ramp within the next 2 years. Also: sites located in areas having a high population of disabled persons or high population of transit dependent persons.
  - c. **Priority 3 – Ramp Code 23 - Low Priority** – Ramp not needed to complete crosswalk, yet is needed to complete all required ramps at a given intersection. Resurfacing project or CIP project scheduled to remedy orphan ramp situation within 2 years, or ramp is not located within an area having a high population of disabled persons.
3. **Maintenance Issues of Curb Ramps.**
  - a. Priorities are as follows:
    1. **Priority 1 – Ramp Code 31 - High Priority** – Ramp is non-compliant and is damaged such that it has one or more significant problems. Documented accidents have occurred.
    2. **Priority 2 – Ramp Code 32 - Medium Priority** – Same as above, but no documented accidents have occurred.
    3. **Priority 3 – Ramp Code 32 - Low Priority** – Non-compliant ramp, but there are no evident conditions that make it dangerous for disabled persons to use.
  - b. Repair issues considered significant and that make the ramp dangerous for disabled persons to use include but are not limited to the following:

1. Gaps of  $\frac{1}{2}$ " or greater
  2. Heaving of concrete sections creating cross-slopes in excess of 2%
  3. Heaving of concrete sections creating longitudinal slopes in excess of a 1/12 slope ratio
  4. Settling or other conditions creating a vertical drop of  $\frac{1}{4}$ " or more anywhere along the ramp
4. **Location of Curb Ramps within Intersections.** Curb ramps at street intersections are to be located within the "Design Boundary" as shown in Figure 9-1.

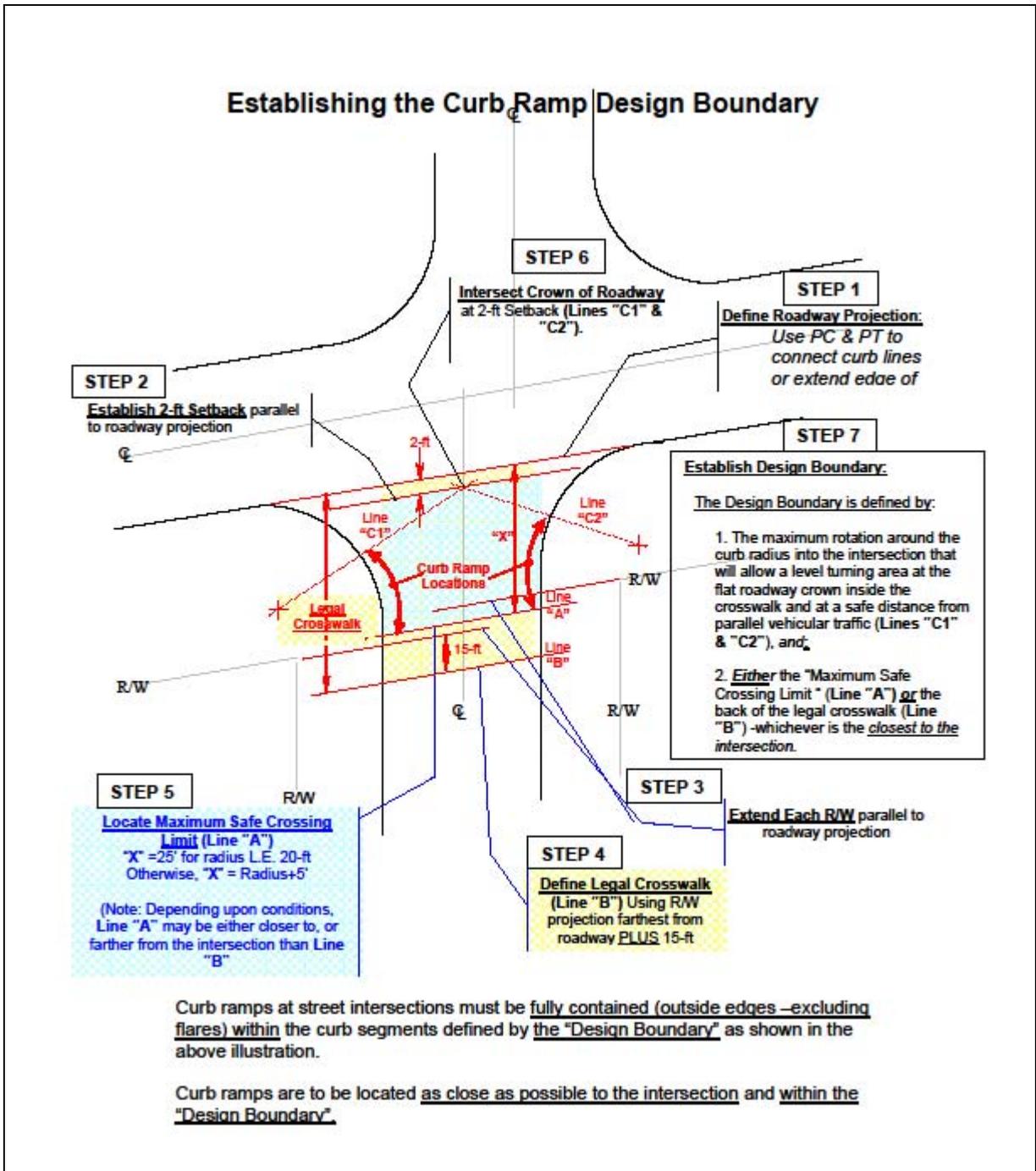


Figure 9-1

**X. TYPES OF CURB RAMPS**

There are a number of different curb ramp styles available for design. Certain styles are preferred as they provide better mobility options for disabled persons, as well as being able to handle other inherently structural problems, such as drainage, better than others.

- A. **Perpendicular Curb Ramps.** These ramps are the preferred style for City of Columbus projects and for private street projects. These are represented by Type “A”, Type “C”, and Type “D” ramps in the City of Columbus Standard Drawings. Perpendicular curb ramps have a running slope that cuts through the curb at right angles or meets the gutter grade break at right angles. Perpendicular ramps may also be installed at curved sections of curb near intersections. They are installed perpendicular to the arc scribed by the curb. Care must be taken to ensure that this perpendicular property is followed, so as to avoid a skewed ramp condition.

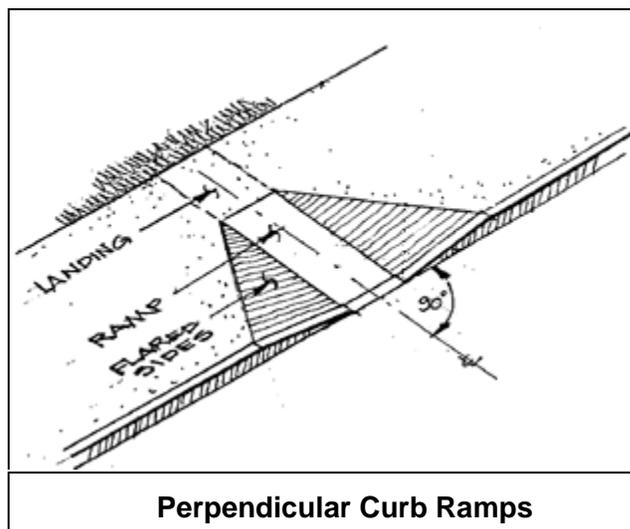


Figure 10-1

- B. **Parallel/Combination Curb Ramps.** A variation of the parallel ramp style is allowed by the City of Columbus. It is represented by the Type P-1 and Type P-2 ramps in the City of Columbus Standard Drawings. These are secondarily preferred, mainly due to drainage issues inherent to the design. Parallel curb ramps shall have a running slope that is in-line with the direction of sidewalk travel.

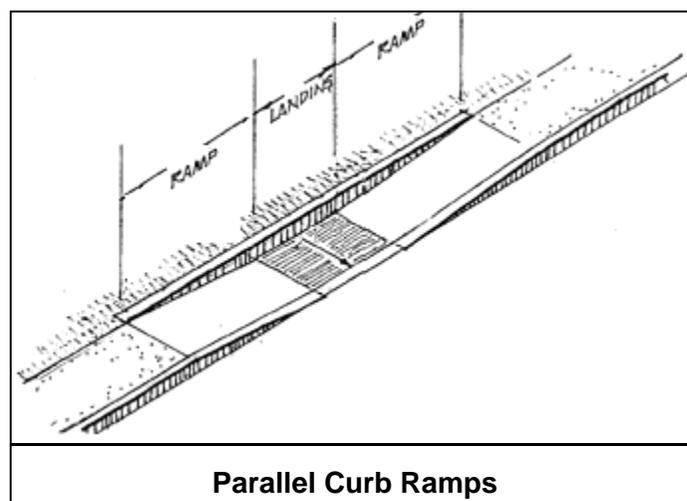


Figure 10-2

- C. **Diagonal (Shared) Curb Ramps.** Diagonal or “Shared” ramps are a variant of the perpendicular type because it also cuts the curb line at right angles. A diagonal ramp is located at the midpoint or apex of the curb radius or return and serves two crossing directions with a single cut. These ramps are generally prohibited in City of Columbus projects, but when they are allowed, they are to be used ONLY in alterations and ONLY with the approval of the City of Columbus Director of Public Service of designee. Otherwise two ramps are to be constructed at each corner.

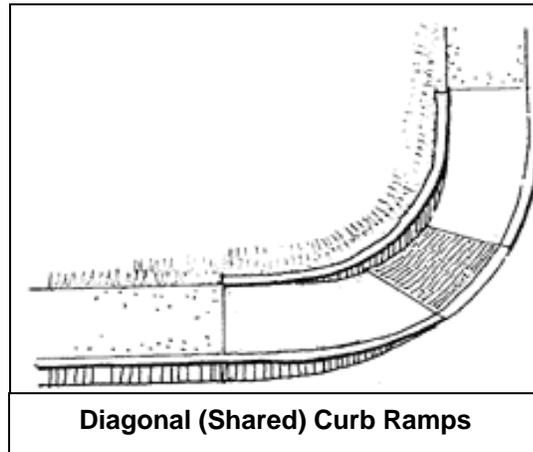


Figure 10-3

- D. **“Skewed” Curb Ramps.** Skewed ramps are not permitted. It is important for manual chair users to approach the base or toe of the ramp straight on when ascending. This permits the user to take advantage of forward momentum from the street crossing. If the curb ramp is skewed to the curb, it will be necessary to turn while ascending - a difficult and taxing maneuver. If the chair user avoids this by entering the ramp at an angle to the change in slope, balance and control are compromised. When all four wheels of a wheelchair or scooter are not in contact with the rolling surface, maneuverability and control are lost. Because the downhill slope of a ramp ends in the street, a loss of control may have serious safety effects. Therefore, in order to provide a straight run to the top of the ramp from the street, curb ramps shall always to be perpendicular to the curb it cuts.

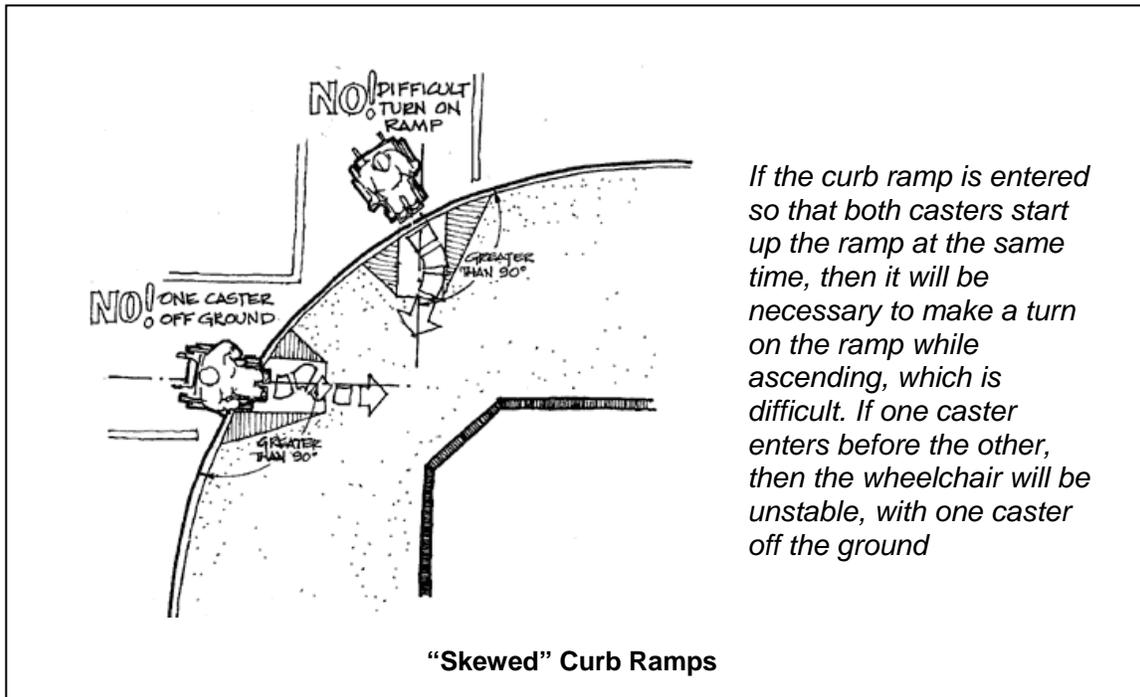


Figure 10-4

*If the curb ramp is entered so that both casters start up the ramp at the same time, then it will be necessary to make a turn on the ramp while ascending, which is difficult. If one caster enters before the other, then the wheelchair will be unstable, with one caster off the ground*

- E. Modified “Skewed” Curb Ramps.** The City of Columbus maintains a standard drawing for modified skewed ramps, Types “G” and “H”. These ramps are set up in such a way that the bottom of the approach is level, meaning that the two front wheels of a wheelchair will touch the level surface of the roadway simultaneously. There are a number of shortcomings with this ramp, including difficulties with drainage and problems with tying it in to sidewalk approaching from another direction. Therefore, this ramp is restricted to use at alleys and private drives, and in situations where lack of ROW makes it impossible to use any other more preferred ramp.

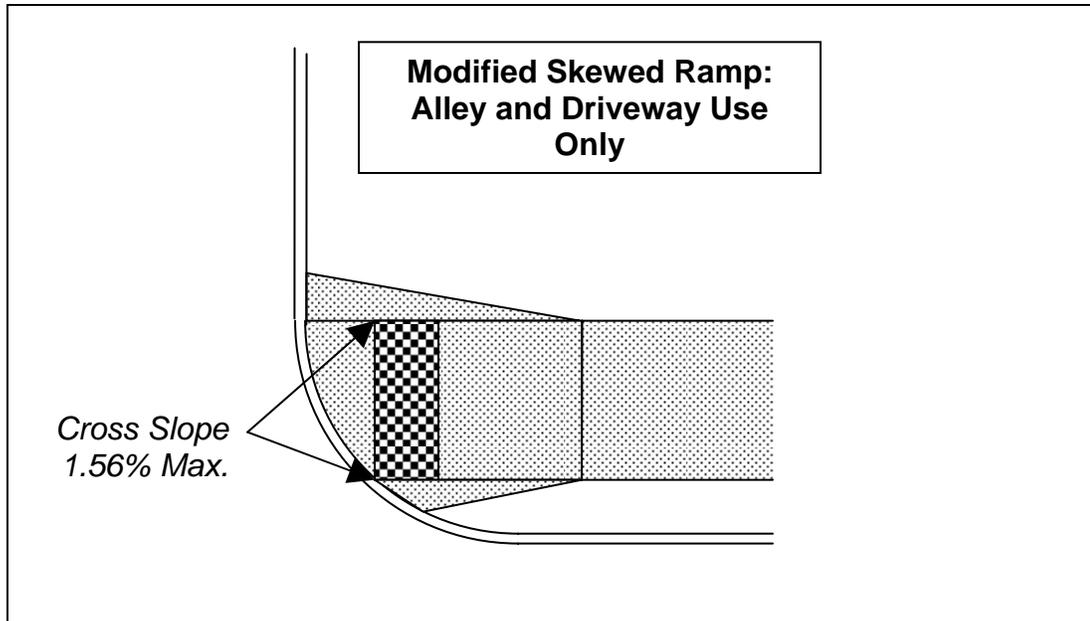


Figure 10-5

## XI. GENERAL RAMP REQUIREMENTS

- A. Running Slope.** This is the slope that runs parallel to the direction of travel along a ramp.

City of Columbus Standard

- Running slope maximum: 1:13 or 7.69%

Federal Standards

- Running slope maximum: 1:12 or 8.33%
- Running slope minimum: 1:48 or 2.08%

Note: the running slope may run downwards toward the street, which is typical, or, in rare circumstances, it may run upward toward the street. Both situations are permitted, as long as the running slope does not exceed the maximum standards.

*EXCEPTION: A combination/parallel curb ramp shall not be required to exceed 15 feet (4570 mm) in length.*

Inspection Guidelines and Construction Tolerances: Ramps are to be designed and constructed to the 1:13 running slope maximum. If an ensuing inspection notes that this standard has not been met, yet the slope of the ramp does not exceed the Federal standard of 1:12, the ramp may be approved, provided it does not violate other ramp design and construction standards established by the City of Columbus.

- B. Cross Slope.** This is the slope that runs perpendicular to the direction of travel down a ramp. It also applies to landings or other level surfaces of a curb ramp.

City of Columbus Standard

- Cross slope maximum: 3/16" per foot or 1.56%

Federal Standards

- Cross slope maximum: ¼" per foot, 1:48, or 2.08%

*EXCEPTION: This requirement shall not apply to mid-block crossings.*

Inspection Guidelines and Construction Tolerances: Ramps are to be designed and constructed to the 1.56% cross slope maximum. If an ensuing inspection notes that this standard has not been met, yet the slope of the ramp does not exceed the Federal standard of ¼" per foot, or 2.08%, the ramp may be approved, provided it does not violate other ramp design and construction standards established by the City of Columbus.

- C. Landing.** A landing 48 inches minimum by 48 inches (1220 mm) minimum shall be provided at the top of perpendicular curb ramps and at the bottom of a parallel curb ramp run and shall be permitted to overlap other landings and clear floor or ground space. General cross slope standards apply.
- D. Long Flares.** On perpendicular curb ramps, flared sides no shorter than 10-times the curb height, measured along the curb line, shall be provided where a circulation path or walkable surface crosses the curb ramp.
- E. Short Flares.** These are commonly 12" or wider, up to 5', at the curb, and are used at locations where there is no walkable surface adjacent to the ramp. Non-walkable surfaces may be grass, trees, landscaping, areas blocked by utility poles or street furniture, etc. Manhole covers and hatches are considered to be walkable surfaces, if they are flush with the sidewalk surface. Short flares should never to be used at any location where pedestrian traffic can be expected to cross them.

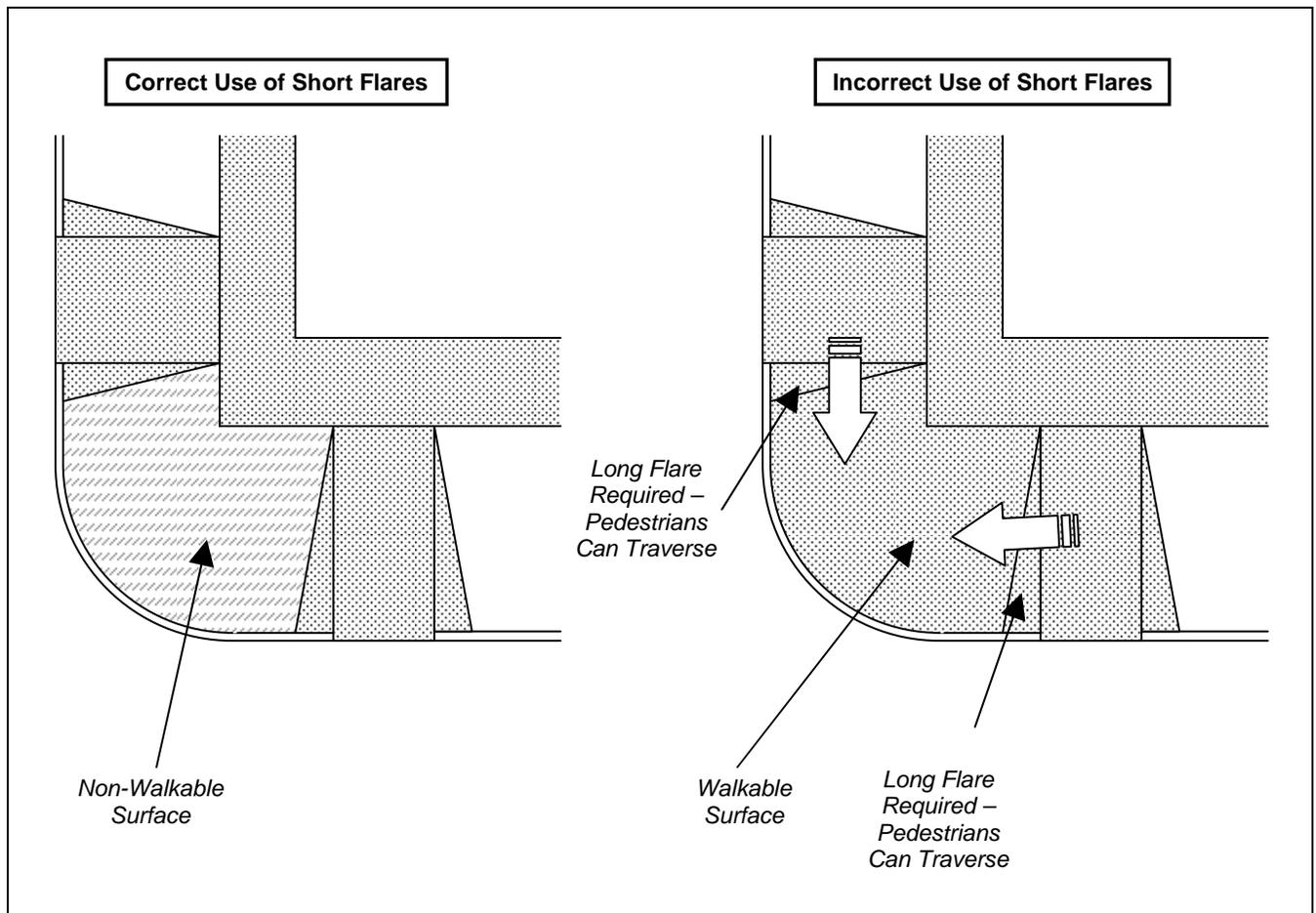


Figure 11-1

- F. **Blended Transitions.** These are transitions from sidewalk into a non-curbed section of pavement, usually a private drive or entrance. Blended transitions shall have running and cross slopes of 1:48 maximum. Note that these are not considered to be curb ramps for payment purposes.
- G. **Width.** The clear width of landings, blended transitions, and curb ramps, excluding flares, shall be 48 inches minimum.
- H. **Detectable Warnings.** Detectable warning surfaces shall be provided in many conditions where a pedestrian path crosses a vehicular way. These conditions as well as other requirements are noted in Section XI and elsewhere in this document and to the specifications set forth in the City of Columbus Standard Drawing 2319 Dr. A.
- I. **Surfaces.** Surfaces of curb ramps, blended transitions, and landings shall comply with Section 302 of the ADA ROW Design Guidelines (2005 edition). Gratings, access covers, and other appurtenances shall not be located on curb ramp landings or slopes, blended transitions, and gutter areas within the pedestrian access route. However, these items may be allowed within sections of the pedestrian accessible route, including flares, provided they comply with requirements set forth for PAR surfaces, in "Guidelines for Accessible Public Rights-of-Way", Section 301.

- J. **Grade Breaks.** Grade breaks shall not be permitted on curb ramps, blended transitions, landings, and gutter areas within the pedestrian access route. Surface slopes that meet at grade breaks shall be flush. Grade breaks shall be perpendicular to the direction of travel and shall be no closer than 2-feet apart.
- K. **Changes in Level (“Lips”).** Vertical changes in level (“lips”) greater than ¼” shall not be permitted on curb ramps, blended transitions, landings, or gutter areas within the pedestrian access route.
- L. **Counter Slopes.** The counter slope of the gutter area or street at the foot of a curb ramp or blended transition shall be 1:20 or 5% maximum for a minimum distance of 2-feet from the bottom of the ramp.

## XII. DESIGN AND CONSTRUCTION PROCEDURES

Projects involving ramps can put into the following categories:

- Resurfacing
- Transportation Capital Improvement Projects
- Other City Capital Improvement Projects
- Private Development

A. **Resurfacing Projects:** Two procedures are available for preparation of contract documents for resurfacing projects involving ramps:

1. **Design**
2. **Design/Build**

1. **Design.** In this process, an engineering firm is assigned to develop construction drawings for each intersection involved in a given project. No formal survey work is done, and there is little or no elevation information unless conditions exist or will exist that requires a higher level of topographic control (see Figure 12-1). The engineer uses GIS information, supplemented by field inspections and records research. Curb ramp types are selected and are laid out in Auto CAD, based on local conditions. Plans are submitted to the Division of Mobility Options, where they are reviewed and returned as needed. This system is preferable when the project areas have numerous design and construction challenges, such as underground vaults, limited right-of-way, utility conflicts, and terrain challenges.

2. **Design/Build.** For this type of contract, the contractor is supplied with sketches, or worksheets, of each intersection, all derived from publicly available GIS information. The line type information (i.e., rights-of-way, surface utilities, edge of pavement, etc.) is typically superimposed on aerial orthographic photos of the site. The contractor will lay out ramps on the worksheets and submit them to the Division of Mobility Options for approval. This procedure works well in areas where there are few design challenges, and saves costs by eliminating the need for an engineer. It also works well when the contractor has extensive experience in ramp layout and construction. It is not recommended when the construction contractor does not have experience.

- B. Transportation Capital Improvement Projects, Other City Capital Improvement Projects, Private Development:** An engineering firm is assigned to develop construction drawings for each intersection involved in a given project. No formal survey work is done, and there is little or no elevation information unless conditions exist or will exist that requires a higher level of topographic control (see Figure 12-1). The engineer uses GIS information, supplemented by field inspections and records research. Curb ramp types are selected and are laid out in Auto CAD, based on local conditions. The ramp designs are included as part of the public improvement plans, following established plan review procedures for the specific plan type. While this process is preferable when the project areas have numerous design and construction challenges, such as underground vaults, limited right-of-way, utility conflicts, and terrain challenges, some ramp designs may require a higher level of detail if topography, obstacles or other elements of the existing environment or the proposed project elements require more accurate layout information. In this case, an additional process, **full design**, shall be used. This is similar to the **design** process, except that formal survey work is done for each intersection. This allows for much more accuracy, plus detailed ramp and sidewalk slopes and grading can be determined, as elevation information is available to the engineer. Spot elevations may be shown on plans as needed. However, this will be used sparingly, and only to indicate important control elevations.

The illustration on the next page demonstrates major concepts expected in construction drawings of curb ramps.

Notes: Major Concepts

1. Reference City of Columbus Standard Drawings to indicate ramp types and for other construction components whenever possible. In the event that a specialized ramp design unique to the project is required, provide a detailed drawing of that ramp with sufficient horizontal control and slope information for use by the contractor.
2. Use spot elevations only as necessary, and at controlling elevations. Do not use for construction unless absolutely necessary. Ramp standard drawings will provide guidance for vertical control needed for construction.
3. Use dimensioning for horizontal control as needed for construction.
4. Use flow arrows to illustrate drainage patterns and to indicate prevailing associated slope.
5. Indicate right-of-way, easement locations, and other legal boundaries applicable to construction activities.

Important note: The referenced figure is not intended to represent a bone fide portion of a construction drawing. Instead, its purpose is to illustrate the five major concepts expected from construction drawings that involve ramp design. The complexity of submitted construction drawings will vary depending on the individual characteristics of each project.

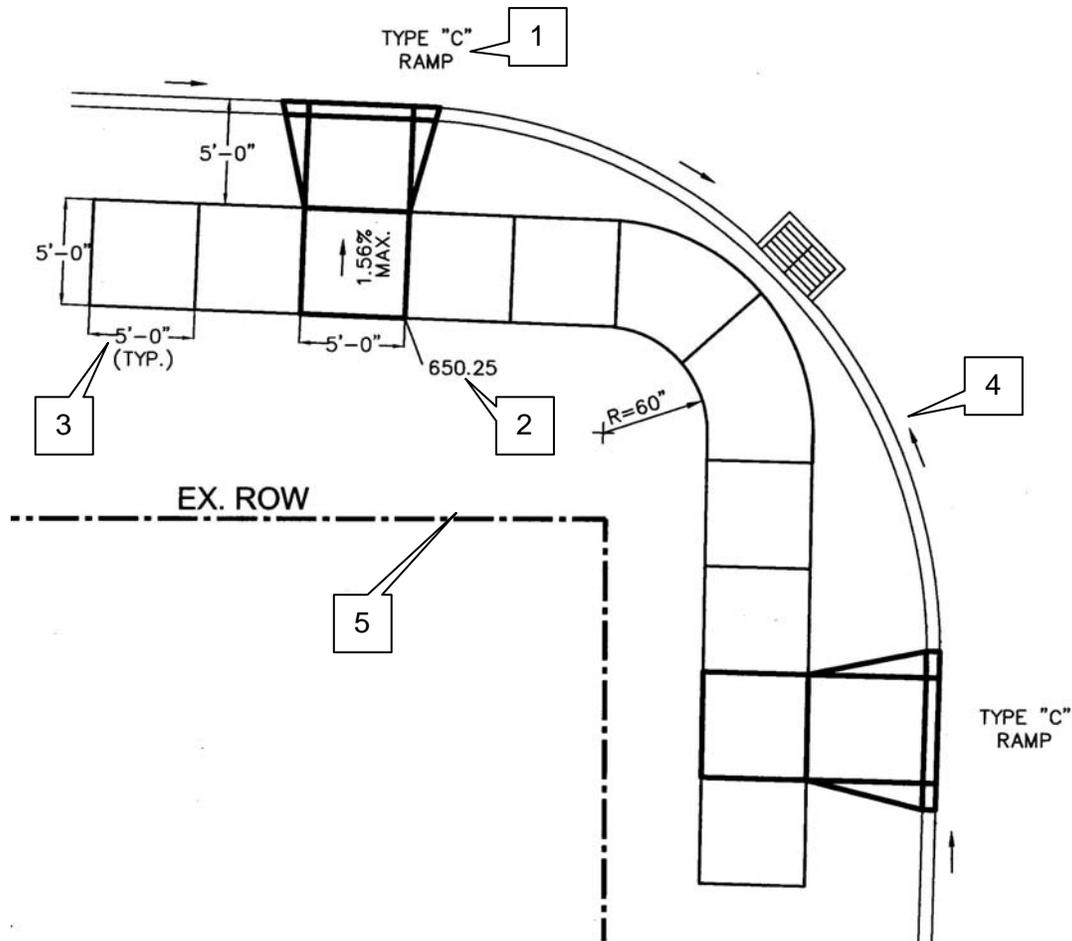


Figure 12-1

### XIII. OTHER ELEMENTS

#### A. Detectable Warning Units

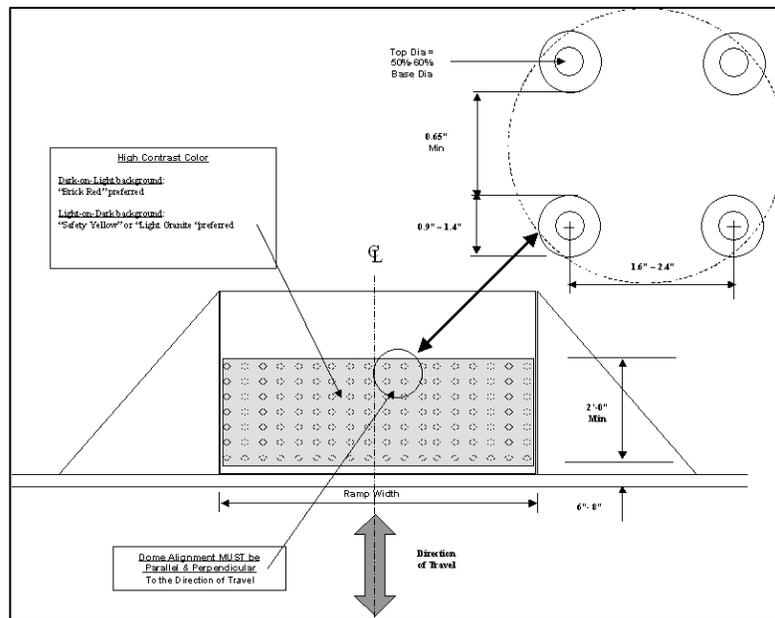
1. **General.** Detectable warnings shall consist of a surface of truncated domes complying with City of Columbus Standard Drawing 2319, and Supplemental Specification #1551. Detectable warnings provide a distinctive surface of truncated domes detectable by cane or underfoot to alert people with vision impairments of the transition to vehicular ways. These warnings compensate for the sloped surfaces of curb ramps which remove a tactile cue provided by curb faces. ADAAG, as originally published in 1991, contained a requirement for detectable warnings on the surface of curb ramps and other locations where pedestrian ways blend with vehicular ways without tactile cues. This requirement was temporarily suspended due to concerns raised about the specifications, the availability of complying products, maintenance, usefulness, safety, and the need for further study. The suspension expired in July 2001, and the City of Columbus requires their use. Detectable warnings shall be on the list of products approved by the City of Columbus.

**2. Where Required.** Detectable Warnings (“truncated domes”) shall be used to mark the street edge where a pedestrian path crosses a vehicular way accessible to the public (see exceptions listed on in Section IV). Blind persons traditionally have used the curb as a wayfinding device that indicates the edge of pavement. As a rule of thumb, detectable warnings are to be installed in any situation where curb has been replaced with a level surface in order to allow persons having mobility disabilities to access crosswalks or other pavement areas. Detectable warnings shall be included in all connections to pedestrian streets (both public and private) and alley crossings and at all signalized/stripped commercial driveways. This requirement exists whether-or-not the pathway is sloped to the roadway surface (curb ramp) or level (street-level transition). Detectable warnings are not normally required where sidewalks cross unmarked, non-signalized driveways or commercial drives. However, if such a crossing presents a hazard to pedestrian safety, the City may require that detectable warnings be used.

Detectable warnings are used and shall be included to mark the following features:

- Curb ramps;
- Street-level transitions;
- Borders of medians and islands;
- Depressed corners;
- Borders of raised crosswalks and raised intersections;
- Street crossings for shared-use paths, and;
- Sidewalks crossing railroad tracks.

**3. Dome Size.** Truncated domes in a detectable warning surface shall have a base diameter of 0.9 inches (23 mm) minimum to 1.4 inches (36 mm) maximum, a top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum, and a height of 0.2 inches (5 mm).



**Figure 13-1**

4. **Dome Spacing.** Truncated domes in a detectable warning surface shall have a center-to-center spacing of 1.6 inches (41 mm) minimum and 2.4 inches (61 mm) maximum, and a base-to-base spacing of 0.65 inches (16 mm) minimum, measured between the most adjacent domes on square grid.
  5. **Contrast.** Detectable warning surfaces shall contrast visually with adjacent walking surfaces either light-on-dark, or dark-on-light. The City of Columbus requires that the color of detectable warning units closely matches or is identical to Federal Standard 595-B code 12144 or 22144, brick red. In all instances, detectable warning units shall be installed in such a way that the unit is surrounded by a border of concrete. No color substitutions are permitted without the express written consent of the Mobility Options Administrator. Under no circumstances are detectable warning units to be installed directly upon brick sidewalks or pathways, as this would not allow proper contrast between the detectable warning unit and the background material.
  6. **Alignment.** Domes shall be aligned on a square grid in the predominant direction of travel to permit wheels to roll between domes. Domes shall **not** be skewed diagonally.
  7. **Size.** Detectable warning surfaces shall extend 24 inches (610 mm) minimum in the direction of travel and the full width of the curb ramp, landing, or blended transition.
  8. **Location - Curb Ramps and Blended Transitions.** The detectable warning surface shall be located so that the edge nearest the curb line is 6 inches (150 mm) minimum and 8 inches (205 mm) maximum from the curb line.
  9. **Location - Rail Crossings.** The detectable warning surface shall be located so that the edge nearest the rail crossing is 6 inches (150 mm) minimum and 8 inches (205 mm) maximum from the vehicle dynamic envelope.
  10. **Location - Platform Edges.** Detectable warning surfaces at platform boarding edges shall be 24 inches (610 mm) wide and shall extend the full length of the platform.
  11. **Location – Shared Used and Combined Trails.** Detectable warnings shall be placed along the entire width of the trail where it intersects with the roadway edge.
- B. Pedestrian Pushbuttons or Accessible Pedestrian Signals (APS)**
1. **General.** Push buttons shall be mounted so that the face of the pushbutton is no closer than 30 inches from the face of the curb.

*EXCEPTION: The minimum distance of 30" from the face of the curb may be reduced for push buttons located in medians and islands.*

Push buttons shall be mounted so that the face of the pushbutton is no further than 10 feet from the face of the curb.

*ADVISORY: Where no curb exists, this distance shall be measured from the edge of the gravel shoulder or berm farthest from the roadway. Where neither a curb, shoulder nor berm exists, distance shall be measured from the outside edge of the roadway (Figure 13-2).*

*EXCEPTION: The 10-foot maximum distance shall be waived if the length of the curb ramp, including a 4-foot landing or “clear ground space”, exceeds 10 feet.*

Where push buttons are used to cross both streets at the same corner, a minimum separation of 10 feet shall be maintained (Figure 13-3).

*EXCEPTION: The minimum distance from other push buttons shall not apply to push buttons located in medians and islands.*

Push buttons shall not be located in the ramp slope or flares (Figures 13-2, 13-4, & 13-5).

Push buttons may be located in the ramp landing or pedestrian walkway provided that the clear width of the Pedestrian Access Route (PAR) is not restricted to less than 48 inches (Figures 13-2, 13-3, & 13-5).

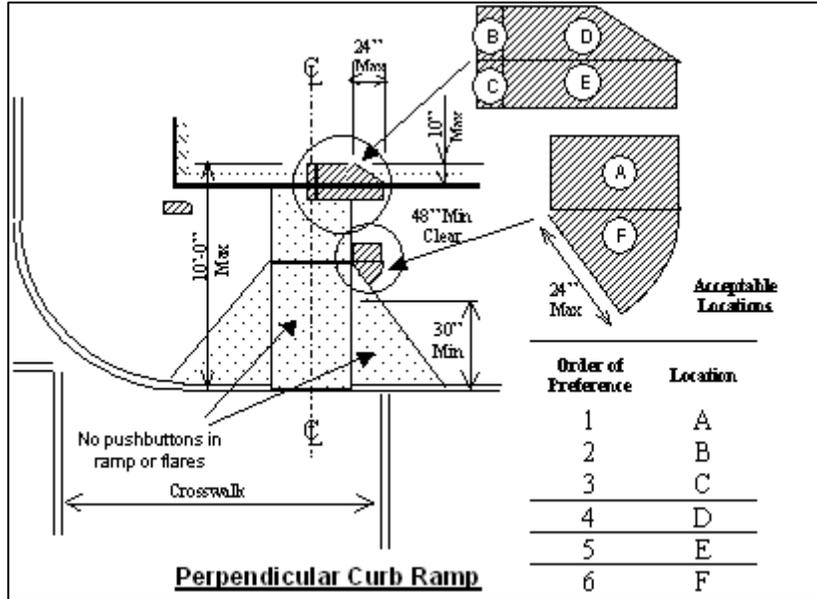
- 2. Mounting Height.** A Push button mounting height of 42 inches is preferred (Figure 13-6). Push buttons shall be mounted at a height not lower than 36 inches (Figure 13-6) and not higher than 44 inches (Figure 13-6).

*ADVISORY: Push button height shall be measured vertically from the centerline of the push button to the surface of the ramp landing (Figure 13-6).*

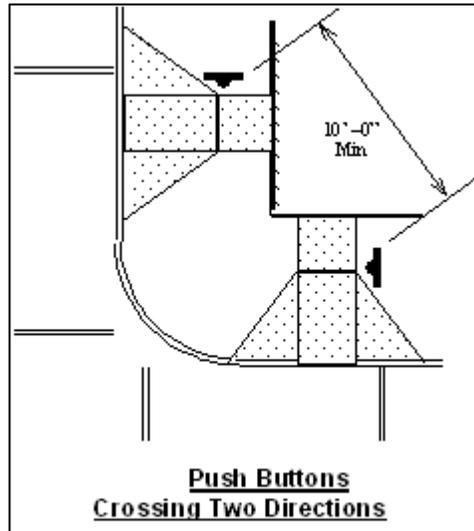
- 3. Size and Contrast.** Pedestrian pushbuttons shall be a minimum of 2 inches across in one dimension and shall provide a high visual contrast with their housing or mounting. Housings shall provide a high visual contrast with mounting poles or supports. Color and contrast shall be in conformance with all applicable state, federal and local requirements.
- 4. Reach & Proximity.** Push buttons shall be located no more than 10 inches behind the curb ramp landing (Figures 13-2 & 13-5).

At perpendicular curb ramps, push buttons shall be located either behind the ramp landing or to the side of the landing farthest from the street intersection (Figure 13-2). At perpendicular curb ramps, push buttons shall be located no more than 24 inches beyond the curb ramp landing (Figure 13-2).

- 5. Orientation.** If push buttons are mounted behind the sidewalk, the control face of the push button shall be perpendicular to the crosswalk being served (Figure 13-7). If push buttons are mounted in the sidewalk or tree/lawn area, the control face of push buttons shall be perpendicular to the centerline of the street and parallel to the crosswalk being served and shall be mounted so that the control face of the push button is facing the intersection (Figure 13-7).



**Figure 13-2**



**Figure 13-3**

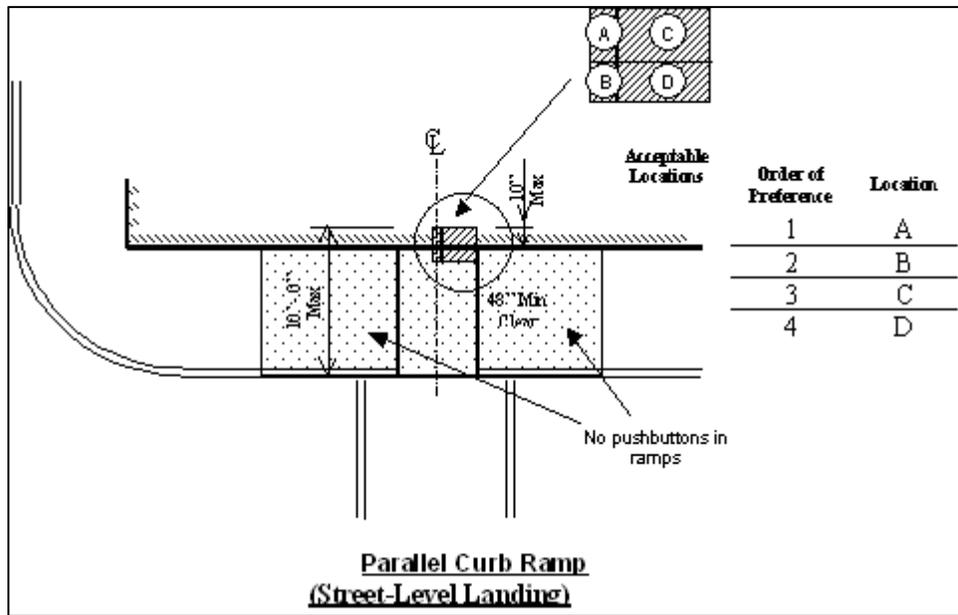


Figure 13-4

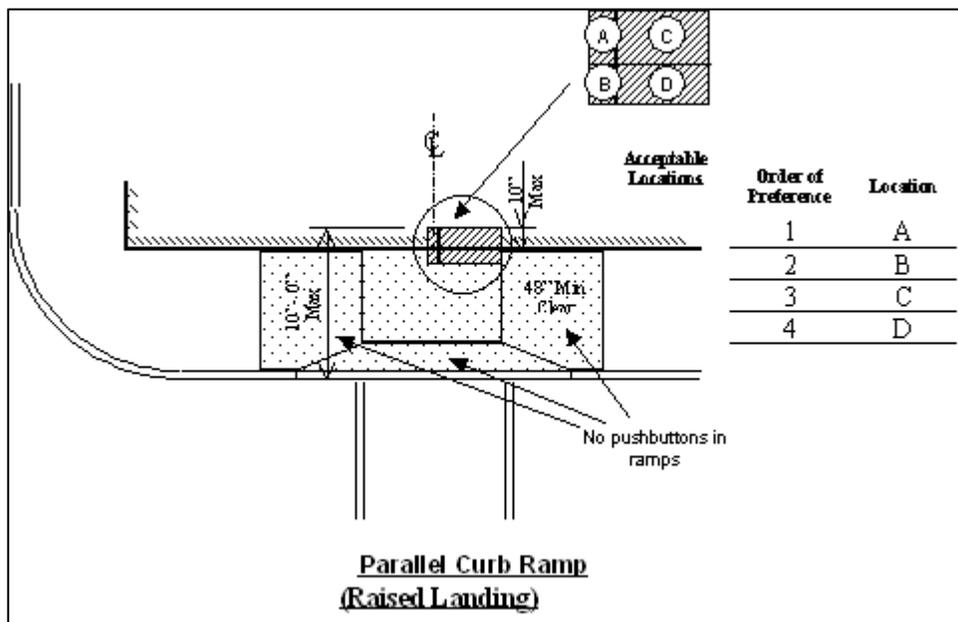
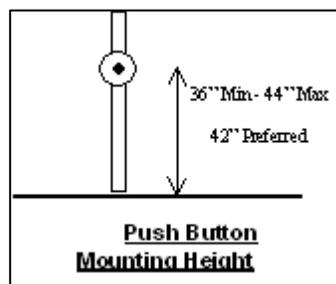
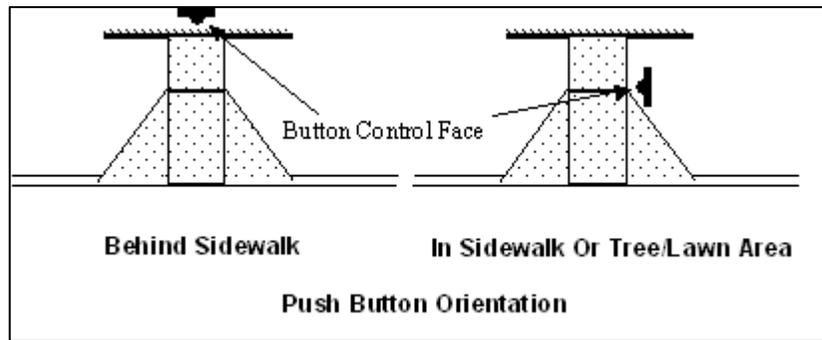


Figure 13-5



**Figure 13-6**



**Figure 13-7**

C. **Shared-Use Paths**

1. **General.** Shared-use paths shall meet all requirements for an accessible “Pedestrian Access Route” as defined herein, and shall be designed in accordance with AASHTO’s *“Guide for the Development of Bicycle Facilities”* and City of Columbus requirements.
2. **Landings.** Landings shall be constructed where the running grade of the shared-use path exceeds 5%. For grades up to 8.33% (1:12), landings are required at every 30-inch change in elevation (rise). For steeper grades, consult the Division of Mobility Options ADA Coordinator. Landings may be on either side of the path and may alternate sides. Landings shall be at 5 feet by 5 feet minimum. Approach and departure tapers to each landing are required.
3. **Street Crossings.**
  - a. **Alignment.** Street crossings should be aligned with the shared-use path (see AASHTO for turn radius guidelines).
  - b. **Curb Ramps.** Curb ramps meeting requirements specified elsewhere in this document shall be provided whenever the pathway crosses a curb or the travel paths of bicycles or motor vehicles.
  - c. **Curb Ramp Width.** Curb ramps and transitions shall be as wide as the shared-use path when measured perpendicular to the centerline of the path and a minimum of 4-feet wide when measured perpendicular to the centerline of the wheelchair path.
  - d. **Curb Ramp Flares.** Curb ramp flares shall lay outside of the width of the shared-use path.
  - e. **Lips.** Lips greater than ¼” are not permitted.
  - f. **Detectable Warnings.** Detectable warnings shall be provided in accordance with requirements specified elsewhere in this document. Detectable warnings shall be installed at any and all locations where the base of the ramp and the street are flush.