761—112.4 (306A) General requirements for entrances where access rights have not been acquired. This rule establishes the general requirements for access to primary highways where access rights have not been acquired.

112.4(1) *Entrance permit.* A person shall not modify an existing entrance or construct a new entrance to a primary highway from abutting property or from a local public road or street until the department has issued an entrance permit for the work.

a. An application for an entrance permit shall be submitted to the appropriate district representative on a form prescribed by the department.

b. The department shall be provided with a plan, drawing or sketch of the property or site to be served by the requested access. This may vary from a simple sketch in the case of a Type "C" entrance to a detailed plan in the case of a Type "A" entrance. See rule 761—112.5(306A) for further Type "A" entrance requirements.

c. The application shall be signed by the owner or owners of record. The signature(s) shall be notarized.

d. If the request is for a property within the corporate limits of a city, an authorized representative of the city must sign the application recommending approval. See subrule 112.4(5).

e. The application shall be approved or denied by the appropriate district representative.

f. If the district representative denies the application, the applicant may appeal the decision by submitting to the appropriate district engineer the application along with background information and an explanation of the need for access.

g. If the district engineer denies the application, the applicant may appeal the decision by submitting to the director of transportation the application along with background information and an explanation of the need for access. The director's decision is final agency action.

112.4(2) *Construction or modification of entrances.*

a. All work performed on a primary highway under the terms of an entrance permit shall comply with the conditions of the permit. These conditions include any accompanying plans, drawings, sketches, or other attachments to the permit. The permit holder or the permit holder's contractor shall have a copy of the permit available at the work site.

b. During the time an entrance is being constructed or modified, care must be taken to ensure the safety of the workers on the site and of the traveling public. The work shall be accomplished in a manner that will minimize interference with normal highway operations. Care must be taken during construction or modification of the entrance and development of the abutting property to avoid tracking mud or other material onto the primary highway.

112.4(3) *Construction costs.* Construction costs, including any costs incurred for modifying the existing primary highway as may be required by the entrance permit, should not be borne by the department.

112.4(4) *Maintenance of entrances.* See subrule 112.3(4).

112.4(5) *Primary road extensions.*

a. On primary road extensions, the location and geometrics of entrances must meet local requirements within the limitations of this chapter, and entrance permit applications must be approved by authorized city officials before final action is taken by the department.

b. Applicants are responsible for ensuring compliance with local building codes, setback requirements, minimum lot sizes, density of buildings, provisions for adequate parking, and other local ordinances and regulations.

c. Entrance permits issued by the department apply to the construction of entrances within the primary highway right-of-way and do not release applicants from compliance with local ordinances and regulations. These requirements are not altered by the issuance of entrance permits. Applicants are responsible for obtaining the required local approvals and permits.

d. Without an approved permit, there shall be no encroachment onto the primary highway right-of-way.

112.4(6) *Considerations for entrance width and radius or flared returns.*

a. Entrance width and the size of radius or flared returns should be determined based on the predominant type of vehicle that will use the entrance. The combination of entrance width and return radii or flares should permit vehicles to enter and exit the highway with minimum disruption to through traffic, yet be restrictive enough to discourage erratic maneuvers.

b. Entrance width should minimize speed differential, which is the difference between the speed of through traffic and the speed of vehicles that are turning into the entrance. In general, the narrower the entrance, the more vehicles must slow down to negotiate the entrance. An increase in speed differential increases the tendency for potential crashes. Use of larger turning radii or flares will reduce speed differential.

c. An entrance can also be too wide. An entrance that is too wide may confuse motorists by creating uncertainty as to where they should position their vehicles within the entrance. Pedestrian traffic must also be considered. Wider entrances may place pedestrians in greater conflict with vehicular traffic.

112.4(7) *Entrance widths.* The width of an entrance is the distance between the beginning points of the return radii or flares, measured perpendicular to the centerline of the entrance.

a. Type "A" entrances. Each case requires special study. See rule 761—112.5(306A).

b. Type "B" entrances.

(1) The minimum allowable width is 24 feet.

(2) The maximum allowable width is 45 feet.

(3) For one-way operation, the minimum allowable width is 12 feet and the maximum allowable width is 30 feet.

c. Type "C" entrances.

(1) The minimum allowable entrance width is 20 feet. In an area where the posted speed limit is 35 miles per hour or less, a minimum width of 15 feet may be allowed.

(2) The maximum allowable width is 30 feet.

(3) If an entrance will serve more than one property, the minimum allowable width is 20 feet and the maximum allowable width is 35 feet.

d. City street and secondary road intersections. The department shall determine the width of city street and secondary road intersections on a case-by-case basis, taking into consideration both local and department standards.

112.4(8) *Radius or flared returns.* Return radii for granular entrances shall be measured along the edge of the primary highway shoulder. Return radii for paved entrances shall be measured along the edge of the primary highway pavement.

If the predominant types of vehicles that will use an entrance are passenger cars and straight trucks, paragraphs *"a"* to *"i"* of this subrule apply. If the predominant types are truck tractor-semitrailer combinations and large equipment, paragraph *"j"* applies.

a. Type "A" entrances. Each case requires special study. See rule 761—112.5(306A).

b. Type "B" entrances, rural-designed area, not paved.

(1) For an entrance angle of 90 degrees to the centerline of the primary highway, the return radii should not exceed 35 feet.

(2) For an entrance angle of 60 degrees to the centerline of the primary highway, the return radius of the obtuse angle should not exceed 50 feet. The return radius of the acute angle should not exceed 25 feet.

(3) For an entrance angle that is between 90 and 60 degrees, the maximum radii of the obtuse and acute angles should be interpolated between the values given in subparagraphs (1) and (2) above and rounded to the nearest 5 feet.

(4) Entrance angles that are less than 60 degrees require department review to establish appropriate radii.

c. Type "B" entrances, rural-designed area, paved.

(1) For an entrance angle of 90 degrees to the centerline of the primary highway, the return radii should not exceed 50 feet.

(2) For an entrance angle of 60 degrees to the centerline of the primary highway, the return radius of the obtuse angle should not exceed 60 feet. The return radius of the acute angle should not exceed 25 feet.

(3) For an entrance angle that is between 90 and 60 degrees, the maximum radii of the obtuse and acute angles should be interpolated between the values given in subparagraphs (1) and (2) above and rounded to the nearest 5 feet.

(4) Entrance angles that are less than 60 degrees require department review to establish appropriate radii.

d. Type "B" entrances, urban-designed area, paved or not paved.

(1) All Type "B" entrances within an urban-designed area should be paved for a minimum distance of 10 feet back from the primary highway curb, as measured 90 degrees to the edge of the primary highway roadway.

(2) The return radii should be no less than 10 feet nor greater than 20 feet.

e. Rescinded IAB 10/30/02, effective 12/4/02.

f. Type "C" entrances, rural-designed area, not paved.

(1) For an entrance angle of 60 to 90 degrees to the centerline of the primary highway, the return radii should not exceed 15 feet for either the obtuse or acute angle.

(2) Entrance angles that are less than 60 degrees require department review to establish appropriate radii.

g. Type "C" entrances, rural-designed area, paved.

(1) For an entrance angle of 60 to 90 degrees to the centerline of the primary highway, the return radii should not exceed 20 feet.

(2) Entrance angles that are less than 60 degrees require department review to establish appropriate radii.

(3) If an existing entrance is being reconstructed, the returns may be replaced in kind.

h. Type "C" entrances, urban-designed area, paved or not paved.

(1) All Type "C" entrances within an urban-designed area should be paved for a minimum distance of 10 feet back from the primary highway curb, as measured 90 degrees to the edge of the primary highway roadway.

(2) The return radii should equal the distance between the back of the curb and the front edge of the sidewalk, not to exceed 10 feet.

(3) When no sidewalk is present or anticipated, the maximum radii should be 10 feet.

i. Flared entrances, urban-designed area. In an urban-designed area, entrances may be constructed with flared returns rather than radius returns. When used, the flare shall be constructed at a 2:1 ratio with the "2" value measured on a line parallel to the entrance centerline and the "1" value measured on a line perpendicular to the entrance centerline. The length of the flare as measured parallel to the entrance centerline should be equal to the radii requirements shown in paragraphs 112.4(8)*"d"* and *"h"* above.

j. Truck tractor-semitrailer combinations. Truck tractor-semitrailer combinations and large equipment vary greatly in length and generally require a customized design for the entrance. Flares will generally not accommodate the movement of these types of vehicles and therefore should not be used. To reduce encroachments onto the traveled way and opposing entrances, turning templates should be used. All turning movements should be evaluated to ensure the entrance width and radii are designed to handle the types and volume of traffic anticipated.

112.4(9) *Entrance angle.*

a. In general, the entrance angle shall be established as near to 90 degrees to the centerline of the primary highway as site conditions will allow.

b. Normally, the centerline of that part of an entrance lying within the right-of-way shall be at a right angle to the centerline of the primary highway for a minimum distance of 30 feet from the near edge of the primary highway pavement.

c. An entrance established for two-way operation for a service station or other development where two access points are authorized shall be 70 to 90 degrees to the centerline of the primary highway.

d. On a divided primary highway where two access locations are authorized for one-way operation, the "ingress" may be 45 to 60 degrees to the centerline of the primary highway and the "egress" may be 60 to 90 degrees to centerline of the primary highway.

112.4(10) *Slope and cross section of entrances in rural-designed area.*

a. The finished, surface elevation of an entrance over a culvert, or the location where a culvert would normally be placed, should be lower than the primary highway pavement, preferably an extension of the 4 percent shoulder grade, to prevent surface water from draining onto the highway pavement. The shoulder grade should be extended onto the entrance at a distance sufficient to provide a safe platform for a vehicle to stop before entering the highway.

b. If an entrance requires drainage pipe, the entrance side slopes from highway shoulder to the entrance pipe shall be no steeper than 8:1 and from the entrance pipe to the right-of-way line shall be no steeper than 6:1. A smooth transition from the 8:1 to the 6:1 slope is required.

c. If an entrance does not require drainage pipe, the entrance side slopes from highway shoulder to the minimum clear zone distance shall be no steeper than 10:1, right-of-way width permitting. From the point of minimum clear zone to the right-of-way line, a smooth transition to a 6:1 slope is acceptable.

d. Upgrading only the surfacing material of an existing entrance will not require a change in existing side slopes.

112.4(11) *Entrance grade.* The grade of an entrance is an important element when considering overall motorist safety because the grade impacts speed differential. Vehicles must slow appreciably to turn into an entrance; therefore, the steeper the entrance grade, the greater the reduction in speed required to prevent "bottoming out." Ideally, the maximum practical grade for entrances varies from 8 to 14 percent for low-volume entrances to approximately 5 percent for high-volume entrances. Above these values, bumpers and other low-hanging parts of a vehicle will scrape the entrance.

An entrance's vertical profile should allow for a smooth transition to and from the highway. Flattening entrance grade lines is another tool in providing safe access to and from the highway system.