Index D804 Pedestrian Channelization Barrier

Design Criteria

AASHTO LRFD Bridge Design Specifications, 6th Edition; ***Florida Building Code***, 4th Edition

Design Assumptions and Limitations

Pedestrian Channelization Barriers are used along medians and roadsides to help guide pedestrians to crosswalk locations. It is recommended to first consider all options for pedestrian safety, including new midblock crosswalks, prior to using a Pedestrian Channelization Barrier.

Use Pedestrian Channelization Barriers only upon the completion of a documented traffic study by a Traffic Operations Engineer to approve the need for channelization barriers along with the corresponding approval of the District Traffic Operations Engineer. The required criteria for consideration of the channelization barriers is included in the Traffic Operations Usage Criteria section.

If warranted, the documented traffic study will include recommendations for the locations of channelization barriers. The Roadway Design Engineer will then be responsible for final design considerations and placement of channelization barriers in the contract plans where sight distance requirements are not violated.

The steel pedestrian channelization fences, Types P1 and P2, are designed for overturn loading in accordance with ***AASHTO LRFD Bridge Design Specifications*** for pedestrians as specified in Section 13.8.2 - Design Live Loads for chain link or metal fabric fences, with a load of 0.015 ksf acting over the surface area of the fence. Fence Type P3 is designed for overturn loading only, in accordance with the ***Florida Building Code*** for handrails and guards as specified in Section 1607, with a load of 0.05 klf acting along the top rope.

The Pedestrian Channelization Barriers are not designed to withstand vehicular impact and are intended to yield in this condition. Fence Types P1 and P2 are not considered breakaway designs and may pose a higher risk to errant vehicles. Fence Type P3 has a wooden breakaway design per the FHWA. The fences have not been crash tested, but considerations have been made for a crashworthy design.

Rigid horizontal members are omitted from the design. For Fence Type P2, the End Post, Corner Post, and Pull Post diagonal Brace Rails are designed with higher vertical angles. To keep this safety feature, do not alter the 4 foot post spacing shown adjacent to the Corner, End, and Pull Posts.

Standard foundation designs assume the water level is below the bottom of the foundation and the soil unit density is 115 pcf with a soil friction angle of 30 degrees. For foundation placement where water level effects are expected simultaneous with pedestrian loading, increase foundation dimensions as required and show project-specific details in the plans.

Traffic Operations Usage Criteria

A. The Traffic Operations Engineer must complete a documented traffic study to determine if the installation of Pedestrian Channelization Barriers is warranted based on, at a minimum, the following considerations:

- The volume of pedestrians crossing the area being evaluated for channelization, where the minimum pedestrian volumes presented in Section 3.8 of the ***Traffic Engineering Manual (TEM)*** will determine the need for channelization;
- The sporadic nature of pedestrian crossing patterns along with the benefits of channelizing this movement to specific locations for the crossing maneuver;
- Roadway data to assist with engineering judgments including, but not limited to, vehicular volumes and pedestrian crossing distances;
- The general aggressiveness of undesirable pedestrian crossings as needed to select a barrier with appropriate resistance to these pedestrian movements (e.g. landscaping - lower resistance; steel fencing - higher resistance);
- Crash records for a period of at least 3 years along with the documented engineering judgment on whether a proposed barrier would help to prevent these crashes;
- The potential channelization barrier's type, length, and all resulting traffic access impacts;
- Sight triangles developed for the traffic study to evaluate sight distance considerations and determine the placement, length, type, and termination point of barriers, particularly adjacent to traffic signals or other controlled locations where turning movements require adequate visibility;
- Any other such information as needed to fully understand the nature of the pedestrian crossing issues and whether a barrier placement would be effective;
- Evaluation of alternatives to barrier treatments, including but not limited to:
  a. On-street parking (adding or taking away)
  b. Provision of additional non-barrier crossing opportunities
  c. Directional pedestrian signing

For Transit areas, the Traffic Operations Engineer must coordinate with transit agencies to identify appropriate channelization locations with respect to transit stops. If relocation of transit stops is required, the study should determine responsibility regarding funding and construction.

B. Should the traffic study indicate the need for a Pedestrian Channelization Barrier, the study must then provide recommendations on barrier location, length, and appropriate traffic control devices with consideration given to pedestrian safety, field conditions, and avoidance of sight distance obstruction (e.g. ***Design Standards*** Index 546 for intersections). A roadway plan view is to be provided showing barrier location recommendations including both sight-obstructing barriers and non-sight-obstructing barriers. Note: Near an intersection, a combination of the two barriers will likely be used.

1. **Non-Sight-Obstructing Barriers - Greater than 1.5' below Sight Line Datum** (e.g. landscaping): To be considered when pedestrians are less likely to be aggressive with sporadically crossing the roadway (e.g. near an intersection crosswalk)
2. **Sight Obstructing Barriers** (e.g. steel or rope fencing): To be considered when pedestrians are more likely to be aggressive with sporadically crossing the roadway (e.g. far from an intersection crosswalk or just outside of an intersection sight triangle) Note: For steel fences, placement on the median is preferred over roadside placement where possible.

C. Design Speed Limitations:

Pedestrian channelization fences are intended for use on curbed roadway segments.

1. For steel fence used on the median (4' min clearance to curb face) - max design speed is 45 mph for Type P1 Fence and 35 mph for Type P2 Fence.
2. For steel fence used on the roadside (adjacent to a sidewalk) or used on a traffic separator (1.5' min clearance to curb face) - max design speed is 35 mph for both fence types.
3. Wooden rope fence with Standard breakaway posts and landscaping options are not speed restricted.

D. The length of fence barrier along the roadway must be consistent with criteria for installation and spacing of crossings per the TEM. The barrier may be used with or without marked crosswalks, RRFBs, HAWK beacons, or any other traffic control device.

Use of Pedestrian Channelization Barriers requires approval from the District Traffic Operations Engineer. For the Landscape Option, approval of the District Maintenance Engineer and District Landscape Architect is also required.

Plan Content Requirements

Insert the entire ***Developmental Design Standards*** Index, received from the Central Office monitor, into the appropriate component plan set in accordance with ***PPM***, Volume 2, Section 3.8.

Landscaping Option:

Low-growing, dense plants may be placed in locations to assist with channelizing pedestrians into desired crossing paths. Obtain final design approval by the District Landscape Architect as well as the District Maintenance Engineer.

Chosen landscaping must not grow into the range of Sight Obstruction as defined by ***Design Standards*** Index 546 and must be maintained accordingly.

Show and label pedestrian channelization landscaping areas on the Roadway Plan sheets and/or Landscape Plan sheets indicating the soil placement, plant type, quantities, and all other details necessary for proper installation. Landscaping may be used in conjunction with the Fence Barrier Options to provide a combined barrier with increased effectiveness and/or provide enhanced aesthetics.

Fence Barrier Option:

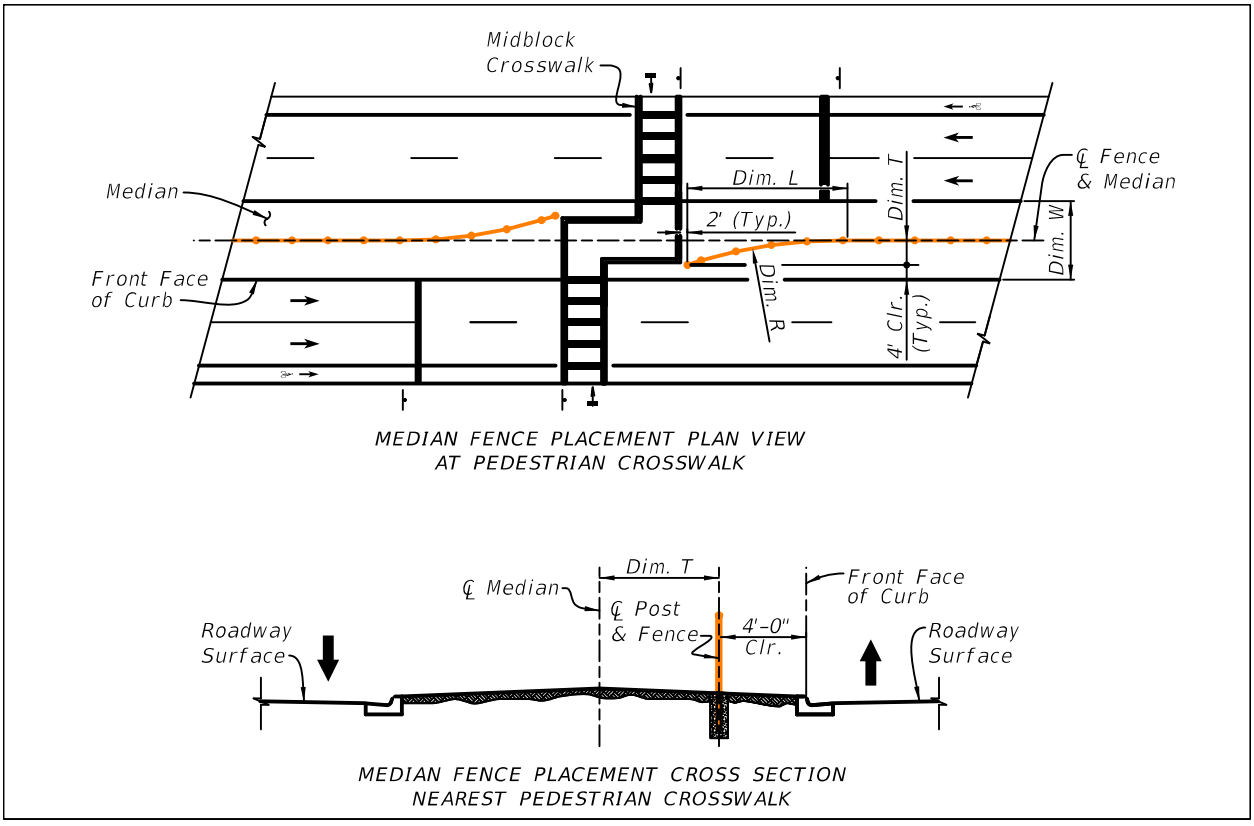
Show and label fence centerlines, support posts, and foundations (including elevations) on the Roadway Plan sheets as well as other plans sheets where needed to meet design considerations. Locate post foundations to avoid conflicts with underground utilities. Include references to ***Developmental Design Standards*** Index D804, Fence Type P1, P2, or P3 as required.

Display foundation locations and elevations with consideration given to geometry constraints provided below. For Fence Type P1, panel types alternate between Type A and B, where elevation changes are permitted on Panel Type A spans only (see Fence Geometry below).

Fence Geometry:

For fencing placed adjacent to sidewalks or near the edge of roadway, comply with horizontal clearance criteria as defined on Sheet 3 of the Index.

For fencing placed on the roadway median, an example of positioning near a pedestrian mid-block crossing is shown below:



Dimension W - Width of Median

Dimension T - Taper Offset

Dimension L - Length of Taper (Minimum L = 2 x W, increase as needed for required line of sight)

Dimension R - Radius of Taper (R = [L2 + T2] / [2 x T])

For fencing adjacent to intersections, place as close as the application requires while complying with sight distance criteria of ***Design Standards*** Index 546. This fencing is considered a Sight Obstruction.

Placement of fencing adjacent to sidewalks and curbing may be considered when a median fence is not viable and all other options have been explored. For fencing adjacent to sidewalks and curbing, do not place near intersections or median breaks where vehicle U-turns and maneuvering are expected perpendicular to the fencing. Analyze placement to avoid vehicular collisions.

Steel Loop Fence, Type P1:

For 6 Foot Panels, limit the nominal plan and elevation geometry offsets between adjacent foundation posts by the following:

- Horizontal - 6" maximum offset for Panel Types A and B.
- Vertical - 3" maximum offset for Panel Type A spans only (every other span, starting with the second span)

Alternate panel type spans when placing foundation locations and elevations in the plans. Foundation elevations will progress with consecutive matching pairs (for Panel Type A spans). Panel Types B must be placed at the beginning and ending of fence to provide end support.

For custom panel length spans (shorter than 6 feet), proportionally scale allowable foundation offsets above to the lesser dimension.

Chain Link Fence, Type P2:

The nominal plan and profile geometry offsets for chain link fencing are flexible. Use engineering judgment for limits of constructability.

Label post types (shown below) in the plans. Place post types according to the following criteria:

- Pull Posts assemblies - Use at all breaks in vertical grade of 15° or more, or at 300 ft. maximum centers along the fence line.
- Corner Post assemblies - Use at all horizontal angle breaks in fence of 15° or more.
- End Post assemblies - Use at the starting and ending points of fencing.
- Line Post assemblies - Use generally where other post types are not required.

Rope Fence, Type P3:

The nominal plan and profile geometry offsets for rope fencing are flexible. Use engineering judgment for limits of constructability.

Payment

Item number	Item description	Unit Measure
914-550-1	P1 - 4' Steel Loop Fence	LF
914-550-2	P2 - 4' Steel Chain Link Fence	LF
914-550-3	P3 - 4' Rope Fence	LF