Index 521-001 Concrete Barrier

Design Criteria

FDOT Design Manual (FDM); ***AASHTO Roadside Design Guide***, 4th Edition; ***AASHTO Manual for Assessing Safety Hardware (MASH)***, Test Level 2 & 4 Criteria; ***AASHTO LRFD Bridge Design Specifications***, 7th Edition.

Design Assumptions and Limitations

For concrete barrier information including crash test level classification, hazard setback requirements, and general placement information, see ***FDM 215***.

For barrier intended to protect bridge piers that theoretically do not have sufficient strength to resist the ***LRFD*** equivalent static impact force, see ***Index 521-002*** (Pier Protection Barrier).

A. General:

Index 521-001 defines concrete barrier segments for various conditions that will be used together to design a complete concrete barrier system on a project-specific basis.

The design of concrete barrier requires that differing segments and features be shown and labeled correctly in the Plans, where the requirements of the Index are not violated including section dimensions and geometry of barriers.

B. Concrete Barrier Types:

1. Median Barrier (All Design Speeds) – double-faced rigid barrier typically used in medians to prevent crossover collisions and to shield vehicles from miscellaneous roadside hazards including sign supports, light supports, and piers.
2. Shoulder Barrier (All Design Speeds) – single-faced rigid barrier typically used on outside shoulders when minimized barrier deflection (or setback) is required to shield vehicles from miscellaneous roadside hazards, including sign supports, light supports, and piers.
3. Curb & Gutter Barrier (Design Speeds ≤ 45 mph) – single-faced rigid barrier typically used to shield vehicles from miscellaneous roadside hazards in urban areas, which may be used in conjunction with adjoining raised curb for water conveyance.

C. Shielding Hazards - Determining Begin/End Length of Need Stations:

The standard method of determining barrier placement for shielding hazards is based on the Runout Length and the Length of Need (LON) calculation in the ***AASHTO Roadside Design Guide (RDG)***, 4th Edition.

See the FDOT ***Concrete Barrier Length of Need (LON)*** Excel program for plan view details and assistance with determining Begin/End LON Stations for shielding

various hazard configurations. This program is located in the Design Tools column on the ***Standard Plans*** website.

D. End Treatments:

End Treatments are required for all Concrete Barrier ends both not connecting to a different barrier type (Barrier End Connection / Continuation) and under the following conditions of Table 1.

Table 1: Barrier End Treatment Usage

Barrier Type:	Barrier End Location:	Applicable End Treatment Type(s):
Median Barrier	Approach – Inside Clear Zone	• Guardrail Approach Terminal (1) • Crash Cushion (2)
	Approach – Outside Clear Zone	• Sloped End Treatment (3)
	Trailing End	• Sloped End Treatment (3)
Shoulder Barrier	Approach – Inside Clear Zone	• Guardrail Approach Terminal (1) • Crash Cushion (2)
	Trailing End	• None
Curb & Gutter Barrier	Approach – Inside Clear Zone	• Guardrail Approach Terminal (1) • Sloped End Treatment (Restricted Use per ***FDM 215***) (4)
	Trailing End	• None

Note: If the barrier end is within the Clear Zone of any nearby lane with approaching traffic (e.g. 2-lane, 2-way facility), then "Approach End – Inside the Clear Zone" criteria applies.

End Treatment Types:

1. Guardrail Approach Terminal: Design placement of Guardrail Approach Terminals along with the required Approach Transition Connection to Rigid Barrier in accordance with ***Index 536-001*** (Guardrail). See the ***Standard Plans Instructions*** for ***Index 536-001*** for LON design information.
2. Crash Cushion (C.C.): Design placement of a Crash Cushion in accordance with ***Standard Plans Instructions*** for ***Index 544-001***. See Part C for LON design information.
3. Sloped End Treatment for Median Barrier: Design placement of the 25-foot length treatment in accordance with the Index drawings.
4. Sloped End Treatment for Curb & Gutter Barrier: This treatment has restrictions on use per the requirements of ***FDM 215***. Use only when a Guardrail Approach Terminal will not fit due to constrained project conditions. Design placement of the Sloped End Treatment in accordance with the Index drawings. Use the 25-foot length treatment option where space is available for it. Use the 10 foot-length treatment option only where space is not available for the other options. See Part C for LON design information.

E. Barrier End Connections / Continuations:

1. Guardrail: Connect to guardrail using the Approach or Trailing Transition Connections to Rigid Barrier in accordance with the details in ***Index 536-001***.
2. Pier Protection Barrier: Connect to Pier Protection Barrier in accordance with the details in ***Index 521-002***. Align Gutter Lines.
3. Single-Slope Traffic Railing:
    a. 36” Height Traffic Railing (bridge application): Connect to Traffic Railing in accordance with the Index details. The ***Standard Plans*** details for Traffic Railing provide for the 38” to 36” height transition on the bridge approach slab. Align gutter lines.
    b. 38” Height Traffic Railing (Junction Slab / MSE Wall coping or other): Connect to Traffic Railing in accordance with the ***Standard Plans***. Align gutter lines.
4. Existing F-Shape Barrier or Traffic Railing: Connect to F-Shape sections using the Median Barrier or Shoulder Barrier’s Connection to F-Shape details as shown in ***Index 521-001***. Between the new Single-Slope section and existing F-Shape section, provide longitudinal space for the 12’-6” Connection Segment plus any ¾” Doweled Joints required per ***Index 521-001*** details. Curb & Gutter Barrier connections to F-Shape sections require project-specific concrete transition details.

Plan Content Requirements

A. General:

In the Roadway Plan views, label Begin and End Stations of the Concrete Barrier types as they correspond to the callout points shown in ***Index 521-001*** (e.g. Begin Median Barrier Sta., Begin Shldr. Barrier Sta., or Begin Curb & Gutter Barrier Sta.).

On the Typical Sections, Cross Sections, Roadway Plan views, and all other appropriate sheets, show the Concrete Barrier system to scale, using Concrete Barrier section dimensions from ***Index 521-001*** as applicable. Label geometry of barrier sections as needed to effectively communicate usage of ***Index 521-001*** components to the contractor, particularly at the starting and stopping points of differing sections and transitions. Where applicable, designate connecting drainage, lighting, and all other features as linked per ***Index 521-001*** details.

B. Summary of Permanent Barrier Wall Table:

Tabulate the individual Pay Items as defined in the ***Basis of Estimates Manual*** and ***Specification 521***. Produce the Summary of Permanent Barrier Wall table and include it in the Plans. The Department's CADD tools, including the Design and Computation Manager and Linked Data Manager, may be used to assist in populating the table. See the CADD Production Support Office website for details.

The location callouts of barrier segments will be listed as Station to Station, but the length of the corresponding segments must be measured along the gutter line of the barrier and include the effect of curvature.

Payment

Item number	Item Description	Unit Measure
521-1-XXX	Median Concrete Barrier	LF
521-72-XXX	Shoulder Concrete Barrier	LF