

**SECTION 521
CONCRETE BARRIERS, TRAFFIC RAILINGS,
AND PARAPETS**

521-1 Description.

Construct precast or cast in place concrete barriers, traffic railings, and parapets, herein referred to as rigid barrier, in accordance with the Standard Plans and the details shown in the Plans. Use stationary removable forms or sliding forms to construct the rigid barrier. Do not use permanent precast concrete rigid barrier on bridge or box culvert structures.

Submit written certification from the manufacturer of the precast rigid barrier that the barrier meets the requirements of this Section. Rigid barrier is produced using certification acceptance; therefore, assume responsibility for performance of quality control testing and inspections required by Sections 346 and 400. Perform all Quality Control Testing and inspections using CTQP qualified testing personnel. Perform compressive strength testing in a laboratory inspected by CCRL or CMEC.

Ensure that each shipment of products to the job site includes a list of products shipped and the required written certification statement for each product. Submit this list and certifications to the Engineer.

521-2 Materials.

Meet the following requirements:

Portland Cement Concrete	Section 346
Reinforcing Steel	Section 415
Joint Materials.....	932-1.1
Joint Materials*.....	932-1.2 and 932-1.3
Barrier Delineators *(1)	Sections 705 and 993

*Use products listed on the Department's Approved Product List (APL).

(1) Mount delineators on the barriers by adhesive or mechanical means as per the manufacturer's recommendations and in accordance with the details shown in the Plans and the Standard Plans.

521-3 Precast Temporary Concrete Barrier.

Meet the requirements of 102-9.6.

521-4 Construction.

521-4.1 General: The Contractor may use stationary removable forms or slip form construction methods provided a completed rigid barrier with acceptable alignment and finish is obtained. Do not use forms which are damaged or are not in alignment. At no expense to the Department, remove and replace sections of rigid barrier having unconsolidated concrete, surface blemishes, deviations in alignment or profile which exceed tolerances, or other defects which cannot be repaired to the satisfaction of the Engineer.

521-4.2 Stationary Form Construction: Provide precast or cast in place concrete rigid barrier constructed using stationary forms in accordance with Section 400 and provide a general surface finish. Align and erect the stationary form so that all plane surfaces of the finished barrier will have no deviation greater than 3/8 inch measured as an ordinate between the concrete and a 10 foot straightedge. Correct all alignment deviations greater than 3/8 inch. Straightedge by half lapping the straightedge for the full length of all plane surfaces.

521-4.3 Slip Form Construction: When electing to use the slip form method in lieu of the stationary forming method, place the concrete with a slip form machine approved by the Engineer. The concrete cover tolerance is plus or minus 3/4 inches from the plan dimensions, except the minimum concrete cover, as constructed, must not be less than 1-3/4 inches.

Provide a finished texture to the slip formed rigid barrier by hand troweling, brushing, or both to eliminate pockmarks, blemishes and any other discontinuities in surface texture. Ensure that the final finish has a fine texture and is free of pinholes, pockmarks, and blemishes.

Remove and recast or repair sections of slip formed rigid barrier having areas of unconsolidated concrete, having surface blemishes, and/or having pockmarks greater than 1/2 inch in diameter after hand troweling and brushing. Repair areas of unsatisfactory surface finish by hand methods using mortar screened from the concrete used to construct the rigid barrier. Use the mortar screened from the rigid barrier concrete only to fill holes and surface blemishes below the slip formed surface of the concrete. Do not use mortar as a surface overlay coating on the rigid barrier concrete.

During the finishing operation, while the concrete remains plastic, straightedge all plane surfaces of the slip formed rigid barrier with a 10 foot straightedge. Straightedge by half lapping the straightedge for the full length of the plane surfaces. Correct any deviation found during straightedging, greater than 3/8 inch, measured as an ordinate between the concrete surface and the straightedge, in an approved manner at no expense to the Department. Do not use surface overlay coatings of mortar screened from the concrete, or surface overlay coatings of concrete to correct alignment deviations.

521-5 Curing.

Meet the requirements of Section 400.

521-6 Joints.

521-6.1 General: Place expansion and contraction joints in concrete rigid barrier either mounted on or adjoining rigid structures in a manner similar to the type and method of jointing used in the supporting or adjoining structure or as shown in the Contract Documents. Place expansion and contraction joints in concrete rigid barrier supported by soil or flexible foundation materials in the manner detailed in the Plans.

521-6.2 Contraction Joints in Rigid Barrier Supported by or Adjoining Rigid Structures: The Contractor may form or saw contraction joints. When sawing contraction joints, saw them as soon as the concrete has hardened sufficiently to permit sawing without raveling and before uncontrolled cracking occurs, but in no case later than 12 hours after casting. Match contraction joints to adjacent contraction joints in the structure. Space contraction joints at 15 to 30 foot intervals. For rigid barrier on bridge structures or approach slabs, space contraction joints as shown in the Contract Documents.

521-6.3 Expansion Joints in Rigid Barrier Supported by or Adjoining Rigid Structures: Construct expansion joints at right angles to the face, and extend them through the entire cross-section of the rigid barrier. Construct expansion joints at the same location and width as the expansion joints in the structure on which the rigid barrier rests and at other locations shown in the Contract Documents. Form expansion joints with an expansion filler material or removable forming materials and secure to the forms as required to provide proper position.

521-7 Repairs and Rejection.

For permanent precast concrete rigid barrier that has not been installed, evaluate cracks, spalls and other deficiencies in accordance with 450-12. Repair deficiencies in accordance with 450-13 or the plant’s approved repair methods that are included as part of the Quality Control (QC) Plan. Ensure that the original performance and durability of the repaired rigid barrier is maintained. Use materials for concrete repair that will meet or exceed the strength requirement for the class of concrete used. Materials meeting the requirements of Section 930 may be substituted for non-shrink grout when required by 450-13. Concrete rigid barrier is subject to rejection if it fails to conform to any of the Specification requirements after repair. The disposition of concrete cracks in rigid barrier after installation shall be in accordance with 400-21.

521-8 Method of Measurement.

The quantity to be paid for under this Section will be the plan quantity, in feet, completed and accepted. The quantity will be measured along the top of the rigid barrier from begin to end station, including transitional and end sections, with no deduction for expansion joints or open joints.

521-9 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section, including all reinforcing steel, materials, soil stabilization, and incidentals necessary to complete the work.

Payment will be made under:

- Item No. 521- 1- Median Concrete Barrier - per foot.
- Item No. 521- 5- Concrete Traffic Railing - Bridge - per foot.
- Item No. 521- 6- Concrete Parapet - per foot.
- Item No. 521- 8- Concrete Barrier – with Junction Slab - per foot.
- Item No. 521- 72- Shoulder Concrete Barrier - per foot.