

SUPPLEMENTAL SPECIFICATIONS  
INDIANA DEPARTMENT OF TRANSPORTATION  
1999 STANDARD SPECIFICATIONS

March 1, 2004

REVISION TO 1999 STANDARD SPECIFICATIONS

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SECTION 601, BEGIN LINE 15, DELETE AS FOLLOWS:

Steel Thrie-Beam Rail..... 910.09(a)  
Steel W-Beam Rail..... 910.09(a)

SECTION 601, LINE 19, DELETE AND INSERT AS FOLLOWS:

~~Concrete~~ *PCC in anchors and in pads or bases for impact attenuators shall be class A, in accordance with 702. Sheet signs and sign posts shall be in accordance with 802.*

*Barrels used in impact attenuators shall be yellow with black lids. The aggregate used in the barrels shall be uncrushed gravel, class F or higher, in accordance with 904 and the following gradation requirements.*

<u>Sieve Size</u>	<u>% Passing</u>
12.5 mm (1/2 in.)	100
300 $\mu$ m (No. 50)	0 - 5
150 $\mu$ m (No. 100)	0 - 2

*All other impact attenuators shall have end reflectorization as shown on the plans or attached to the nose of the attenuator in accordance with the attenuator manufacturer's recommendation.*

SECTION 601, LINE 28, INSERT AS FOLLOWS:

*the locations shown on the plans. In locations where conditions will not allow the use of 2130 mm (7 ft) posts, 1830 mm (6 ft) posts may be substituted when approved.*

SECTION 601, BEGIN LINE 99, DELETE AND INSERT AS FOLLOWS:

The fabrication, assembly, and installation of thrie-beam components and timber posts and

100 blocks for guardrail transitions ~~type TGB or WGB, and GP~~ will be required at ~~for~~ the locations shown on the plans.

**601.07 Guardrail End Treatments.** Guardrail end treatments ~~shall be~~ *are* required to terminate guardrail installations at the locations shown on the plans. ~~The type of guardrail end treatment, the allowable alternates for each type of guardrail end treatment, the~~ *The type I guardrail end treatment shall be either as shown on the plans, or shall be selected from the Department's List of Approved Guardrail End Treatments. The type II guardrail end treatment shall be as shown on the plans. The type OS or MS guardrail end treatment shall be selected from the Department's List of Approved Guardrail End Treatments. The* reflectorization of guardrail end treatments, and the grading requirements shall be as shown on the plans.

Double facing of guardrail end treatment type I will be required when it is used in conjunction with double faced guardrail.

*Each unit shall be installed in accordance with the manufacturer's recommendations.*

*Assembly and installation shall be supervised or performed at all times by an installer trained and certified by the unit's manufacturer, and shall be in accordance with the manufacturer's recommendations at the locations shown on the plans. A copy of the installer's certificate shall be provided to the Engineer prior to the start of the work.*

*The Contractor shall provide the Department with original copies of all necessary current manufacturer's installation manuals and shop drawings prior to beginning installation work. Shop drawings shall be a minimum of 550 by 850 mm (22 by 34 in.) in size. No installation work shall begin prior to the Department's receipt of such manuals and drawings. Such manuals and drawings will remain the property of the Department. If there is a discrepancy between shop drawings and the plans, the shop drawings shall govern.*

When installing end treatments to existing rub rail type guardrail, the rub rail, if not spliced at the last existing post, shall be cut and the end repositioned behind the flange of the post. If the rub rail is spliced at the last existing post, the existing splice material shall be removed and the end of the rub rail repositioned behind the flange of the post. In both cases, the rub rail shall be connected to the post as shown on the plans.

Guardrail end treatments shall be installed within 24 h of the completion of the guardrail installation to which they are to be attached. Drums in accordance with 801.10 801.09 shall be placed for overnight marking of the bare end of the guardrail when the installation

of the guardrail end treatment will not be completed until the day following the completion of the guardrail installation to which it is to be attached.

**601.07.1 Impact Attenuators.** *Impact attenuators shall be placed or reset to obtain the proper height where shown on the plans. The unit for each new location shall be of the width recommended by the manufacturer and for the test level specified and shall be chosen from those shown on the Department's list of approved Impact Attenuators. Each unit shall be placed in accordance with the manufacturer's recommendations, on a PCC pad.*

*Assembly and installation or resetting shall be supervised or performed at all times by an installer trained and certified by the unit's manufacturer, and shall be in accordance with the manufacturer's recommendations at the locations shown on the plans. A copy of the installer's certificate shall be provided to the Engineer prior to the start of work.*

*The Contractor shall provide the Department with original copies of all necessary current manufacturer's installation manuals and shop drawings prior to beginning installation work. Shop drawings shall be a minimum of 550 by 850 mm (22 by 34 in.) in size. No installation work shall begin prior to the Department's receipt of such manuals and drawings. Such manuals and drawings will remain the property of the Department. If there is a discrepancy between shop drawings and the plans, the shop drawings shall govern.*

*Transition panels and all other necessary hardware shown in the manufacturer's recommendations to be required for bi-directional traffic protection shall be included in the installation or resetting, if the unit is installed at a location where traffic is passing the unit on both sides in opposite directions.*

*If a spare parts package is required for the unit being installed, such package shall consist of those parts which are shown on the list provided by the manufacturer. The spare parts shall correspond to those shown on the list for the unit to be placed. The package shall be delivered to the location directed and will become the property of the Department.*

*Impact attenuators may be placed on the Department's approved list based on the manufacturer's documentation subject to the Department's acceptance. The manufacturer shall provide a copy of the test report stating that its product fully complies with the requirements of NCHRP 350 crash test level 3, and that its product has been approved by the FHWA. Products will be maintained on the Department's approved list by a manufacturer's certification submitted annually in October and the Department's continued acceptance. This certification shall state that the product has not been changed since the NCHRP 350 crash testing, that the NCHRP 350 test results still apply to this product, and that the FHWA approval is still applicable.*

SECTION 601, BEGIN LINE 148, DELETE AND INSERT AS FOLLOWS:

**601.12 Method of Measurement.** Guardrail, *guardrail with rub rail*, shop curved guardrail, adjusting guardrail height, guardrail removal, and resetting guardrail will be measured by the meter (linear foot) along the top of the rail element, complete in place. Nested guardrail will be measured ~~by the meter (linear foot) along the top of the nested rail elements, complete in place~~ *per each 30.48 m (100 lft) run placed. Modified posts for nested guardrail will be measured per each, complete in place.* Guardrail transitions, *W-beam guardrail cable terminal anchors*, and guardrail end treatments will be measured per each, complete in place *Guardrail buried end treatments type II will be measured per each. Impact attenuators, reset impact attenuators, and impact attenuator spare parts packages will be measured per each for the type and width and test level, complete in place.* The curved W-beam guardrail connector system and the curved W-beam guardrail terminal system will be measured per each for the type specified. Grading at guardrail end treatments, the reflectorization of guardrail end treatments, and concrete used in anchoring guardrail end treatments will not be measured for payment.



*The cost of all grading required for the guardrail buried end treatment shall be included in the cost of guardrail end treatment, type II.*

*The costs of earthwork, grading, and transition panel if required, and PCC pad shall be included in the cost of impact attenuator.*

*The cost of excavation, concrete footings, reinforcement, and structural steel tubing required for modified posts, nested guardrail, shall be included in the cost of the pay item.*

*The cost of all materials, including replacing damaged or missing parts, labor, and necessary incidentals required to reset impact attenuators, will be included in the cost of impact attenuator, reset.*

SECTION 602, LINE 52, DELETE AND INSERT AS FOLLOWS:

*specified cross section, as measured from a longitudinal straightedge. Where concrete pavement or concrete shoulder abuts the concrete barrier, a double application of curing compound shall be placed between the barrier and the pavement or shoulder.*

*Where the concrete barrier is to be placed on PCCP, dowel bars shall be placed as shown on the plans. The dowel bars shall be installed in the PCCP by drilling and grouting.*

*The barrier wall shall be constructed in single pours without subsequent vertical extensions.*

**(c) Finishing.** Concrete barrier and concrete glare screen shall be finished in accordance with 702.21(a). If slip-form construction is used, an approved brush finish will be permitted. Curing material in accordance with 912.01(e) shall be applied as a bond

SECTION 602, BEGIN LINE 68, DELETE AND INSERT AS FOLLOWS:

**(f) Reflectorization.** All concrete barrier shall be reflectorized with barrier delineators ~~as shown on the plans~~ *spaced a minimum of 12 m (40 ft) apart and centered 600 mm (2 ft) above the surface of adjacent pavement or shoulder. The reflectorization shall be on both sides of the wall if traffic is on both sides.* All delineators damaged during installation or

placement of the concrete barrier shall be replaced with no additional payment. The color of the reflectors shall match the color of the adjacent pavement traffic markings.

SECTION 602, LINE 73, DELETE AND INSERT AS FOLLOWS:

**602.04 Temporary Concrete Barrier *Blank*.** ~~Temporary concrete barrier shall be~~

SECTION 602, DELETE LINES 74 THROUGH 141.

SECTION 602, DELETE LINES 148 THROUGH 151.

SECTION 602, DELETE LINES 159 THROUGH 163.

SECTION 602, DELETE LINES 173 AND 174.

SECTION 602, DELETE LINES 178 THROUGH 180.

SECTION 603, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

## SECTION 603 -- FENCES

**603.01 Description.** This work shall consist of the construction of fence and gates in accordance with ~~these specifications and in reasonably close conformance with the lines and grades shown on the plans or as directed~~ **105.03**.

### MATERIALS

**603.02 Materials.** Materials shall be in accordance with the following:

Barbed Wire.....	910.18(b)4
Chain Link Fabric.....	910.18(b)
Concrete, Class A or B .....	702
Concrete, <del>packaged</del> <i>Packaged dry</i> .....	913.17
<i>Farm Field/Woven Wire</i> .....	<i>910.18(a)</i>
Fence Posts.....	910.13
Gates .....	910.18(d)
Tension Wire.....	910.18(b)1
<del>Woven Wire</del> .....	<del>910.18(a)</del>

### CONSTRUCTION REQUIREMENTS

**603.03 General Requirements.** Clearing and grubbing shall be ~~performed as necessary to construct the fence to the required grade and alignment~~ *in accordance with 201.03*.

At locations where breaks in a run of fencing are required, or at intersections with existing fences, appropriate adjustment in post spacing shall be made in accordance with the requirements for the type of closure indicated.

When the plans require that posts, braces, or anchors be imbedded in concrete, temporary guys or braces shall be installed, if required to hold the posts in proper position; ~~until such time as the concrete has set sufficiently to hold the posts~~. Unless otherwise permitted, no materials shall be installed on posts or strain placed on guys and bracing set in concrete until ~~four days~~ *96 hours* have elapsed from the time of placing of the concrete.

The tops of all posts shall be set to the required grade and alignment. Cutting of the ~~tops of the posts will only be allowed only with approval and under the conditions specified~~ *with the approval of the Engineer. Post caps shall be installed at the time the fence fabric is placed on the posts*.

Wire or fencing of the size and type required shall be firmly attached to the posts and braces in the manner indicated. All wires shall be stretched taut and installed to the required elevations.

At each location where an electric transmission, distribution, or secondary line crosses any of the types of fences covered by these specifications, a ground, conforming to applicable requirements of the National Electric Safety Code, shall be furnished and installed.

**603.04 Setting Posts.** ~~Unless otherwise directed, posts~~ *Posts*, including the concrete ~~base~~ *foundation* for posts, ~~braces and anchors~~ shall be set so that the entire fence is inside the right-of-way and ~~such that the fence can be placed on the side of the post facing the pavement roadway.~~ If an object, such as a tree, is located on the right-of-way and is to remain in place, the fence may be ~~set off line enough to miss the object adjusted to miss the obstruction.~~ There shall be a gradual offset for at least three posts in each direction ~~to eliminate sharp bends of the obstruction.~~

Line posts for farm field ~~type~~ fence shall be set on 5 m (16 ft) ~~maximum~~ centers, and ~~those~~ for chain link ~~type~~ fence on 3 m (10 ft) centers. In either case, a tolerance of  $\pm 0.6$  m (2 ft) in spacing will be allowed at special locations as approved. Spacing of these posts shall be as uniform as practicable under the existing conditions. However, additional posts shall be set ~~at each abrupt change in grade to maintain the bottom clearance dimensions as required.~~

Pull posts shall be set at 150 m (500 ft) maximum intervals in straight runs and at each vertical angle point of 10 degrees or more.

Corner posts shall be set at each horizontal angle point of 10 degrees or more.

End, corner, and pull posts for both types of fence, line posts for chain link ~~type~~ fence and diagonal braces for farm field ~~type~~ fence shall be set in concrete as shown on the plans.

Except where rock is encountered, intermediate or line posts shall be driven and furnished with an approved anchor plate or other satisfactory device to hold the post in proper alignment and plumb. The plate or anchor shall be ~~satisfactorily~~ welded or riveted ~~to the post~~ with no less than two rivets ~~to the post~~.

Gate posts shall be set in concrete as shown on the plans.

Extra length posts shall be required at stream crossings as shown on the plans or as directed and also at ~~small~~ ground depressions where it is not practicable for the fencing to follow closely the contour of the ground. These posts shall be set in concrete as shown on the plans.

~~When so directed, at~~ *At* small stream crossings and ground depressions, the space below the fence fabric shall be closed with barbed or ground tension wire, either on horizontal lines or fanned, as shown on the plans or as directed. The wires shall be stretched taut between and fastened to the posts to prevent vertical movement of the wires. Barbed or tension wire shall not be ~~required~~ *placed* where its installation would cause collecting drifts in the channel.

**603.05 Placing Barbed and Tension Wire and Fabric.** The bottom of the fabric shall be placed above the ground line as shown on the plans. Over irregular ground, a minimum of 25 mm (1 in.) and a maximum of ~~150~~ 100 mm (6 4 in.) clearance will be permitted ~~for the maximum distance shown on the plans~~. All necessary excavation and backfilling required shall be performed in accordance with ~~these provisions~~ 201.03.

The tension required to stretch the fabric and wire shall be applied by mechanical fence stretchers and with single wire stretchers designed and manufactured for the purpose, and in accordance with the fence manufacturer's recommendations.

All splices in the fabric and wire shall be securely made in accordance with the best practice and the manufacturer's recommendations, and by the use of tools designed for that purpose.

Farm field fence shall be placed by fastening one end and then applying sufficient tension to remove all slack before making permanent attachments elsewhere. The line wires shall be fastened to end, corner, and pull posts by wrapping the wires around the posts and tying the wire back on itself with no less than 1 1/2 tightly wrapped twists. ~~Such tying~~ Tying shall be done with tools designed for the purpose in accordance with the fence manufacturer's recommendations. This same method shall be used in placing barbed or tension wire. Fence fabric shall be fastened to intermediate or line posts with at least five wire ties ~~or other satisfactory methods~~. Barbed or tension wire shall be fastened in the same manner with one ~~satisfactory~~ fastening device for each post.

The top and bottom tension wires of chain link fence shall be placed, stretched taut, and secured at the ends and to all posts ~~in a satisfactory manner~~ before the fabric is placed. The ends of the fabric shall be secured by the use of stretcher-bars threaded through the loops of the fabric and secured to the posts by means of clamps with bolts and nuts. The number of clamps shall be as indicated on the plans. The fabric shall be placed by securing one end and then applying tension to remove all slack before making attachments elsewhere. The fabric shall be fastened to the line posts and to the top and bottom tension wires with tie wires ~~or aluminum bands~~ spaced as shown on the plans.

**603.06 Resetting Fence.** Resetting fence shall consist of the removal of existing fence within the *specified* limits ~~of the new improvement~~ and, if necessary, storing it ~~in a careful manner~~ and then resetting it ~~when so shown on~~ *in accordance with* the plans, or as ~~otherwise~~ directed. Resetting fence shall be in accordance with ~~applicable provisions of this specification for setting new fence~~ 603.03, 603.04, and 603.05 ~~and shall include the replacement of damaged~~ *Damaged* or missing parts, including posts *shall be replaced*.

**603.07 Method of Measurement.** Fence and resetting fence will be measured by the meter (linear foot) *for the type specified*. Measurement will be made along the top of the fence from outside to outside of end posts for each continuous run of fence.

Gates will be measured as complete units of the size and type specified.



**603.08 Basis of Payment.** The accepted quantities of fence and resetting fence will be paid for at the contract unit price per meter (linear foot) *for the type specified, complete in place*. Gates will be paid for at the contract unit price per each for fence gate, of the type and size specified, complete in place.

Payment will be made under:

<del>Metric Pay Item</del>	<del>Metric Pay Unit Symbol</del>
<del>(English Pay Item)</del>	<del>English Pay Unit Symbol</del>
Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
Fence, _____, _____ mm ( <i>in.</i> ).....m ( <i>LFT</i> )	
type          height	
<del>(Fence, _____, _____ in. ....LFT)</del>	
type          height	
Fence, _____, Reset .....m ( <i>LFT</i> )	
type	
Fence, Farm Field, Barbed Wire, _____ mm ( <i>in.</i> ).....m ( <i>LFT</i> )	
<del>(Fence, Farm Field, Barbed Wire, _____ in. ....LFT)</del>	
Fence, Farm Field, Tension Wire, _____ mm ( <i>in.</i> ).....m ( <i>LFT</i> )	
<del>(Fence, Farm Field, Tension Wire, _____ in. ....LFT)</del>	
Fence Gate, _____, _____ mm ( <i>in.</i> ) x _____ m ( <i>ft</i> )..... EACH	
type          height                  length	
<del>(Fence Gate, _____, _____ in. x _____ ft..... EACH)</del>	
type          height                  length	

*The cost of adding grounding in accordance with the National Electric Safety Code including all materials, and labor shall be included in the cost of the fence.*

*The cost of fence, and corner, end, line, and pull posts shall be included in the cost of the fence.*

*The cost of fence, post and miscellaneous hardware shall be in the cost of the gate.*

The cost of all miscellaneous hardware related to the type of fence including brace connections, caps, clips, clamps, hinges, rivets, ties, truss rods, diagonal braces and stretcher bars shall be included in the cost of the fence.

*The cost of concrete for posts, braces or anchors shall be included in the cost of the fence and gates.*

*The cost of removal, storage, re-installation, and the replacement of damaged or missing parts shall be included in the cost of the resetting fence.*

SECTION 604, DELETE LINES 1, THROUGH 193.

SECTION 604, AFTER LINE 194, INSERT AS FOLLOWS:

***SECTION 604 – SIDEWALKS, CURB RAMPS, STEPS, AND HANDRAILS***

***604.01 Description.*** *This work shall consist of constructing HMA or PCC sidewalks; curb ramps; concrete steps; or the reconstruction of PCC sidewalks in accordance with 105.03.*

200

***MATERIALS***

***604.02 Materials.*** *Materials shall be in accordance with the following:*

210

<i>Coarse Aggregate, Class D or Higher, Size No. 53 .....</i>	<i>904</i>
<i>Concrete, Class A.....</i>	<i>702</i>
<i>Detectable Warning Elements .....</i>	<i>905.05</i>
<i>Fine Aggregate, Size No. 23, No. 24, or No. 15 .....</i>	<i>904</i>
<i>Joint Filler .....</i>	<i>906.01</i>
<i>Paint .....</i>	<i>909.05</i>
<i>Reinforcing Bars .....</i>	<i>910.01</i>
<i>Silica Sand.....</i>	<i>ASTM C 778</i>

*Hand railing shall be aluminum pipe in accordance with ASTM 221, alloy 6063, temper T52 or galvanized steel pipe in accordance with ASTM A 53, grade B, all as specified.*

220

*The detectable warning elements shall be set in a thin set latex modified mortar in accordance with ANSI A108.1 or as recommended by the element manufacturer for outdoor use for adhering brick to concrete.*

*A type A certification in accordance with 916 for detectable warning elements and thin set latex modified mortar shall be furnished prior to use of the materials.*

*A type C certification in accordance with 916 for the silica sand shall be furnished prior to use of the material.*

***CONSTRUCTION REQUIREMENTS***

230

***604.03 Portland Cement Concrete Sidewalks and Curb Ramps.***

***(a) General Requirements.*** *The location of curb ramps shall take precedence over the location of drainage structures and signal, utility, or light poles. Drainage structures shall not be located within the limits of the curb ramp, exclusive of flared sides. Poles shall be located so as not to impede the usage or safety of the curb ramps. Crosswalk markings shall be located such that the curb ramps shall be contained within the markings unless otherwise specified. The flared sides need not fall within the crosswalk lines. The normal gutter flow line shall be maintained throughout the curb ramp area, and appropriate drainage structures shall be used, as needed, to intercept the flow prior to the*

240 curb ramp area. Positive drainage shall also be provided to carry water away from the intersection of the curb ramp and the gutter line.

*The bottom edge of curb ramps and the top of curb shall be flush with the edge of the adjacent pavement or the gutter line.*

*The curb ramp running slope shall not exceed 12:1, except where conditions necessitate, a 10:1 slope may be utilized for a maximum rise of 150 mm (6 in.). Curb ramp cross slope shall not exceed 50:1 except where infeasible.*

250 **(b) Excavation.** *Excavation shall be made to the required depth and to a width that will permit the installation and bracing of the forms. The foundation shall be shaped and compacted to a firm even surface in accordance with the section shown on the plans. All soft and yielding material shall be removed and replaced with acceptable material.*

**(c) Forms.** *Forms shall be of wood, metal, or other approved material and shall extend for the full depth of the concrete. Forms shall be straight, free from warp, and of sufficient strength to resist the pressure of the concrete without springing. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.*

260 **(d) Placing Concrete.** *The foundation shall be thoroughly moistened immediately prior to the placing of the concrete. The proportioning, mixing, and placing of the concrete shall be in accordance with 702. The thickness of the concrete in the curb ramp, including flared sides, shall be as shown on the plans for the type specified.*

**(e) Finishing.** *The surface shall be finished with a wooden float. No plastering of the surface will be permitted. Ramp surfaces shall be coarse broomed and corrugated transverse to the slope as shown on the plans. The surface texture of the flared sides shall be coarse broomed with the striations transverse to the slopes.*

270 *All exposed edges shall be finished with a 6 mm (1/4 in.) radius.*

**(f) Joints.** *The type and location of joints and the size of preformed joint filler shall be as shown on the plans.*

*All concrete joints shall be finished with a 6 mm (1/4 in.) radius.*

280 *Preformed 13 mm (1/2 in.) joint filler shall be placed around all appurtenances, such as manholes and utility poles which extend into and through the sidewalk, and between the sidewalk and any fixed structure, such as a building or bridge. The preformed joint filler shall extend for the full depth of the sidewalk or curb ramp, and shall be flush with the surface of the adjacent concrete.*

*(g) Detectable Warning Elements.* Detectable warning elements shall be as shown on the plans. They shall be set in a thin set mortar on top of the concrete base. The concrete base shall be cleaned of all materials which might prevent the mortar from adhering to the base. The mortar shall be applied to the concrete in accordance with the manufacturer's recommendations. Where elements smaller than full sized are needed, whole elements shall be cut full depth with an appropriate power saw.

290

*Brick joints shall be hand tight with a maximum of 1.5 mm (1/16 in.) width.*

*The joints between bricks shall be filled with a fine aggregate No. 15 or an equivalent sand. This filling shall be accomplished by repeated brooming of the aggregate across the face of the bricks. Excess aggregate shall then be removed from the surface.*

300

*(h) Curing.* Concrete shall be cured for at least 72 h. Curing shall be in accordance with 504.04 except curing compound shall not be used in the area where detectable warning elements are to be installed. During the curing period all pedestrian traffic shall be excluded.

*(i) Painting.* The exposed surfaces of the curb throughout the width of curb ramps shall be painted yellow in accordance with 808.06. Silica sand shall be applied to the wet paint along the top of the curb at the rate of 0.7 kg/L (6.0 lb/gal.).

**604.04 PCC Steps.** PCC steps shall be in accordance with the applicable provisions of 604.03. In addition, all exposed edges shall be rounded to a 6 mm (1/4 in.) radius.

310

**604.05 Reconstructed PCC Sidewalk.** Where existing concrete sidewalk is to be reconstructed, all disintegrated concrete, brick, stone, or other material shall be completely removed and replaced with new concrete sidewalk in accordance with 604.03.

*Such sidewalk shall be constructed to a minimum depth of 100 mm (4 in.) unless another depth is designated and to the width of the adjoining walk, or to a width of no less than 1200 mm (48 in.) from the face of curb, or to such other width as directed.*

320

*The removal of concrete sidewalk shall be to uniform lines as directed. The sidewalk to be removed shall be cut in a straight line with an approved power driven concrete saw. The sawing shall be such that the portion of sidewalk to remain in place shall not be damaged. All portions which are damaged or removed back of the established line shall be replaced.*

*Unless otherwise directed, sidewalk which must be removed shall be removed between tool marks or joints. At locations where the sidewalk and curb are adjacent and the curb is deteriorated, the curb shall also be replaced as directed.*

330

*The new sidewalk shall have a joint pattern similar to the surrounding sidewalk. Sidewalk placed at drives shall be 150 mm (6 in.) thick, or the same depth of the existing drive, whichever is greater.*

**604.06 Re-Laid Sidewalk.** *This work consists of the removal and re-laying of concrete, stone-slab, or brick sidewalk at the locations shown on the plans or as directed. In the operations of removing and re-laying, care shall be taken not to damage any of the sidewalk. Before re-laying, a cushion of fine aggregate shall be spread on the prepared subgrade to a depth of no less than 50 mm (2 in.). Cracked or damaged sections shall not be relaid but shall be disposed of as directed.*

**604.07 HMA Sidewalk.**

340

*(a) Excavation and Forms.* Excavation and forms, when required, shall be in accordance with 604.03(b) and 604.03(c).

*(b) Bed Course.* Bed course material shall be coarse aggregate No. 53 and shall be placed in lifts not exceeding 100 mm (4 in.) in depth. Each lift shall be thoroughly compacted.

350

*(c) Placing HMA Sidewalk.* HMA sidewalk material shall be placed on a compacted bed course in one or more courses. The mixture shall consist of HMA base, intermediate, or surface, type A in accordance with 402. A MAF in accordance with 402.05 will not apply. Aggregate requirements of 904.03(d) do not apply. Compaction shall be accomplished by means of a hand operated or power roller of an acceptable type and mass (weight) in accordance with 402.15. In areas inaccessible to the roller, hand tamping will be permitted. In any case, the HMA sidewalk material shall be uniformly compacted.

*If the finished compacted surface is too open or remains sticky, the surface shall be given a coating of fine aggregate, well broomed over the surface, leaving no excess.*

360

**604.08 Backfilling and Finishing Shoulders and Slopes.** *After forms have been removed, the space on each side of the sidewalks shall be filled to the required elevation with suitable material which shall be firmly compacted and neatly graded. Adjacent shoulders and slopes shall be finished to the required grade and cross section.*

**604.09 Hand Rails.** *This railing shall be erected in a workmanlike manner, straight and true to line and grade. Posts shall be vertical and railings shall be parallel to the walk surface or to the plane of the steps and spaced as shown on the plans. Fastenings shall be as indicated on the plans. Railing posts on masonry shall be held in place in a manner that develops the full strength of the railing post in bending.*

370

*Fabrication and placement of railings shall be completed in accordance with the applicable requirements of 711. Ends of tube sections shall be milled or sawed. Cut ends shall be true, smooth, and free from burrs and ragged edges. Welds shall be ground smooth. The rail system shall be continuous except as shown on the plans. Joints shall be spliced as detailed on the plans. Welding of steel shall be in accordance with 711.32 and welding of aluminum shall be in accordance with the applicable requirements of 803. Radiographic, magnetic particle, and dye penetrant inspection will not be required.*

380        *All aluminum surfaces in contact with concrete shall be coated with an aluminum impregnated caulking compound prior to installation. After installation and alignment, openings between metal surfaces and concrete shall be sealed in a watertight manner with the caulking compound.*

*Steel pipe railing not designated to be painted shall be galvanized after fabrication and prior to installation. Railing designated to be painted shall receive one shop coat of paint after fabrication and two field coats after installation. The type and color of paint shall be as specified on the plans. Cleaning and painting shall be in accordance with 619.*

390        **604.10 Method of Measurement.** *Concrete sidewalk, reconstructed concrete sidewalk and re-laid concrete sidewalk will be measured by the square meter (square yard) of finished surface. HMA for sidewalk will be measured by the megagram (ton) of mixture placed. Bed course material will be measured by the megagram (ton).*

*Concrete curb ramps will be measured by the square meter (square yard) in accordance with the pay limits shown on the plans.*

400        *Concrete steps will be measured by the cubic meter (cubic yard) based on the neat lines shown on the plans.*

*Hand rails will be measured by the meter (linear foot) in accordance with the dimensions shown on the plans or as directed. Measurements will be made from end to end of the railing along the centerline.*

*Curb and curb and gutter will be measured in accordance with 605.09. Reinforcing bars, if used, will be measured in accordance with 703.07.*

410        **604.11 Basis of Payment.** *The accepted quantities of concrete sidewalk will be paid for at the contract unit price per square meter (square yard) for sidewalk, concrete. HMA for sidewalk will be paid for at the contract unit price per megagram (ton), complete in place. Bed course material will be paid for at the contract unit price per megagram (ton). Concrete steps will be paid for at the contract unit price per cubic meter (cubic yard) for steps, concrete. Reconstructed sidewalk and relaid sidewalk will be paid for at the contract unit price per square meter (square yard) for sidewalk, reconstruct, or sidewalk, re-lay. Joint material will be paid for at the contract unit price per meter (linear foot), complete in place.*

420        *The accepted quantities of curb ramps will be paid for at the contract unit price per square meter (square yard) for curb ramp, concrete, per the type, complete in place.*

*Hand rails will be paid for at the contract unit price per meter (linear foot).*

*Curb and curb and gutter will be paid for in accordance with 605.10.*

*Reinforcing bars, if used, will be paid for in accordance with 703.08. Curb, if directed to be replaced, will be paid for in accordance with 605.10.*

*Payment will be made under:*

430	<b><i>Pay Item</i></b>	<b><i>Metric Pay Unit Symbol (English Pay Unit Symbol)</i></b>
	<i>Bed Course Material .....</i>	<i>Mg (TON)</i>
	<i>Curb Ramp, Concrete, _____</i>	<i>m2 (SYS)</i>
	<i>type</i>	
	<i>Hand Rail, _____</i>	<i>m (LFT)</i>
	<i>type</i>	
	<i>HMA for Sidewalk .....</i>	<i>Mg (TON)</i>
	<i>Joint Material .....</i>	<i>m (LFT)</i>
	<i>Sidewalk, Concrete .....</i>	<i>m2 (SYS)</i>
440	<i>Sidewalk, Concrete, Reconstruct .....</i>	<i>m2 (SYS)</i>
	<i>Sidewalk, Concrete, Re-Lay.....</i>	<i>m2 (SYS)</i>
	<i>Steps, Concrete.....</i>	<i>m3 (CYS)</i>

*The cost of excavation, backfill, and necessary incidentals shall be included in the cost of the pay items in this section.*

*The removal and disposal of concrete sidewalk which is unsuitable for re-laying and which has not been damaged due to negligence will be paid for in accordance with 202.13. Concrete sidewalk which is specified to be re-laid or to remain in place and which is damaged shall be removed and disposed of and replaced with no additional payment.*

*If directed, concrete sidewalk shall be constructed to a depth greater than that shown on the plans. Such additional thickness will be converted into the equivalent square meters (square yards) quantity of concrete sidewalk of the thickness shown on the plans and will be paid for as such.*

*The cost of furnishing and applying sand to finished compacted surfaces shall be included in the cost of HMA for sidewalk.*

*The cost of the concrete base, detectable warning element, thin set mortar, fine aggregate for filling joints, and the painting of the curb through the width of the curb ramp including the silica sand shall be included in the cost of the curb ramp.*

*The cost of aluminum impregnated caulking compound and the painting of steel hand railing shall be included in the cost of the handrail.*

SECTION 605, BEGIN LINE 12, DELETE AND INSERT AS FOLLOWS:

Coarse Aggregate, Class D or Higher, size Size No. 53 ...	904.02
Concrete .....	<del>702</del> 502
Joint Materials .....	906
Joint Mortar .....	906.03
Precast Concrete Curbing.....	913.05
Reinforcing Steel .....	910.01

~~Concrete used to construct curb or combination curb and gutter shall incorporate Class AP, size No. 8 for its coarse aggregate.~~

SECTION 605, BEGIN LINE 58, DELETE AND INSERT AS FOLLOWS:

**(c) Proportioning and Placing.** Concrete shall be proportioned, mixed, and placed in accordance with the requirements for the class of concrete specified 502. Where integral curb and gutter is specified, that portion of the curb below the upper surface elevation of the adjoining pavement shall be constructed by extending the pavement to the outer vertical plane of the curb at the time the pavement is placed. The concrete used in this extension shall be the same composition as that of the pavement.

~~The upper portion of the curb shall be of class A concrete in accordance with in 702.~~ After the concrete for the upper portion is placed in the forms, it shall be tamped and spaded or vibrated until mortar entirely covers the surface. The top shall be floated smooth and the outer upper corner rounded to a 6 mm (0.25 in.) radius.

The face and top of the curb, integral curb, *and* gutter, ~~and sidewalk~~ shall be checked with a 3 m (10 ft) straight edge. Portions showing irregularities of 6 mm (0.25 in.) or more shall be removed and replaced.

SECTION 605, BEGIN LINE 87, DELETE AND INSERT AS FOLLOWS:

**(e) Joints.** ~~Where the adjacent pavement contains joints, such joints shall be continued through integral curb. Pavement contraction joints shall be carried through integral curb with preformed joint material 6 mm (0.25 in.) thick, shall be in accordance with the cross section of the curb, and shall be set perpendicular to the face and top of the curb. Preformed expansion joints shall be placed at the beginning and end of all curb returns and also at castings~~ *Joints in integral curbs shall be located at joints in adjoining PCCP. The joints shall be saw cut or formed with 6 mm (0.25 in.) thick preformed joint material. Joint sealant is not required for joints in integral curbs.*

Curbing not constructed integral with adjacent pavement shall be constructed with intermediate joints located at 3 m (10 ft) intervals. These joints may be sawed or formed with metal separator plates, and the depth and width shall be in accordance with the plans. ~~Preformed expansion joints, 6 mm (0.25 in.) thick, shall be placed at the beginning and end of all curb returns and also at castings.~~

*Preformed expansion joints, 6 mm (0.25 in.) thick, shall be placed at the beginning and end of all curb returns and also at castings.*

SECTION 605, BEGIN LINE 111, DELETE AS FOLLOWS:

**(i) Integral Curb Walk.** ~~If integral curb walk is specified, it shall be constructed as shown on the plans using class A concrete in accordance with 702. Reinforcing steel shall be in accordance with 703.~~



SECTION 605, BEGIN LINE 131, DELETE AS FOLLOWS:

**605.06 ~~Cement~~ Concrete Center Curbing.** The subgrade shall be prepared the same as for the adjoining pavement. If subbase is provided for the adjoining pavement, it shall be carried through for the full width of the curb and at the same thickness as that for the pavement.

~~Class A concrete in accordance with 702 shall be used.~~

The temperature limitations of ~~501.10~~ *502.11* shall apply to placing the concrete. The surface shall be troweled smooth with a metal trowel. Curing shall be in accordance with ~~501.17~~ *504.04*.

Forms shall be removed within 24 h after the concrete has been placed. Plane surfaces and exposed sides of the curb shall be checked with a 3 m (10 ft) straightedge. Portions showing irregularities of 6 mm (0.25 in.) or more shall be removed and replaced in compliance with these specifications.

~~If adjacent to cement concrete pavement, 10 mm (3/8 in.) expansion joints shall be placed through the center curb opposite contraction joints in the pavement. If adjacent to asphalt pavement, 10 mm (3/8 in.) expansion joints shall be spaced at 12 m (40 ft) intervals. The material used shall be in accordance with 906. Intermediate joints, 8 mm (1/3 in.) in depth, shall be placed at 6 m (20 ft) intervals.~~

*Joints in center curbs adjacent to PCCP shall be aligned with joints in adjoining PCCP. Joints in center curbs adjacent to asphalt shall be spaced at 15.5 m (18 ft) maximum. The joints shall be saw cut or formed with 6 mm (0.25 in.) thick preformed joint material. Joint sealant is not required for joints in center curbs.*

Where an expansion joint is constructed in ~~cement concrete pavement~~ *PCCP* adjacent to concrete center curb, the expansion joint shall be carried through the center curb in accordance with applicable requirements of 501.14(c).

SECTION 605, BEGIN LINE 171, DELETE AND INSERT AS FOLLOWS:

**(c) Mixture.** ~~Unless otherwise specified, the HMA mixture shall be in accordance with 402 for HMA surface 9.5 mm, except that the percent passing the 75  $\mu$ m (No. 200) sieve shall be between 3.0% and 9.0%, the minimum percent crushed shall be 95%, and the binder content shall be 7.0%. Mixture adjustments in accordance with 904.02(a) will not apply. Aggregate requirements of 904.02(d) do not apply. Weather limitations shall be in accordance with 402.10. The mixture shall be HMA Surface Type A in accordance with 402 except no RAP shall be used, the binder content shall be 7.0%, and the gradations shall meet the following.~~

<i>HMA Curbing Gradations</i>	
<i>Sieve Size</i>	<i>Percent Passing Sieves</i>
<i>12.5 mm (1/2 in.)</i>	<i>100.0</i>
<i>9.5 mm (3/8 in.)</i>	<i>80.0 – 100.0</i>
<i>4.75 mm (No. 4)</i>	<i>73.0 ± 5.0</i>
<i>600 μm (No. 30)</i>	<i>20.0 – 50.0</i>
<i>75 μm (No. 200)</i>	<i>6.0 – 12.0</i>

*A MAF in accordance with 402.05 will not apply. Weather limitations shall be in accordance with 402.12. Acceptance of HMA mixtures will be in accordance with 402.09 except the gradation tolerances shall be ±2.5% on the 75 μm (No. 200) sieve, ±4.0% on the 4.75 mm (No. 4) sieve, and binder content tolerance shall be ±0.5% from DMF.*

SECTION 605, BEGIN LINE 227, DELETE AS FOLLOWS:

**605.09 Method of Measurement.** Curbing, both new and reset, and curb removal will be measured by the meter (linear foot) along the front face of the section at the finished grade elevation. Combined curb and gutter will be measured along the face of the curb. Curb turnout will be measured longitudinally by the meter (linear foot) as curb of the type specified, from the ends of the radii which touch the front face of the longitudinal curb portion. Combined curb and gutter turnout will be measured longitudinally by the meter (linear foot) as curb and gutter of the type specified, from the ends of the radii which touch the front face of the longitudinal curb portion. No deduction in length will be made for drainage structures installed in the curbing such as catch basins or drop inlets. Concrete center curb will be measured by the meter (linear foot), unless it is of variable width, in which case measurement will be by the square meter (square yard). ~~Integral curb walk will not be measured for payment. The quantity to be paid for will be that shown on the plans. Reinforcing steel for integral curb walk will be measured in accordance with 501.25.~~

SECTION 605, BEGIN LINE 239, DELETE AND INSERT AS FOLLOWS:

the plans. Reinforcing steel for integral curb walk will be measured in accordance with ~~501.25~~ 610.06.

SECTION 605, BEGIN LINE 250, DELETE AS FOLLOWS:

~~Integral curb walk will be paid for at the contract unit price per cubic meter (cubic yard) for concrete, A, structures for the quantity shown on the plans.~~

~~Reinforcing steel for integral curb walk will be paid for in accordance with 501.26. The portion of expansion joint contained in the center curb will be paid for in accordance with 501.26.~~

SECTION 606, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

**SECTION 606 – ~~Blank~~ SHOULDER CORRUGATIONS**

**606.01 Description.** *This work shall consist of placing corrugations in paved shoulders in accordance with 105.03. Corrugations shall not be constructed within the limits of reinforced concrete bridge approaches or on bridge decks.*

*The operation shall be coordinated such that milled materials do not encroach on pavement lanes carrying traffic and all milled materials are disposed of in accordance with 104.07.*

10

*The corrugations shall be constructed by cutting smooth strips in existing or newly constructed shoulders. The operation shall be conducted by means of a cutting machine that provides a series of smooth cuts without tearing or snagging. The equipment shall include guides to maintain uniformity and consistency in the alignment of the strips.*

20

**606.02 Method of Measurement.** *HMA and PCCP shoulder corrugations will be measured by the meter (linear foot), measured parallel to the center line of the roadway. Gaps in PCCP shoulder corrugations at the D-1 joints will be included as milled PCCP corrugations.*

**606.03 Basis of Payment.** *HMA and PCCP shoulder corrugations will be paid for at the contract unit price per meter (linear foot), when specified.*

*Payment will be made under:*

30

<b><i>Pay Item</i></b>	<b><i>Pay Unit</i></b>
<i>Milled HMA Shoulder Corrugations .....</i>	<i>m (LFT)</i>
<i>Milled PCCP Shoulder Corrugations .....</i>	<i>m (LFT)</i>

SECTION 608, BEGIN LINE 11, DELETE AND INSERT AS FOLLOWS:

Coarse Aggregates, Class ~~A, B, C, or~~ D or Higher,  
Size No. 8 .....904.02

SECTION 609, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

**SECTION 609 – ~~Blank~~ REINFORCED CONCRETE BRIDGE APPROACHES**

**609.01 Description.** *This work shall consist of constructing reinforced concrete bridge approaches, RCBA, on a prepared subgrade and subbase in accordance with 105.03.*

## **MATERIALS**

**609.02 Materials.** *Materials shall be in accordance with the following:*

<i>Coarse Aggregate, Class D or Higher, Size No. 53 .....</i>	<i>904</i>
<i>Concrete, Class C * .....</i>	<i>702</i>
<i>Curing Materials .....</i>	<i>912.01</i>
<i>Joint Materials .....</i>	<i>906.02(a)1</i>
<i>Reinforcing Bars, Epoxy Coated .....</i>	<i>910.01</i>
<i>Support Devices .....</i>	<i>910.01(b)9</i>

*\* Coarse Aggregate shall be Class AP, Size No. 8*

## **CONSTRUCTION REQUIREMENTS**

**609.03 General Requirements.** *Subgrade shall be prepared in accordance with 207. Subbase shall be prepared in accordance with 302.*

**609.04 Forms.** *Forms shall be either steel or wood and shall be in accordance with 508.04(c)1 or 508.04(c)2.*

**609.05 Joints.** *Longitudinal construction joints will only be permitted as shown on the plans. The Type I-A joint will be constructed as shown on the plans.*

**609.06 Reinforcing Bars.** *Furnishing and placement of reinforcing bars shall be in accordance with 703.*

**609.07 Thickness.** *The depth of the RCBA will be checked by the Engineer prior to pouring, by making stringline measurements every 1 meter (3 feet) across the width of the approach. Any location deficient in depth by 13 mm (1/2 in.) or more shall be corrected prior to placing the concrete.*

**609.08 Concrete Placement.** *The subbase shall be uniformly moist at the time of concrete placement. Delivery and placement of concrete shall be in accordance with 702.*

**609.09 Finishing.** *The RCBA shall be finished with equipment in accordance with 508.04(c)3 and 508.04(c)4. The operations shall be controlled so that an excess of mortar and water is not worked to the top. Long handled floats may be used to smooth and fill in open textured areas. The edges of formed RCBA shall be tooled or chamfered.*

*The finished RCBA surface shall be textured with a double thickness burlap drag or a minimum 1.2 m (4 ft) wide turf drag. Immediately after the finishing operation is complete and before the surface film has formed, the surface of the RCBA shall be textured by transverse grooving in accordance with 504.03. The grooves may be formed by mechanized equipment using a vibrating beam roller, a series of discs or other approved device. Manual tools such as fluted floats, spring steel tined rakes, or finned floats with a single row of fins may be used. The grooves shall be relatively uniform and smooth and shall be formed without tearing the surface or bringing coarse aggregate to the top.*

*All areas of hardened RCBA which do not conform to the requirements due to either a deficiency in the grooving or a rough open textured surface shall be corrected. Corrections shall be made by cutting transverse grooves in the hardened surface with an approved cutting machine and retexturing to a satisfactory finish as directed.*

**609.10 Curing.** *RCBA shall be wet cured in accordance with 702 or shall have liquid membrane forming curing compound applied to exposed surfaces within 30 min after the finishing operations have been completed. The edges of the RCBA shall be cured immediately upon removal of the forms. The edge shall be covered with curing materials equal to the material used on the surface or banked with soil 300 mm (12 in.) wide or greater.*

*When conditions arise which prevent timely application of curing materials the surfaces shall be kept wet with a fine spray of water. The fine spray of water shall continue until application of curing materials is resumed.*

*Liquid membrane forming curing compound shall be applied in a continuous uniform film at a rate not less than 1 L/3.7 m<sup>2</sup> (1 gal./150 ft<sup>2</sup>). Additional applications, if needed, shall follow the previous application within 30 min. The curing compound may be warmed in a water bath during cold weather at a temperature not exceeding 38°C (100°F). Thinning with solvents will not be permitted. Non-uniform film rates will result in the discontinuance of that application method.*

*A new coat of curing compound shall be applied to areas damaged by rain or other means during the curing period. The recoating shall be applied as soon as possible and at a rate equal to that specified for the original coat.*

**609.11 Smoothness.** *The smoothness of the surface of the RCBA will be measured by means of a 3 m (10 ft) long straightedge as soon as practical following curing or completion of adjoining roadway or structure sections. All surface variations shall be corrected to 3 mm (1/8 in.) or less.*

*Smoothness variations outside specified tolerances shall be corrected in accordance with 502.20.*

**609.12 Opening to Traffic.** *RCBA may be opened to traffic after 14 days. The RCBA may be opened earlier if test beams indicate a modulus of rupture of 3800 kPa (550 psi) or greater.*

*The Contractor and Engineer will conduct an inspection of the new RCBA for any damage. The inspection and all necessary repairs shall be completed prior to opening to traffic.*

**609.13 Method of Measurement.** *Reinforced concrete bridge approaches will be measured by the square meter (square yard). Dense graded subbase will be measured in accordance with 302.08. Reinforcing bars will be measured in accordance with 703.07.*

*Subgrade preparation will not be measured for payment. Finishing and curing of the RCBA will not be measured for payment. Construction joints will not be measured.*

**609.14 Basis of Payment.** Reinforced concrete bridge approaches will be paid for at the contract unit price per square meter (square yard). Dense graded subbase will be paid for in accordance with 302.09. Reinforcing bars will be paid for in accordance with 703.08.

*Payment will be made under:*

<b><i>Pay Item</i></b>	<b><i>Metric Pay Unit Symbol (English Pay Unit Symbol)</i></b>
<i>Reinforced Concrete Bridge Approach, _____ mm (in.) ..... m2 (SYS)</i> <i>thickness</i>	

*The cost of all materials, water, equipment, and all labor for the compaction of the subgrade, shall be included in the cost of the RCBA.*

*The cost of finishing, furnishing and placing curing materials shall be included in the cost of the RCBA.*

*The cost of corrections for smoothness or re-texturing shall be included in the cost of the RCBA.*

*The cost of all labor and materials for the placement of construction joints shall be included in the cost of the RCBA.*

SECTION 610, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

#### **SECTION 610 -- ~~SURFACES FOR APPROACHES AND CROSSOVERS~~**

**610.01 Description.** This work shall consist of constructing ~~cement concrete bridge approaches and surfacing~~ or resurfacing ~~the area~~ from the edge of the main line surface pavement to the right-of-way line at public road intersections; turn lanes, passing lanes, acceleration lanes, deceleration lanes, or recovery lanes ~~between the edge of the main line surface and the right-of-way line, of which~~ *where* the total longitudinal dimension is less than 30 m (100 ft), excluding tapers; ~~over the area of rural mail box approaches; from the edge of the mainline surface to a width of 1 m (36 in.) on private and commercial driveways; over the area of public road and private and commercial driveway crossovers; and other locations as specified~~ *all* in accordance with 105.03.

#### **MATERIALS**

**610.02 Materials.** Materials shall be in accordance with ~~402, 500, or 700, whichever is applicable. HMA for approaches may be that specified for mainline or HMA base, intermediate, or surface. Mixture adjustments in accordance with 904.02(a) will not apply to approaches.~~ *the following:*

<i>Aggregate Base</i> .....	301.02
<i>Subbase</i> .....	302.02
<i>HMA</i> .....	402.02
<i>PCCP</i> .....	502.02

## CONSTRUCTION REQUIREMENTS

**610.03 General Requirements.** ~~Except as otherwise herein provided, subgrade~~ *Subgrade* for approaches shall be prepared in accordance with 207.04. ~~Aggregate base shall be constructed in accordance with 301. HMA for approaches shall be constructed in accordance with 402. HMA mixture for approaches shall be HMA surface or intermediate, type A, B, or C in accordance with 402.04. A MAF in accordance with 402.04 will not apply.~~

*Dense graded subbase shall be constructed in accordance with 302. PCCP for approaches shall be constructed in accordance with 502.*

~~For open graded base mixtures, a cover aggregate, or choke, will be required for which the gradation of shall be 100% passing the 12.5 mm (1/2 in.) sieve and 0% to 10% passing the 75  $\mu$ m (No. 200) sieve.~~

~~Forms, unless otherwise provided, shall be used for laying paving mixtures. They may be of wood or metal and shall be of sufficient strength to resist springing and firmly held true to line and grade during depositing and compacting the material. They shall be cleaned and oiled each time before material is placed against them.~~

~~When placing HMA mixtures, a mechanical paver will not be required unless specified. Approved hand methods may be used.~~

~~The course or courses shall be compacted with either a three wheel roller or a tandem roller in accordance with 408.03(d). Areas inaccessible to the roller equipment shall be thoroughly compacted with mechanical tamps, vibrators, or other approved compacting methods.~~

~~If approved, plain cement concrete pavement may be substituted where the mixture for approaches as described in 610.02 has been specified. The approach shall be constructed in accordance with applicable provisions of 610.05 except joints will not be required unless designated. For such substitution, measurement shall be in accordance with 610.06 and payment made at the contract unit price for HMA mixture for approaches.~~

**610.04 Existing Approaches and Crossovers.** If an existing asphalt surface is to be left in place as an approach pavement or crossover, ~~and if directed, such~~ *the* surface shall be patched in accordance with ~~305.05 304.04 or 305.04, or as directed.~~

~~Other corrections to existing approaches shall include all necessary excavation and shaping or leveling of material in place, the application of asphalt material for prime or tack coats, and the placing of HMA mixtures.~~

**610.05 Cement Concrete Bridge Approach Pavement.** ~~Cement concrete bridge approach pavement shall be either reinforced or plain as specified, and constructed as pavement on approaches to bridges when such approaches are a part of the bridge contract. It may be constructed by either machine or hand methods. Regardless of the method of construction, the pavement will be cored as miscellaneous pavement. The pavement thickness and location of reinforcing steel will be measured. All variations will be administered in accordance with 501.24.~~

**(a) Machine Method.** ~~The pavement may be constructed in accordance with 501, including composition of concrete, except construction of the pavement in traffic lane widths will be permitted provided an approved, power driven, tandem screed, finishing machine is used. Forms and joints shall be in accordance with the requirements set out for hand methods.~~

**(b) Hand Method.** ~~The concrete shall be class A in accordance with 702. If mixed at the site, it may be transported from the mixer to the subgrade by any satisfactory means. The pavement shall be poured in a minimum width of one traffic lane, and a maximum width of 7.3 m (24 ft). Screeds shall be, as a minimum, the full width of the pour. Forms shall be of metal with no less than a base width of 150 mm (6 in.). The forms shall be drilled or slotted to provide for placement of dowel bars. The longitudinal keyway construction joint shall be in accordance with 501.14(b). A drag template or strike off shall be used to ensure accurate placing of the mesh. Finishing shall be in accordance with applicable provisions of 501.15 except the use of the vibrator on the strike-off template shall be provided during the first pass and as directed on subsequent passes.~~

~~Mixing and placing capacity and amount of forms required shall be no less than shown in the following table:~~

Total pavement at structure m <sup>2</sup> (sq yd)	Minimum mixing and placing capacity, m <sup>3</sup> /h (lft/hr) 3.6 m (12 ft) width	*Minimum length of usable forms, m (LFT)
0.84-2090 (1-2,500)	7(25)	120 (400)
2091-4180 (2,501-5,000)	11.0 (37.5)	180 (600)
4181-6270 (5,001-7,500)	15.0 (50)	240 (800)
6271-8360 (7,501-10,000)	19.0 (62.5)	300 (1,000)
8361-upward (10,001-upward)	22.9 (75)	370 (1,200)

~~\* May be reduced to 2 times the length of maximum continuous length of pavement to be poured if less than amount shown in table.~~







Permanent Traffic Markings.....	808
Traffic Control Devices.....	801
Treated Wood Posts .....	911.02(e)

## CONSTRUCTION REQUIREMENTS

~~611.03 General Requirements.~~ Except as otherwise provided, all applicable provisions of the section under which the mixture being used for paving the specified area is made shall apply. Subgrade shall be prepared in accordance with 207.04. The course or courses shall be compacted with either a three wheel or a tandem roller in accordance with 408.03(d).

~~611.04 Temporary Crossovers.~~ Temporary crossovers shall be either type A or type B as shown on the plans and as specified herein.

~~The pavement structure for the temporary crossover shall be as shown on the plans.~~

~~Traffic control devices, including temporary pavement markings, shall be as shown on the plans. Separation of opposing vehicular traffic between two crossovers shall be as shown on the plans.~~

~~Refurbishing of a temporary crossover shall consist of the removal of drums or earth cover from an existing temporary crossover. The temporary crossover shall be patched and resurfaced as directed. Excavated soil resulting from the refurbishing operation, if not used as a part of the contract work, shall become the property of the Contractor. Removed drums will remain the property of the Department.~~

~~After construction is complete, and prior to the opening of all lanes to traffic, the temporary crossover shall be removed or closed.~~

~~Where guardrail is required to be removed for construction or refurbishing of crossovers, such removal and subsequent re-erection shall be done as shown on the plans or as directed.~~

**611.05 611.03 Mailbox Assembly.** Existing mailboxes and assemblies shall be carefully removed without damage from the highway right-of-way. Mailboxes, which must remain in service between removal and erection of the new assembly, shall be securely mounted to an empty 240 220 L (55 gal.) metal drum. The temporary assembly shall be located where it is accessible for mail delivery but placed as far as possible from the traveled roadway. The apparent owner of the existing mailbox shall be contacted and allowed to take possession of the existing mailbox and assembly. If the owner refuses to take possession, the existing mailbox and assemblies shall be removed.

Mailbox assemblies shall be furnished and installed as shown on the plans. Alternate mailbox assemblies which have been crash tested and approved in accordance with FHWA NCHRP 350 requirements may be considered upon receipt of a written request. Alternate mailbox assemblies approved for use shall be furnished and installed in conformance with the manufacturer's recommendations.

Mailboxes complying with the requirements of the United States Postal Service, including markings and sizes, shall be furnished and installed with the mailbox assembly. The mailbox shall be of comparable size to the existing mailbox previously removed from the highway right-of-way. The markings shall include "approved by U.S. Postmaster" stamped on the mailbox by the manufacturer and the address number, box number, or house number, in 50 mm (2 in.) or larger reflective material placed on the side of the mailbox in view of motorists in the nearest travel lane.

~~611.06~~ **611.04 Method of Measurement.** ~~Cement concrete pavement will be measured by the square meter (square yard), including all curb which is not a pay item. Compacted aggregate will be measured by the megagram (ton). Preformed joint material, if specified as a pay item, will be measured by the meter (linear foot). Mailbox assemblies will be measured by the number of units installed. Temporary crossovers type A and type B will be measured per each crossover. The refurbishing of temporary crossovers will be measured per each type of crossover refurbished. Drainage pipe will be measured in accordance with 715.11. Seeding and sodding will be measured in accordance with 621.12. Flashing arrow signs, type III-B barricades, road closure sign assemblies, temporary pavement markings and temporary raised pavement markers, if specified, will be measured in accordance with 801.17. Permanent pavement markings and snowplowable raised pavement markers will be measured in accordance with 808.11. Removal of existing conflicting pavement markings, messages, and raised pavement markers will be measured in accordance with 808.11. Resurfacing will be measured in accordance with 610.06. Patching will be measured in accordance with 620.07. HMA mixtures will be measured by the megagram (ton) in accordance with 109.01(b).~~

~~611.07~~ **611.05 Basis of Payment.** ~~The accepted quantities of cement concrete pavement will be paid for at the contract unit price per square meter (square yard) for the use specified. Compacted aggregate will be paid for at the contract unit price per megagram (ton) for the type specified. HMA mixture will be paid for at the contract unit price per megagram (ton) for the specified type of material. Preformed joint material, when specified as a pay item, will be paid for at the contract unit price per meter (linear foot), complete in place. The accepted quantities of temporary crossovers will be paid for at the contract unit price per each for the type specified. The accepted quantity of refurbishing existing temporary crossovers will be paid for at the contract unit price per each for the type specified. HMA mixtures required for temporary crossovers will be paid for as HMA for approaches, complete in place in accordance with 610.07.~~

~~The accepted quantities for pavement placed for mailbox approaches will be included with quantities required to construct the shoulder section, when the shoulder is paved. If the shoulder is unpaved, the pavement placed for mailbox approaches will be paid for as HMA mixture for approaches and compacted aggregate base. Mailbox assemblies will be paid for at the contract unit price for each, complete in place.~~

~~Flashing arrow signs required for use with temporary crossovers will be paid for in accordance with 801.18.~~

~~Traffic control devices which are specified as pay items will be paid for in accordance with 801.18.~~

~~Temporary pavement markings and temporary raised pavement markers, if specified, will be paid for in accordance with 801.18. Removing existing conflicting pavement markings and raised pavement markers, the placement of permanent pavement markings, and snowplowable raised pavement markers will be paid for in accordance with 808.12.~~

~~Resetting of guardrail, if required, will be paid for accordance with 601.13. Drainage pipe, when required, will be paid for in accordance with 715.12. Seeding and sodding will be paid for in accordance with 621.13.~~

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
Cement Concrete Pavement for _____	m2 (SYS)
Compacted Aggregate, _____ type	Mg (TON)
HMA for _____ mixture	Mg (TON)
Mailbox Assembly, Double .....	EACH
Mailbox Assembly, Single .....	EACH
Preformed Joint Material .....	m (LFT)
Temporary Crossover, _____ type	EACH
Temporary Crossover, _____, Refurbish type	EACH

The cost of wood or pipe posts, support hardware, mailbox, and removal of existing mailbox and its assembly shall be included in the cost of the mailbox assembly.

~~The costs of installation, maintenance, and removal or closure of the temporary crossover, including excavation, compaction, subgrade preparation, and reshaping damaged median area shall be included in the cost of temporary crossover.~~

~~The costs of removal of earth cover, removal of drums, reshaping damaged median areas, and closure or removal of temporary crossover shall be included in the cost of temporary crossover, refurbish.~~

~~The costs of excavation, compaction, subgrade preparation, preformed joint material when not specified as a pay item, and all necessary incidentals shall be included in the costs of other pay items.~~

SECTION 614, BEGIN LINE 3, DELETE AND INSERT AS FOLLOWS:

**614.01 Description.** This work shall consist of the construction or reconstruction of ~~portland cement concrete~~ *PCC* headers adjacent to railroad tracks, bridges, and similar locations in accordance with ~~these specifications and in reasonably close conformance with the lines, grades, and details shown on the plans or as directed~~ *105.03*.

## MATERIALS

**614.02 Materials.** Materials shall be in accordance with the following:

Concrete .....	<del>501</del> 702
Reinforcing Steel .....	<del>910</del> 910.01

SECTION 614, BEGIN LINE 20, DELETE AND INSERT AS FOLLOWS:

If the header is adjacent to asphalt pavement, the concrete ~~may~~ *shall* be proportioned in accordance with ~~501.03~~, or it may be class A in accordance with 702 using class AP coarse aggregate.

## CONSTRUCTION REQUIREMENTS

**614.03 ~~Cement Concrete~~ *PCC* Header.** Construction shall be in accordance with the applicable provisions of ~~501~~ 702 and with these requirements.

SECTION 614, DELETE LINES 30 THROUGH 37.

SECTION 615, BEGIN LINE 3, DELETE AND INSERT AS FOLLOWS:

**615.01 Description.** This work shall consist of furnishing and setting, setting only, or resetting right-of-way markers, monuments for marking section or other lines, bench-mark posts and tablets, and parking barriers in accordance with ~~these specifications and in reasonably close conformance with details shown on the plans or as directed~~ *105.03*.

SECTION 615, BEGIN LINE 12, DELETE AND INSERT AS FOLLOWS:

Coarse Aggregate, Class A <i>or Higher</i> , Size No. <del>5</del> , <del>No.</del> 8	
or No. 91 .....	<del>904</del> 02
Fine Aggregate, Size No. 23.....	<del>904</del> 04

SECTION 615, BEGIN LINE 52, DELETE AND INSERT AS FOLLOWS:

The pin shall be set perpendicular to and flush with the top of the monument while the concrete is plastic and left undisturbed until the concrete has set. The pin shall be copper and shall be 25 mm (1 in.) in diameter and ~~130~~ 125 mm (5 in.) long. If for type

SECTION 616, BEGIN LINE 9, DELETE AND INSERT AS FOLLOWS:

**616.02 Materials.** Materials shall be in accordance with the following:

Asphalt Joint Filler.....	906.01
Clay.....	903.01
Concrete, Class A.....	702
<i>Fine Aggregate, Size No. 23.....</i>	<i>904</i>
Geotextile.....	913.18
<i>Portland Cement.....</i>	<i>901.01(b)</i>
<i>Precast Concrete Riprap.....</i>	<i>905.04</i>
Riprap .....	904.04
<i>Water.....</i>	<i>913.01</i>
Welded Steel Wire Fabric .....	910.01(b)5

Welded wire fabric shall be 150 mm by 150 mm (6 in. by 6 in.) mesh, W-3 x W-3 wires, with a mass (weight) per square area of 205 kg/100 m<sup>2</sup> (42 lb/100 ft<sup>2</sup>).

### CONSTRUCTION REQUIREMENTS

**616.03 Placing Dumped Riprap.** Dumped riprap shall be placed to produce a surface of approximate regularity but need not necessarily be hand placed. The finished surface shall vary no more than ~~230~~ 225 mm (9 in.) from a true plane. The thickness perpendicular to its surface shall be no more than 0.6 m (2 ft) nor less than 0.3 m (1 ft) unless otherwise directed.

*616.04 Placing Grouted Riprap. The aggregate, preparation of the slope, and the depth of riprap aggregate for grouted riprap shall be in accordance with 616.05. After the aggregate has been placed and accepted, all openings shall be filled with cement grout. The finished surface shall be approximately smooth, solid, and true to line, grade, and section.*

*Grout shall be composed of one part portland cement and four parts fine aggregate. The portland cement and fine aggregate shall be dry-mixed to a uniform mixture. Water shall be added as the mixing continues until the grout attains a consistency that will allow it to flow into the openings.*

**616.04 616.05 Placing Revetment, Class 1, and Class 2 Riprap.** Revetment, class 1 and class 2 riprap may be placed by dumping and shall be placed to the required thickness. The finished surface shall be free from clusters of small stones or of large ones. The finished surface shall vary from a true plane no more than ~~230~~ 225 mm (9 in.) for revetment riprap or 450 mm (18 in.) for class 1 or class 2 riprap but shall not be less than the minimum depth specified.

**616.05 616.06 Placing Uniform Riprap.** Uniform riprap shall be placed to produce a surface of approximate regularity with edges having projections no more than ~~100~~ 75 mm (4 3 in.) above the required cross section. The material shall be hand laid or placed by other approved means.

**616.06 Blank.**

**616.07 Placing Grouted Riprap.** *Blank* ~~The aggregate, preparation of the slope, and the depth of riprap aggregate for grouted riprap shall be in accordance with 616.04. After the aggregate has been placed and accepted, all openings shall be filled with cement grout. The finished surface shall be approximately smooth, solid, and true to line, grade, and section.~~

SECTION 616, BEGIN LINE 159, DELETE AND INSERT AS FOLLOWS:

If slag is used as dumped riprap and payment will be made per megagram (ton), the pay quantity will be adjusted in accordance with ~~904.02(a)~~ *904.01*.

SECTION 619, BEGIN LINE 34, DELETE AND INSERT AS FOLLOWS:

The painting Contractor shall be certified SSPC-QP 1 for cleaning and painting bridge steel which does not have lead coatings and *certified* SSPC-QP 2 for cleaning and painting bridge steel which does have lead based coatings. Evidence of the certifications shall be provided in the QCP. A QCP manager and QC technicians shall also be identified in the QCP.

SECTION 619, BEGIN LINE 116, DELETE AND INSERT AS FOLLOWS:

Construction signs in accordance with ~~801.03~~ *801.04* shall be furnished and placement at each project site shall be shown in the QCP. However, a "Bridge Painting Ahead" sign

SECTION 621, BEGIN LINE 4, DELETE AND INSERT AS FOLLOWS:

seeding or placing approved sod. It includes furnishing and placing seed, fertilizer, inoculants, top soil, and mulch, if required, in a prepared seed bed or furnishing and placing sod at locations ~~shown on the plans, or as directed~~ *in accordance with 105.03*.

SECTION 621, AFTER LINE 13, INSERT AS FOLLOWS:

*Grass Seed, Temporary..... 914.02*

SECTION 621, LINE 15, DELETE AS FOLLOWS:

Mulch .....~~914.05(a), 914.05(c), 914.05(d), 914.05(e)~~

SECTION 621, BEGIN LINE 24, DELETE AND INSERT AS FOLLOWS:

**621.03 Preparation of Ground Before Seeding.** The area to be seeded shall be made smooth and uniform and shall be in accordance with the finished grade and cross section shown on the plans or as otherwise designated. ~~It and shall have been given final trimming~~ *be trimmed* in accordance with 210.

SECTION 621, AFTER LINE 38, INSERT AS FOLLOWS:

*For temporary seeding, the seed bed, if not loose, shall be scarified. The area to be temporary seeded need not be made smooth and uniform.*

SECTION 621, BEGIN LINE 207, DELETE AND INSERT AS FOLLOWS:

**621.06 Seed Mixtures.** Seed mixtures shall be classified as follows. Mixes including warm season grasses, forbs, or aquatic species will be specified in the plans.



**(a) Seed Mixture R.** ~~This is a general purpose seed mixture. It~~ *This seed mixture* shall be applied at the rate of 190 kg/ha (170 lb/acre). The mixture shall consist of 43 kg (95 lb) of low endophyte Kentucky 31 Fescue or approved equal, 30 kg (65 lb) perennial rye grass, and 4.5 kg (10 lb) Jasper Red Fescue or approved equal. Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05.

**(b) Seed Mixture U.** This seed mixture shall be applied ~~at specific locations.~~ ~~It shall be applied~~ at the rate of 165 kg/ha (150 lb/acre). The mixture shall consist of 43 kg (95 lb) of a 4-way blend of turf type tall fescues such as Tribute, Rebel II, Trailblazer, or approved equal; 9 kg (20 lb) Jasper Red Fescue or approved equal; and 16 kg (35 lb) certified fine bladed perennial ryegrass such as Regal, Fiesta, Blazer, or approved equal. Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05.

**(c) Seed Mixture P.** This seed mixture shall be ~~used on the shoulder, pavement, and median areas on grading contracts where paving is not included or on salt damaged and rutted shoulder areas. It shall be~~ applied at the rate of 90 kg/ha (80 lb/acre). The mixture shall consist of 14 kg (30 lb) of "Fults" Puccinella Distans, 14 kg (30 lb) of Jasper Red Fescue, or approved equal, and 9 kg (20 lb) of perennial ryegrass. Fertilizer shall be applied at the rate of 450 kg/ha (400 lb/acre). Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05.

**(d) Seed Mixture CV.** This seed mixture shall be used on all 3:1 or steeper slopes. ~~Also, it~~ *It* may be directed that this seeding be used on granular slopes or other slopes highly susceptible to erosion. It shall consist of adding 11 kg/ha (10 lb/acre) of ~~seed mixture CV~~ *crown vetch* to the seed mixture requirements set out above for the various classes. This seed mixture shall be placed on selective areas and slopes on the prepared seed bed with an approved hand type spreader just prior to placing the specified seed mixture. The amount of ~~inoculant~~ *inoculum* used shall be two times the manufacturer's recommendation.

SECTION 621, BEGIN LINE 253, DELETE AND INSERT AS FOLLOWS:

**(f) Seed Mixture T.** This seed mixture shall be used to establish a temporary cover for disturbed soil during the construction operations. ~~It shall be placed when directed.~~ Seed mixture T shall ~~also~~ be used for ~~late season~~ soil stabilization and temporary ground cover. Temporary cover mixes shall ~~not~~ be *placed as directed and be* subject to seasonal limitations as defined ~~in herein 621.11.~~ This mixture is not intended to be used as a permanent seed mixture. *The mix shall be mulched in accordance with 621.05(c) when slopes exceed 3:1. From December 1 to March 14 and from June 16 to August 31, mulching alone shall be used to stabilize the soil.* This mixture shall not be used to satisfy the requirements of the warranty bond.

~~The method of planting shall be with a rangeland no till drill or approved equal. An alternate method of planting shall be by means of hydroseeding with mulch applied in a separate operation. The mix shall be mulched in accordance with 621.05(c)1 or 621.05(g). Fertilizer shall be applied at the rate of 224 kg/ha (200 lb/acre). Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05. The mixtures shall be applied at the following rates per hectare (acre).~~

1. **Conventional Spring Mix.** *Spring mix shall be used from March 15 through June 15. This mixture shall be applied at the rate of 90 165 kg/ha (80 150 lb/acre). The mix shall consist of oats 18 kg (40 lb) low endophyte Kentucky 31 Fescue or approved equal, and 18 kg (40 lb) perennial ryegrass.*

2. **Color Fall Mix.** *Fall mix shall be used from September 1 through November 30. The color mix may be added as a supplement to the standard turf mixes. This mixture shall be applied at the rate of 8 165 kg/ha (7 150 lb/acre). If specified, this mix shall be applied from March 15 through July 15. This mix of flowering plants may be used in high visibility areas to soften the visual impact of construction. This mix may be used in combination with the conventional mix as specified above or with other standard mixes. This mix shall consist of winter wheat 2 kg (4 lb) Scarlet Flax, 0.5 kg (1 lb) Corn Poppy and 1 kg (2 lb) Painted Daisy. As an exception to this recommended mix, other annuals may be specified at a rate not to exceed 9 kg/ha (8 lb/acre).*

SECTION 621, AFTER LINE 364, INSERT AS FOLLOWS:

**621.10.1 Seeding or Sodding Disturbed Areas Outside Construction Limits.** *Areas outside shown construction limits which are disturbed by the Contractor shall be repaired to their original condition or better. The areas shall be seeded with a seed mixture grass type 2 in accordance with 621.06(g)2 or seed mixture legume type 2 in accordance with 621.06(h)2 as directed. If the contract contains seed mixtures other than the two listed here, the Contractor may seed the disturbed area with the mixture contained in the contract provided the area is less than 0.5 ha (1 ac) in size. If the area disturbed is well-maintained and part of a residential or commercial lot, it shall be sodded unless the Engineer determines otherwise.*

SECTION 621, BEGIN LINE 400, DELETE AND INSERT AS FOLLOWS:

Payment for mobilization and demobilization for seeding will be made for the initial movement to the project site so that *permanent or temporary* the seeding or mulching work, as specified, is performed. *When one or more operations are completed within the same mobilization, payment will be made for one mobilization.* Payment will be for all work necessary to move personnel and equipment to and from the project site. Payment will also be made for additional mobilization, when directed.

SECTION 621, AFTER LINE 431, INSERT AS FOLLOWS:

*Repair of areas outside the construction limits which must be disturbed to construct the work required by the contract will be paid for in accordance with 201.07(e).*

SECTION 622, LINE 368, DELETE AND INSERT AS FOLLOWS:

The sign shall otherwise be in accordance with ~~621.05(h)~~ 621.06(h).