ALTERNATE PRESTRESSED PRECAST CONCRETE I-BEAM TO STANDARD AASHTO TYPE IV PRESTRESSED PRECAST CONCRETE I-BEAM

The Contractor will be permitted to substitute, with no change in payment, the Illinois 1372 mm (54 inch) prestressed precast concrete I-beam, hereinafter referred to as the Illinois 54 inch I-beam, for the standard AASHTO type IV prestressed precast concrete I-beam. This substitution will be permitted on a one for one basis. The number, spacing, and location of the alternate beams shall be as shown on the plans for the standard AASHTO type IV I-beam. Intermixing of the two beam types will not be permitted on the same structure. Modifications to the substructure design and plan details will not be permitted except for adjustments to the substructure elevations as described herein.

The alternate Illinois 54 inch I-beam shall be in accordance with 707. Dimension tolerances shall be as shown on the plans. The design of the alternate Illinois 54 inch I-beam shall be in accordance with Division I of the AASHTO Standard Specifications for Highway Bridges, and the Department's design criteria. The cross section dimensions, mild reinforcement, and standard grid system for the Illinois 54 inch I-beam shall be as shown on the plans.

If the Contractor elects to use this alternate, the work shall also be in accordance with the requirements shown below.

(a) DESIGN COMPUTATIONS AND SHOP DRAWINGS SUBMISSIONS. The Contractor shall submit one set of design computations and four sets of detailed shop drawings of the Illinois 54 inch I-beam for approval. The alternate beams shall not be fabricated until design computations and shop drawings are approved. The design and details of the end region reinforcement shall be as required to resist the bursting stresses. Shop drawings shall show revised plan dimensions for the location of the 25 mm (1 in.) diameter holes through the beams and the 19 mm (3/4 in.) diameter inserts in the interior face of the exterior beams at the diaphragm locations on skewed structures.

One set of design computations and four sets of detailed shop drawings of the elastomeric bearing pads shall be submitted for approval. The elastomeric bearing pads shall not be fabricated until the design computations and shop drawings are approved.

Design computations for the Illinois 54 inch I-beam and the elastomeric bearing pads, and the computations for the screed elevations, the adjusted bridge seat elevations, and related substructure elevations shall be prepared by an approved consulting engineering firm and checked by another approved consulting engineering firm prior to submission for approval. All computation sheets shall be signed, sealed, and dated by a professional engineer registered in the State. These signatures, seals, and dates shall be required for both the design and the checking of the design.

(b) PRESTRESSING STRANDS. The Illinois 54 inch I-beam may be fabricated using draped strands or debonded strands to reduce stresses in the end regions of the beam.

1. DRAPED STRANDS. At the ends of each beam, the top row of draped strands shall be placed 80 mm (3 in.) from the top of the beam.

The remaining rows of draped strands shall be spaced 100 mm (4 in.) apart when practical. This reduces the possibility of cracking at the ends of the beam by de-emphasizing the separate grouping of strands.

2. DEBONDED STRANDS. The guidelines to be used when debonding strands at the ends of the Illinois 54 inch I-beam shall be as follows:

Number of Strands in a Row	Maximum Number of Debonded Strands in a Row
8 or 10	4
4 or 6	2

Debonded strands will not be permitted in rows with fewer than four strands.

(c) CONCRETE COMPRESSIVE STRENGTH. The use of concrete compressive strengths of up to 345 MPa (5,000 psi) at initial prestress and up to 415 MPa (6,000 psi) at 28 days will be permitted for the Illinois 54 inch I-beam.

(d) RESIDUAL CAMBER. Theoretical residual beam cambers, which are beam cambers after the slab and diaphragm are in place, for the Illinois 54 inch I-beam shall be compared to the residual beam camber shown on the plans for the AASHTO type IV I-beam. If the difference between these residual cambers is greater than 13 mm (1/2 in.), then the bridge seat elevations and all substructure elevations below the bridge seats shall be adjusted. The Contractor shall submit such adjusted elevations for approval.

(e) SCREEDS. The Contractor shall submit screed elevations for the Illinois 54 inch I-beam.

(f) DAMAGE OF BEAMS. All beams shall be checked for tendency to buckle sideways before they are moved. All beams damaged during handling, storage, transporting, or erecting shall be replaced with no additional payment.