SMART HIGHWAY BRIDGE
OVER ELLET VALLEY

Smart Highway Bridge: Cast-in-place segmental reinforced concrete spans.
Two abutments and four piers, with five spans of: 86.5-144.0-144.0-144.0-86.5m
Pier heights: 24.52, 41.31, 38.51 and 25.94m, Virginia's tallest bridge.

Materials:
Concrete has a minimum compressive strength of 55MPa.
Total concrete quantity for the project is 10,590m³.
Reinforcing steel has a yield strength of 420Mpa.
Epoxy coated quantity is 739,329kg, uncoated quantity is 667,160kg.
Post-Tensioning steel has a ultimate strength of 1862Mpa.
Total quantity for the project is 353,370kg.

Construction Definitions:
Cantilever Construction: A method whereby the segments are sequentially constructed alternately on either side of the pier in a balanced cantilever to a point where a closure segment is cast-in-place.
Segment: refers to a modular section of the superstructure consisting of a certain cross-section shape.
Cast-in-place: refers to a method of concrete placement whereby the concrete is lifted up to the forms with a crane and bucket, in contrast to precast which is cast on the ground and lifted as a solid unit into position.
Form Travelers: refers to a self-launching structural system that is supported off the tip of the cantilever and used for supporting the formwork to cast the cantilever superstructure segment along with the weight of the segment in its final structural position.
Post-Tensioning the application of a compressive force to the concrete by stressing tendons or bars after the concrete has been cast and cured to a specified strength. The force in the stressed tendons or bars is transferred to the concrete by means of anchorages. Some compression forces are as high as 4000kN, almost one million pounds.
Tendon: a high strength steel member made up of a number of strands, strands are made up of a number of wires. Typical tendons for this bridge is made up of 19 strands, each strand has 7-15.24mm diameter wires. A tendon can also be a single solid steel bar or a group of bars.
Anchorage: an assembly of various hardware components that secure a tendon at its ends after it has been stressed and imparts the tendon force into the concrete.

Cantilever Tendons: a tendon or group of tendons that are required during the construction phase of the project to support the self-weight and construction loads imposed on the cantilever. These tendons are located and stressed in the top portion of the segment.

Continuity Tendons: a tendon or group of tendons that are required during the service phase of the project to support the self-weight, traffic and other design loads imposed on the bridge as a complete system. These tendons are located in the bottom of the segment and are stressed from inside the box.

Transverse Tendons: a smaller tendon that runs transverse (crosswise) located in the top deck. These tendons support loads on the overhang or wing of the segment.