



TensorTech TW3 bridge abutment and wing wall nearing completion. Lightweight scaffold is for safety working at height only.



## Walls & Slopes Nº 494

### M42 Junction 6 Improvements (BR12) Farm Access Bridge

📍 West Midlands, UK

CONSTRUCTED IN 2022

## Benefits

#### Reduced maintenance

as a direct result of adopting a fully integral bridge abutment design that avoids the need for deck expansion joints

**No departure from standard approval required from National Highways** as the TensorTech TW3 system has BBA/HAPAS Certification

#### Lower carbon solution

compared to reinforced concrete abutments. This aligns with National Highways carbon cutting objectives

### Fully integral load bearing bridge abutment eliminates expansion joints

A new farm access bridge was needed as part of the new link road project connecting the M42 to Birmingham airport. The bridge has a 33.5m single span with fully integral bankseats, supported directly on Tensor reinforced soil abutments. Integral bankseats carry both vertical and horizontal deck loading, transferring these loads onto the TensorTech® TW3™ abutments.

#### CLIENT'S CHALLENGE

The bridge design comprises a single span multi-girder steel/concrete composite deck, supported on fully integral bankseats, transferring vertical and lateral loads to the abutments. This solution requires no expansion joints, reducing future maintenance needs. A proven reinforced soil abutment system was required to carry the high vertical and horizontal bankseat loadings. The solution needed a certified 120-year design life with a precast concrete facing.

#### TENSAR SOLUTION

Skanska engaged Tensor following successful collaboration on similar schemes. Tensor proposed the BBA/HAPAS Certified TensorTech TW3 wall system for the load bearing abutments and wing walls. Tensor took responsibility for the design of the reinforced soil structures, working closely with Skanska's bridge design partner, Mott McDonald. TensorTech System components were then supplied by Tensor.



Load bearing abutment sitting directly onto the reinforced soil

## PROJECT BACKGROUND

A new link road was planned to join the M42 to Birmingham Airport, as part of the M42 Junction 6 improvement scheme. As part of the works, a new agricultural access road was required to cross the proposed link road. This comprises a single 33.5m span steel and concrete composite deck. A fully integral bankseat design was selected. Vertical and lateral loads are transferred into the abutments. This avoids the need for deck expansion joints, thereby reducing future maintenance costs and disruption. The choice was made to use reinforced soil abutments and wingwalls to support the bankseats. This decision was made by Skanska, primarily based on their lower carbon cost and speed of construction. The lower carbon footprint of this type of construction, when compared to RC retaining walls, aligned with Skanska’s mission and the carbon cutting targets of the client, National Highways.

Having collaborated with Tensor on similar integral bridge structures, Skanska appointed Tensor for design of the reinforced soil abutments and wing walls. Tensor worked closely with the contractors’ design consultant, Mott MacDonald, who had overall design responsibility for the bridge works.

Tensor proposed their BBA/HAPAS Certified TensorTech TW3 wall system with a precast concrete block facing, combined with Tensor uniaxial soil reinforcement geogrids.

Fully integral bridge design imparts both horizontal and vertical loading to the supporting embankments. Horizontal loads are generated from creep and shrinkage of the composite bridge deck plus expansion/contraction forces due to daily and seasonal temperature variation. Braking forces are minor and assumed to be transferred to the backfill behind the deck end wall.

### Bridge Details:

TensorTech System	Abutment Loading		Bridge bankseat type			Bridge function		Spans	Total deck length
	Non-load bearing	Load bearing	Simply supported	Semi-integral	Integral	Over Structure	Under structure		
TensorTech TW3		X			X	Single carriageway	2-lane dual carriageway	1	33.5m

### Client

National Highways

### Contractor

Skanska

### Contractor Design Consultant

Mott MacDonald

### Sub-Contractor for TensorTech TW3 Wall Construction

PC Construction

*“Constructability is the key thing for us. We need a wall system that is straightforward to build, well thought out, with quality components from a reliable source. The TensorTech TW3 system has all that, plus great support from the Tensor team”.*

*“Meeting deadlines and controlling costs are critical for any specialist contractor. We need to work with systems that allow us to control construction risks and deliver a quality structure on time for our customer. We have built a lot of retaining walls, our construction teams know what they are doing and like working with the TensorTech systems”.*

### Jack Cross

Contracts Manager  
PC Construction