

## Case study 1

### Queen Street Tunnel

Structural Soils undertook site investigation work within the 900-m-long tunnel at Queen Street Station, Glasgow, as part of the renewal of the tunnel slab track.

The work initially took place during a New Year 29-hour closure and included track bed and bedrock coring, installing a remote ground water monitoring network and core sampling of the tunnel wall and crown lining through to the bedrock behind. Working for 29 hours in a dark tunnel required detailed planning to ensure that adequate lighting, fume extraction, welfare facilities and communications were available.

The main phase of work was complemented by follow-up surveys and laboratory testing to aid the design of the track bed lowering and the installation of overhead line equipment on the tunnel roof.



Queen Street Tunnel

## Case study 2

### Filton Bank four tracking

This work has involved site investigation for the electrification of Bristol Patchway Station to Bristol Temple Meads line. The initial package of work had 40 exploratory locations involving dynamic sample boreholes with rotary follow on, hand-dug trial pitting, concrete coring and window sampling.

Additional work has included the structural investigation of concrete bridge abutments, the structural investigation of brickwork over bridges, geotechnical investigations of gabion basket retaining walls, geophysical investigations of stonework wing walls and more traditional site investigation techniques such as ballast sampling.

Structural Soils was subsequently awarded the investigation work relating to the four tracking of a section of the same railway. This work comprised geological mapping of bedrock subcrops to determine the correct methodology of track-bed installation, using lightweight deflectometers to determine the suitability of in situ deposits for the reuse of excavated materials, in situ testing for crane pad design, waste acceptance criteria testing, water quality sampling and reuse contamination surveys of proposed site compounds. Structural Soils has completed more than 500 exploratory holes on the project.

**RAIL SI+PLUS** has provided a series of ecological site appraisals, staff training, baseline noise surveys, protected species recognition training, European protected species translocation licence applications and permits, and bat emergence surveys.



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## STRUCTURAL SOILS RAIL RAIL SI RAIL SI+PLUS

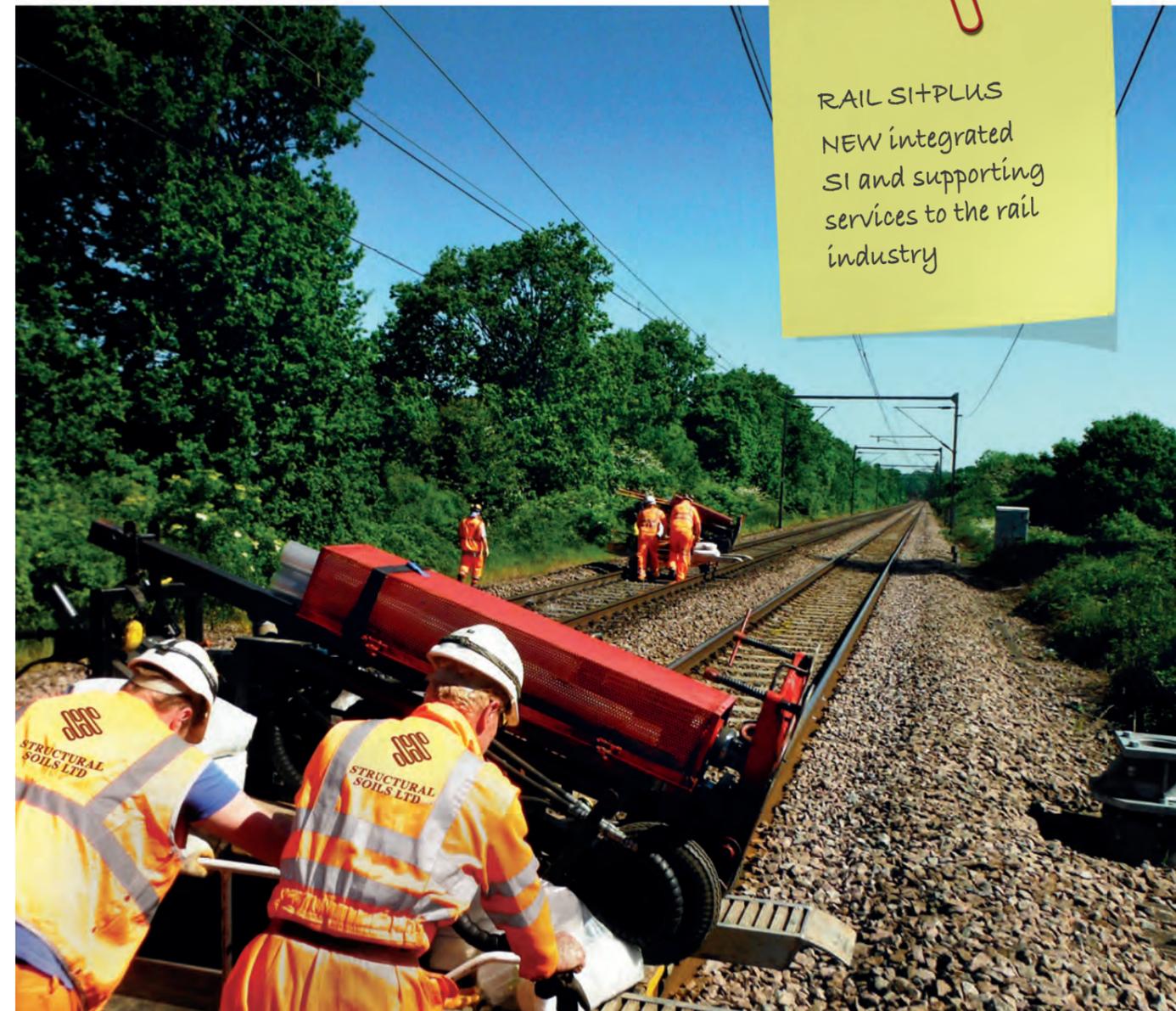
## CONTACT

### STRUCTURAL SOILS' RAIL TEAM:

Mike Addinall 0117 947 1000 – STRUCTURAL SOILS Rail, **South**  
Alex Jones 01977 552255 – STRUCTURAL SOILS Rail, **North**  
Jon Bassett 0141 418 0471 – STRUCTURAL SOILS Rail, **Scotland**

[rail@soils.co.uk](mailto:rail@soils.co.uk)

[www.soils.co.uk](http://www.soils.co.uk)



## RAIL SI

Structural Soils, an RSK company, provides a full site investigation service to the rail sector (Rail SI) using dedicated staff and equipment for this unique working environment. Highly experienced in the rail sector, we can offer innovative solutions to meet your requirements on projects of all scales.



### On-site services

#### Concrete coring

Coring and sampling of concrete materials in bridges, tunnels and other built structures:

- hand-held coring equipment for rapid deployment
- bolt-on coring rigs for deeper coring
- inclined and vertical coring in tunnel crowns

#### Window sampling (WS) and dynamic probing (DP)

Sampling and in situ testing of shallow soil:

- tracked lightweight rig: self-propelled on double-link trolleys or within a goods-carrying cage
- lightweight mast: detached mast on wheels, ideal for platforms
- handheld equipment: restricted-access locations

#### Rotary coring

Sampling and in situ testing of soil and rock

- tracked rigs: dynamic sampling and rotary coring from the same rig
- certified lifting point for road-rail vehicle (RRV) transport to borehole locations

#### Cone penetration (CPT) testing

In situ testing of soil with direct determination of geotechnical parameters:

- truck and crawler units: self-propelled
- detached basket units for use directly from an RRV boom for rapid deployment and slopes

### Post-investigation services

#### Monitoring

Programmed and ad-hoc monitoring of investigative water and gas installations, settlement and movement monitoring

#### Reporting

From providing factual site records and full factual reports to interpretive reporting, we can offer a full range of bespoke reports prepared by our engineers and consultants to meet your project requirements.

#### Auto ballast sampling (ABS)

Sampling of ballast and sub-ballast materials:

- hand-held equipment: 0-1-m depth
- lightweight hydraulic mast: 0-2-m depth

#### Cable percussive drilling

Sampling and in situ testing of soil and weak rock:

- traditional vehicle-towed rig with certified lifting points
- modular and electric-powered rigs for restricted access

#### In situ testing

- Tests such as plate bearing tests, California bearing ratio and nuclear density
- Installation of long-term monitoring points for water, gas, settlement and ground movement
- Light weight deflectometer testing

#### Difficult access

Experienced in accessing difficult areas such as steep slopes, tunnels, soft ground and remote locations

#### Laboratory testing

Our in-house laboratories spread throughout the UK are fully UKAS-accredited for a full range of geotechnical testing. Our geochemical laboratory provides UKAS- and MCERTS-accredited testing. The collection and couriering of samples directly from sites to our laboratories occur under a full chain-of-custody system.

## RAIL SI+PLUS

The Rail SI+PLUS service offers all Structural Soils' site investigation capabilities with the addition of wider site investigation services that clients traditionally have to source and coordinate from different suppliers. By offering a single point of contact, we can coordinate a wide range of services to support and progress wider investigations of the rail environment.

#### Geospatial surveys

Detailed surveys by personal track safety trained staff:

- topographical surveys
- 3D laser scanning: point cloud and 3D surveys
- detailed measured building surveys, including detailed elevations and sections
- high-accuracy control networks
- horizontal and vertical monitoring of structures and ground
- automated monitoring systems
- volumetric and earthworks, including machine guidance systems
- setting out engineers: mechanical, piping, civil and earthworks

#### Ecological surveys for all UK protected species and habitats and plants

Detailed surveys by personal track safety trained staff:

- route-wide ecological constraints surveys and walkovers, including extended phase 1 habitat surveys
- badger, bat, newt and otter surveys, including development licence application to Natural England/Scottish Natural Heritage and mitigation
- invasive species surveys, for example, Japanese knotweed, giant hogweed and Himalayan balsam
- tree and arboricultural surveys
- ecological and environmental clerk of works (ECOW) and watching brief services

#### Asbestos management

- UKAS-accredited management, refurbishment and demolition surveys
- UKAS-accredited sampling and analysis, air monitoring and four-stage clearance testing
- UKATA-approved and bespoke training courses
- Management of removal and remedial work
- Asbestos in soil

### Accreditations



AUDITED

★★★★★

#### RISQS B2 categories qualified by audit product codes

Product codes	Product names
04.18.01 SER	Intrusive
12.12.01 SER	Underbridges
12.12.02 SER	Overbridges
12.12.04 SER	Bridges, culverts and retaining walls
12.12.05 SER	Tunnels
12.12.07 SER	Earthworks



### Staff qualifications

Personal track safety (PTS)  
Hand trolley operator  
Industry Common Induction (ICI)  
OLEC 1

### Resources

Personal track safety trained qualified engineers, drilling crews, ecologists, site technicians and labourers

In-house Sentinel coordinator

In-house drilling rigs, including ABS, WS, DP, CP and rotary

Provision of technical information and data sheets, risk-assessment method statements and documentation to principal contractor level