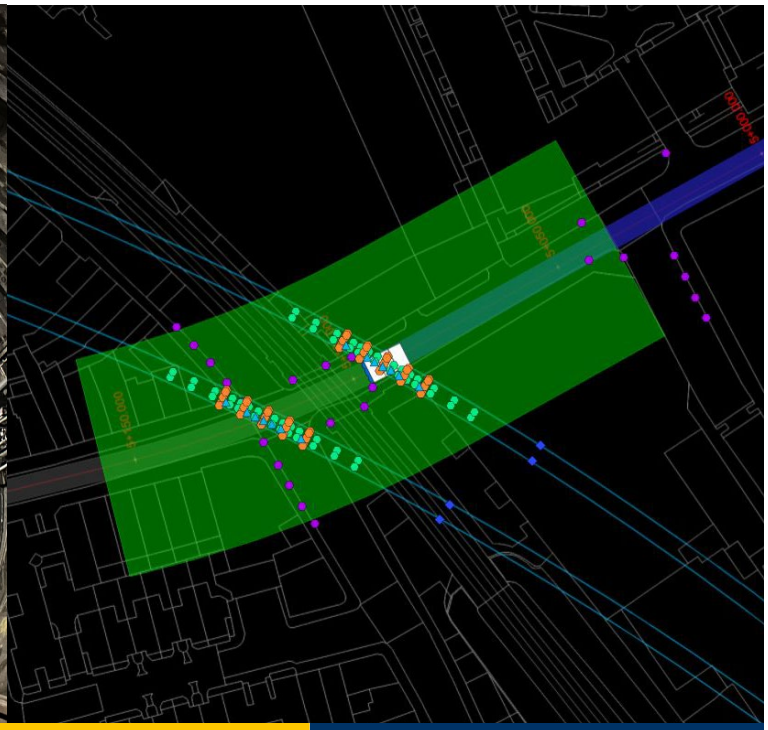
LONDON POWER TUNNELS 2, NATIONAL GRID

MANUAL SURVEYING & AUTOMATED REMOTE MONITORING



Key achievements

- **Real time TBM location tracking and monitoring data integrated into GEO-Instruments' web-based visualisation QuickView**
- **2+ years of daily manual monitoring of multiple concurrent tunnel drives**

The Project

LPT2 is a network of new cable tunnels being constructed across South London between Wimbledon and Crayford. Four Tunnel Boring Machines (TBMs) completing five separate tunnel drives over a distance of 32.5km. It is the second phase of a National Grid project to improve London's power infrastructure.

The Challenge

At its peak LPT2 had four TBMs running concurrently. Daily surveys of roads and structures were required for the areas around each TBM.
In total there were more than 20 separate 3rd party interfaces that required detailed monitoring. Asset holders included London Underground, DLR, UKPN and Network Rail.

The Solution

GEO-Instruments delivered a monitoring scheme combining manual and automated solutions consisting of over 3500 precise levelling points, more than 600 3D survey targets and hundreds of automated wireless sensors including tiltmeters, tilt-distometers and ShapeArrays.
The design included comprehensive monitoring of road assets, Network Rail tracks and London Underground Tunnels. Track trolley geometry and condition surveys were undertaken regularly on several rail crossings.

Careful planning was required to manage baseline, post-tunnelling and daily surveys which changed continually in line with TBM progress.
Instrumentation installations and surveys of key interfaces were scheduled ahead of projected TBM passage.
Effective, open communication with the client and asset holders was essential to avoid potential delays to the programme.

Significant developments were made to GEO-Instruments' in-house data visualisation software QuickView to display monitoring data and live TBM progress within one unified platform.

Application
Structural monitoring
Infrastructure monitoring

Technique
Manual surveys
Automated surveys
Track geometry surveys
Deformation monitoring
Remote wireless monitoring

Market
Tunnelling
Infrastructure

Client
Hochtief Murphy Joint Venture
National Grid

Project Duration
3 Years

Instrumentation
Precise levelling points
3D survey targets
Wireless tiltmeters
Tilt distometers
Shape Accel Arrays
Hydrostatic Levelling Cells