

Madrid M30, Spain

The M30, a major highway that circles the central district of Madrid, is **one of the busiest highways in Spain** and contains **the longest urban motorway tunnels in Europe**. In 2007, the city saw the completion of the £3.5bn scheme **provided additional capacity to alleviate congestion**, reduce travel time, improve traffic flow, improving connectivity between the city and significantly reducing the environmental and acoustic impact of the M30 operations on Spain's capital city.



Madrid Town
Council



£639m
(multiple
contracts)



2004
- 2007



PPP

The Madrid M30 scheme was delivered under a Public-Private Partnership (PPP), Madrid Calle 30, realising the benefits of delivering this large scale, complex programme under a PPP approach. Our sister company, Ferrovial Services, owns 50% of the private share.

The construction works for 96km of new highway, were divided into 15 contracts to be delivered within a very demanding timeframe. We successfully constructed on time and on budget, two of the 15 contracts under lump sum contracts – the north tunnel of the south bypass and the west tunnels. The 4.2km north tunnel comprised 3.6km bored by an Earth Pressure Balance (EPB) TBM and the remaining 600m by cut and cover. The west tunnels comprised 3km of cut and cover works at depths up to 25m. Excavation was undertaken above and below existing structures with low clearance such as the 16th Century Segovia Bridge above and the C-5 railway line below.

We collaborated closely with Madrid Town Council to ensure all programme interfaces were successfully achieved. To optimise overall scheme programme and ensure safety and on-time opening, we undertook additional scope by constructing all 16 cross passages, successfully managing the interface to the South tunnel.



ADDED VALUE

- We constructed a temporary embankment within the adjacent Manzanares river to permit traffic to be diverted and alleviate traffic disruption, maintaining the M30 traffic (260,000 vehicles per day). This innovative solution ensured no additional land was required for construction while maintaining the river flow
- For the bored-tunnel, we optimised the client's design to a three-level tunnel, eliminating intermediate column supports to the road slab from the emergency gallery, maximising usable space and eliminating collision risks
- We developed the largest EPB TBM in the world at that time, the innovative design featured dual concentric cutterheads, with a central diameter of 7m and outer 15.16m they could contra-rotate to reduce torque. This avoided shield tilt as it progressed through highly cohesive geotechnical conditions (similar to London Clay)
- Our TBM design optimisations delivered a tunnel drive that achieved a peak rate of 500m / month, nearly twice the average initial estimate of 300m / month
- We developed a unique air intake/exit, with clean air intake via the emergency gallery and extraction through the ventilation gallery. Innovative particle filtering stations removed 90% of contaminants, a first for tunnel designs and delivering significant environmental benefits

4.2km

bored tunnel and 16 cross passages

3km

of cut and cover tunnels

15.16m

diameter TBM, the largest in the world at the time

50,000+ points

monitoring settlement with live data shared via intranet

2.5 million

litres / year of fuel consumption reduction due to improved traffic flows

708 million

hours of travel time to be saved over the next 30 years