

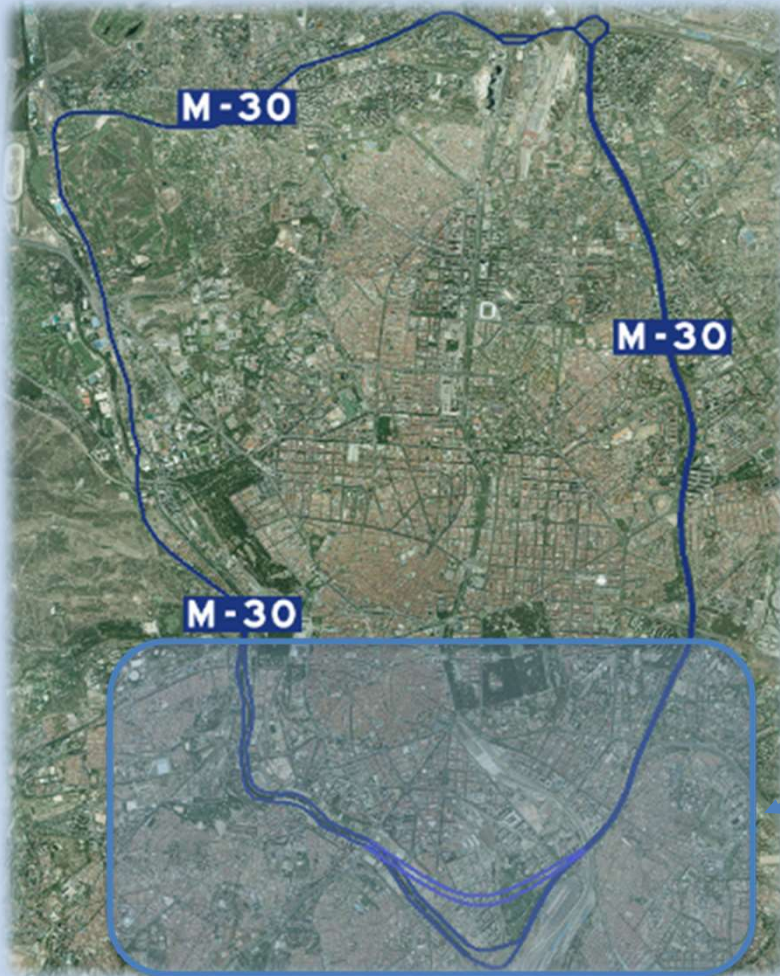
# Madrid Río: How a motorway ring becomes a linear park along our river

by Javier Berges

Installations, Technology and System Manager of MC30



## M 30 Highway



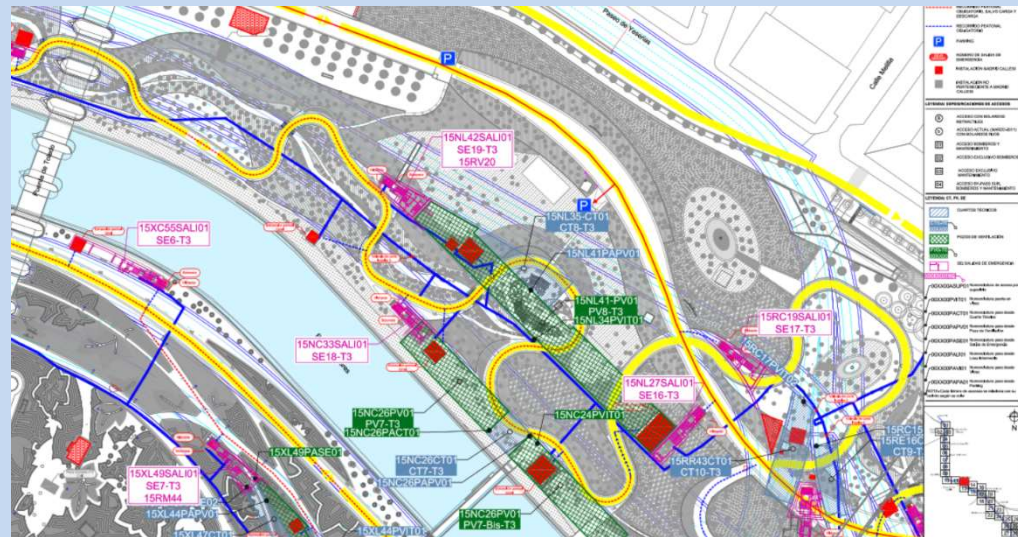
- First ring road of Madrid city
- Surrounds the central districts
- The main national radial roads begin in M30
- The highway with the highest number of trips in Spain.





# Madrid Río Park

- Park of 120 Ha.
- Manzanares River goes through it.
- Construction 2007-2011
- It has allowed the connection between the neighborhoods along the sides of the Manzanares.
- Bicycle and pedestrian lane connecting with Casa de Campo.
- Green areas, sports facilities, etc...
- Historical and singular bridges
- Madrid Río park is located over MC30 tunnels.



## History of the M-30



- Started in the 70s (east and west section)
- Finished in the 90s (north section)



## Chronology of the M-30 undergrounding



Transfer of ownership of the infrastructure from the Ministry to the Madrid City Council.

2004



**Remodeling Works.** Main milestones:

- Undergrounding between Marqués de Monistrol and Puente de Praga
- Undergrounding of Paseo Extremadura
- Bypass between Parque de Arganzuela and A-3
- Remodeling of East arc links (Avda. América, Nudo de la Paloma, Costa Rica, A-3, etc.)

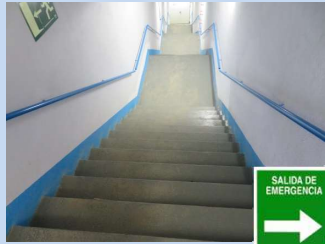
2005

2006

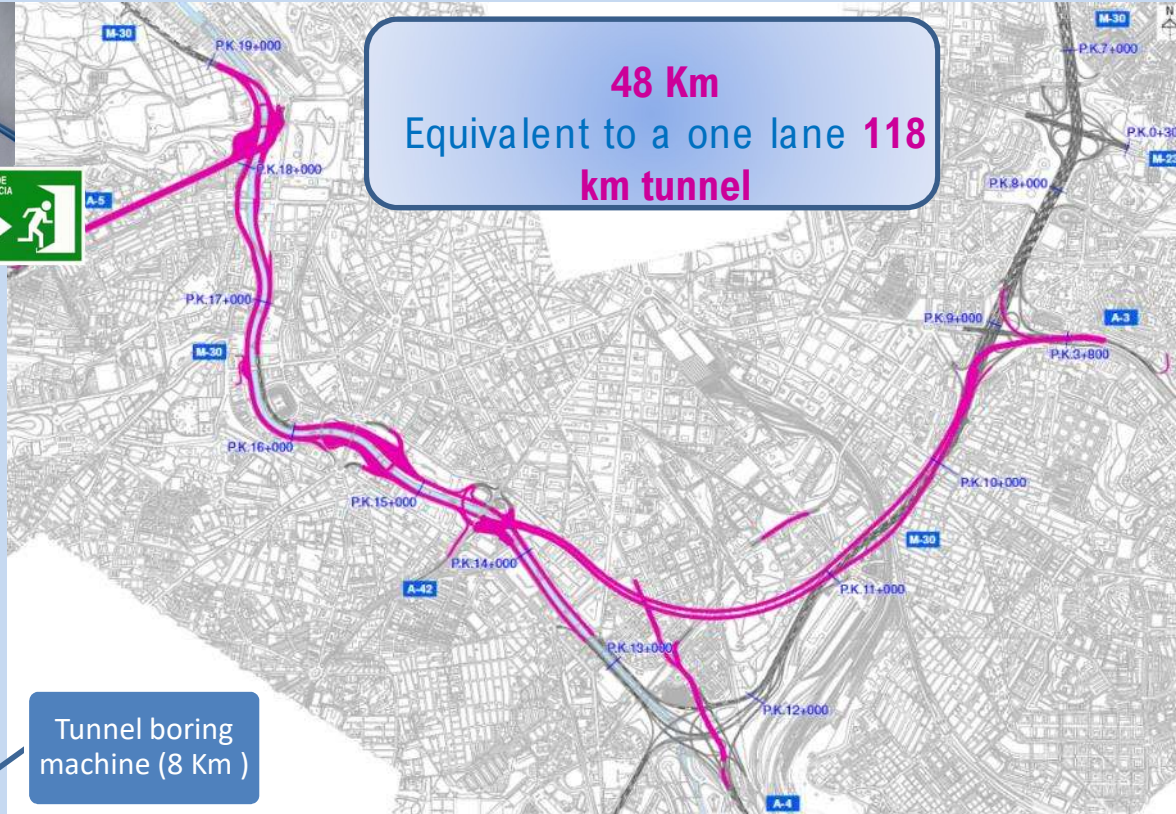
2007



# M30 tunnel network



**311**  
Emergency  
exists



Building  
method

Tunnel boring  
machine (8 Km)

Cut and Cover  
(40 Km)

more than **16.000**  
equipment



**37**  
Technical  
rooms



**938**  
Fans



# A constructive boast: tunnels and bypass

**madrid calle 30** **TBM Dulcinea – Bypass sur túnel Norte**

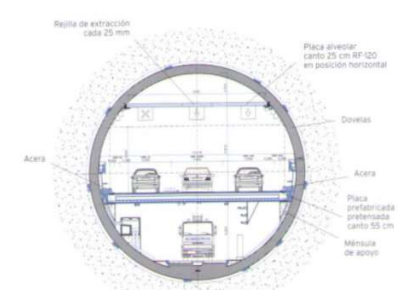
- EPB Diámetro 15.20 m
- Motores hidráulicos
- Rueda central independiente
- Tres tornillos de extracción
- Herrenknecht (Alemania)

**madrid calle 30** **TBM Tizona – Bypass sur túnel Sur**

- EPB Diámetro 15.20 m
- Motores eléctricos
- Cabeza de corte única
- Un tornillo de extracción
- Mitsubishi- Duro Felguera (España)



- Diámetro interior 13.45 m
- 10 dovelas de 60 cm de espesor
- 3 carriles de 3.50 m
- Arcenes y aceras de 0.50 m
- Gálibo vertical libre de 4.50 m
- Galería inferior de servicios
- Galería superior de ventilación



Dowels	→	318.000 m <sup>2</sup>
Supports	→	21.587 Ud

# M-30 tunnels



Slabs	⇒	556.000 m <sup>2</sup>
Iron used (Kg)	⇒	218 million
Walls	⇒	60.000 ml

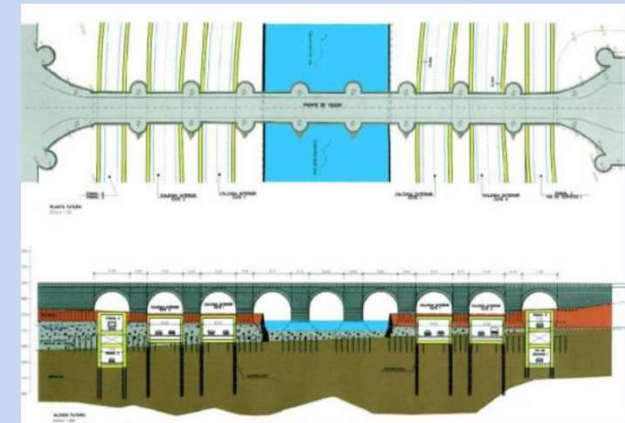
**40 km**  
3 to 5 lanes in each direction



▪ 45 Linking branches

## Main construction challenges:

- Crossings with bridges
- Crossings under the river
- Crossings with subway lines
- Crossings with collectors
- Intersections between several branches





# Madrid Rio park – M30 tunnels



# Madrid Rio park – M30 tunnels





# Madrid Rio park – M30 tunnels



# Madrid Rio park – M30 tunnels





### Benefits

- Environmental improvement
- Green areas
- Space for public use and events
- Tourism increase
- House revaluation

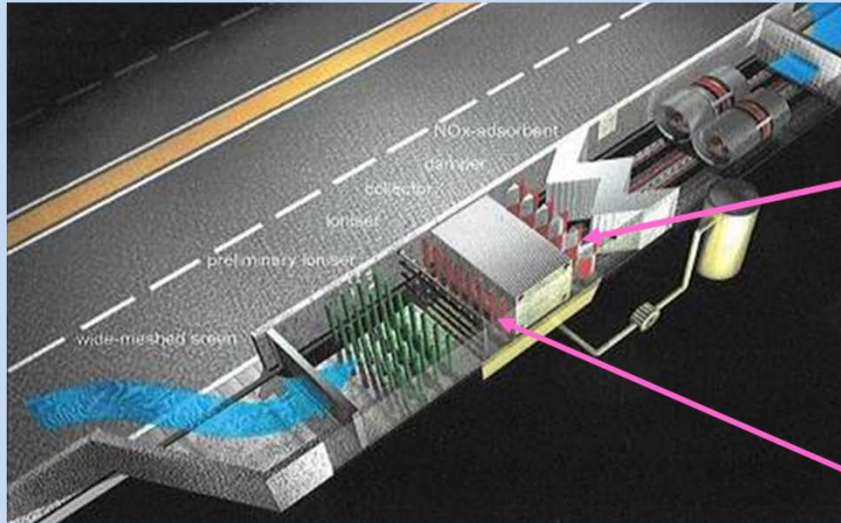


### Environmental benefits

- Reduction of noise pollution
- Air pollution improvement due to:
  - ✓ Smoother traffic flow
  - ✓ Speed limit reduction
  - ✓ Building materials that absorb CO<sub>2</sub>
- Recovery of the Manzanares River ecosystem







Carbon filters



EP filters

### Tunnels improve air quality

- Filters for gases and particles
  - 30 EP for particle filtering
  - 4 Carbon filters for NO<sub>2</sub>
- The structure of the tunnels retain particles and absorb gases

### **Social benefits**

- Suppression of the barrier effect between the neighbourhoods on both sides of the Manzanares River
- Improved accessibility, both for vehicular and pedestrian traffic
  - Travel time savings: +/- 27% (equivalent to 17 hours per year per person and per trip)
- Improvement of the comfort of the population in the area
  - Green areas, cycling paths, sports and leisure facilities...
  - Less noise
  - Improved air quality
- Decrease in accident rates
  - Reduction (by 75%) of the annual mortality rates



**Thank you**

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