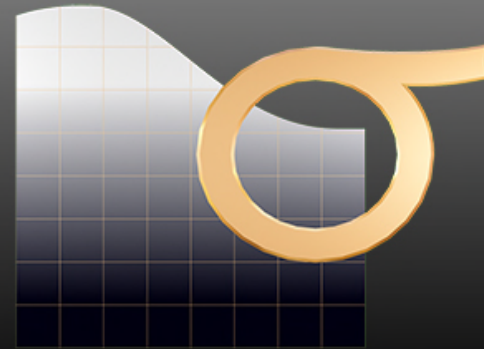


# 2D FE Analysis for Geotechnical Design

Oasys



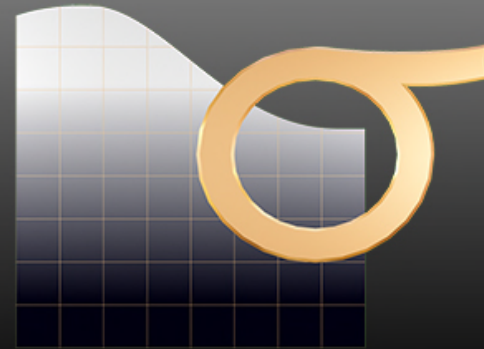
*Oasys*



Safe

## Case Studies

*Oasys*



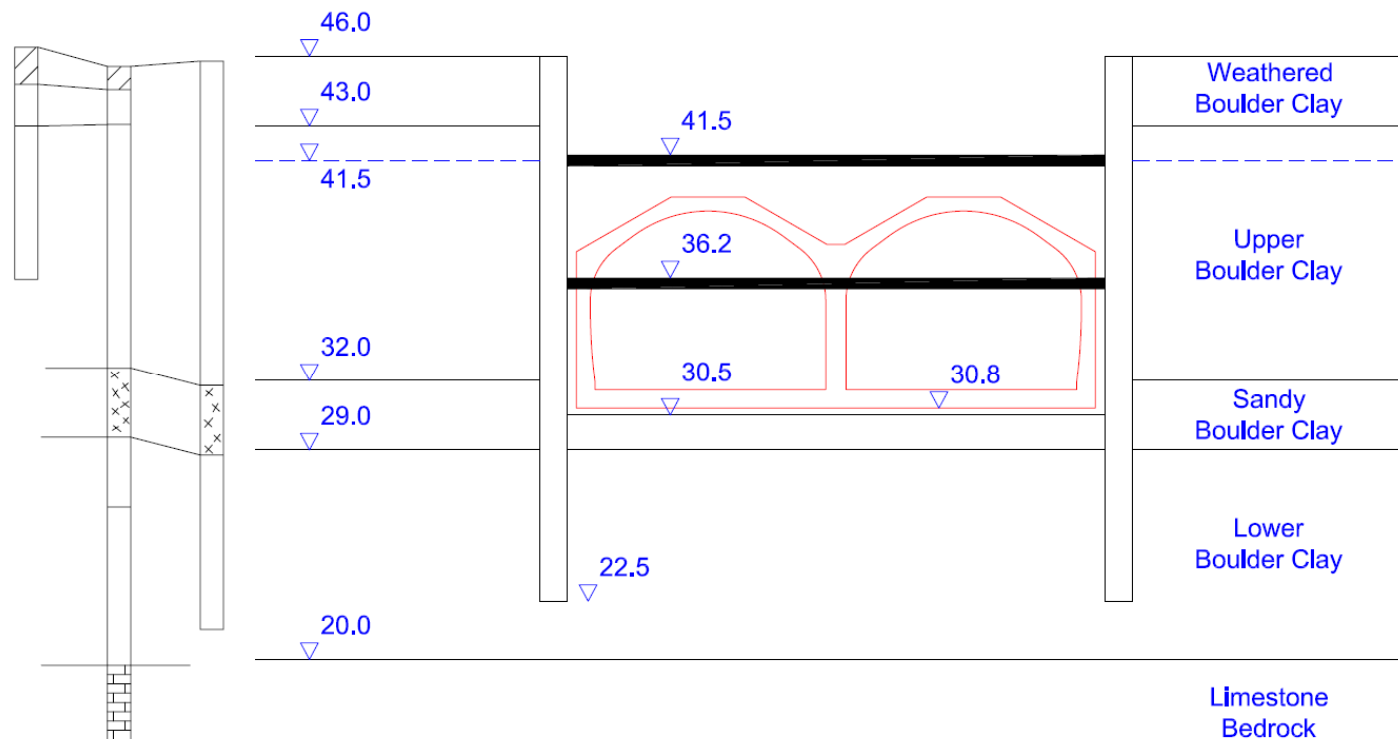
Safe

## Cut and Cover Tunnel

**Raison Foster Associates**  
Geotechnical Design and Consulting

# Project Brief

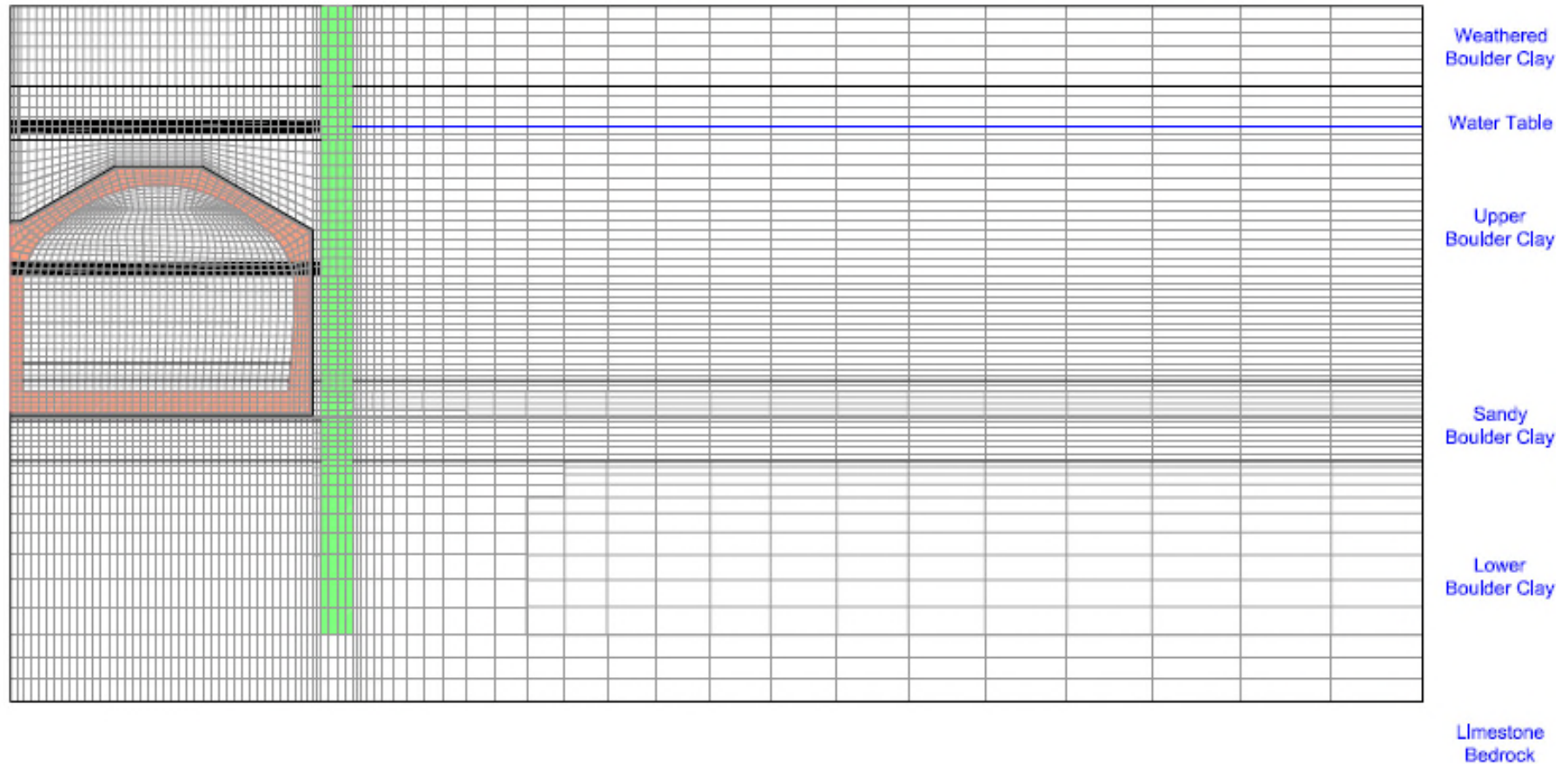
- Needed to examine the stresses within the tunnel section base slab for a cut and cover tunnel
- ULS and SLS checks



# Construction sequence

- 0 Initial conditions
- 1 Install diaphragm wall and excavate to 5m depth
- 2 Prop and excavation to 10.5m depth with dewatering
- 3 Prop and excavation to 15.5m depth with dewatering
- 4 Construction and delay at formation level with dewatering
- 5 Place drainage layer and cast tunnel base slab
- 6 Remove lower prop
- 7 Complete tunnel segments
- 8 Backfill above tunnel to underside of upper prop
- 9 Remove upper prop
- 10 Backfill above tunnel to ground level
- 11 Construct road formation inside tunnel
- 12a SLS long term conditions
- 12b ULS long term conditions

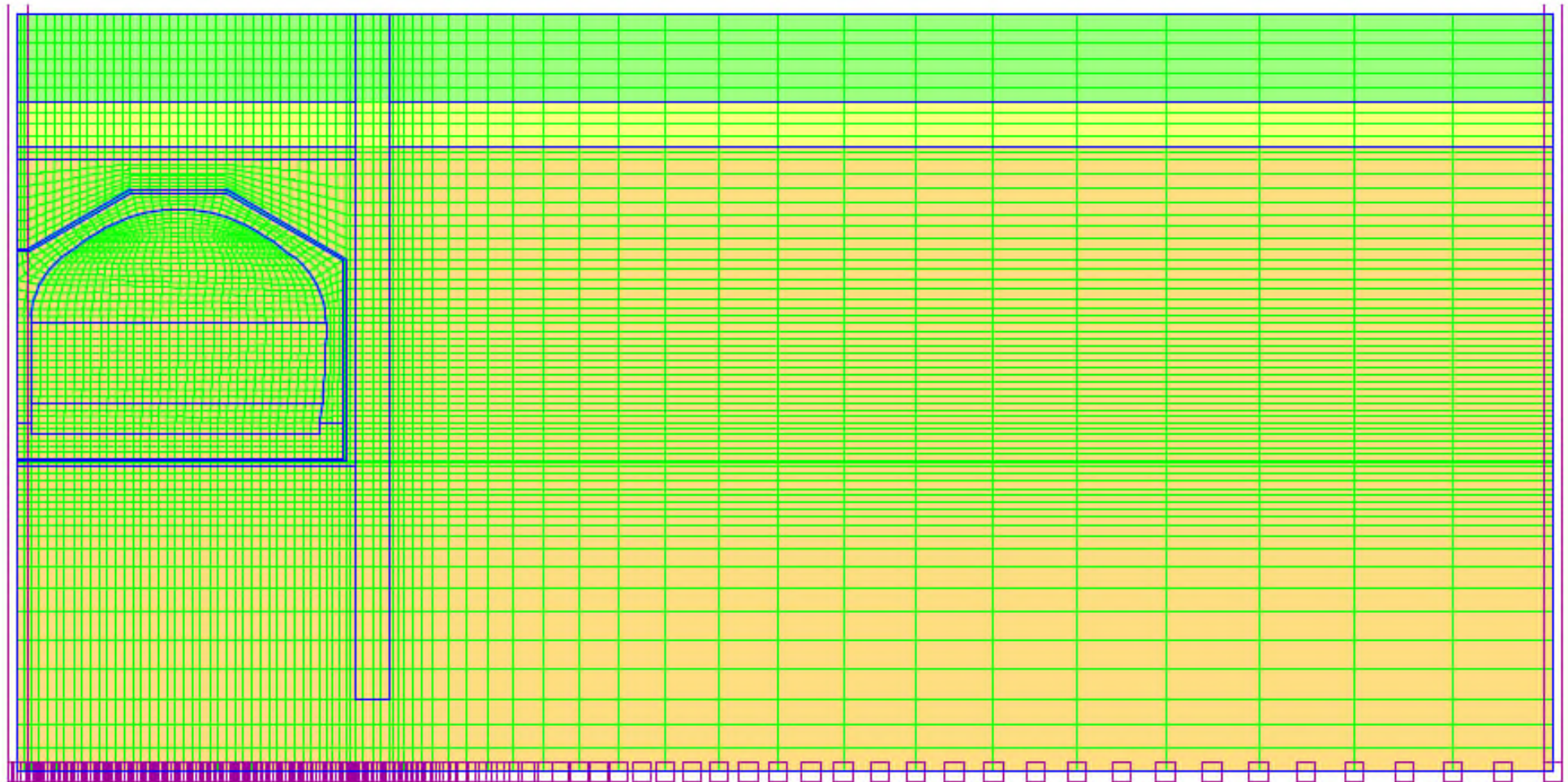
# Mesh Generation



**Initial Mesh**

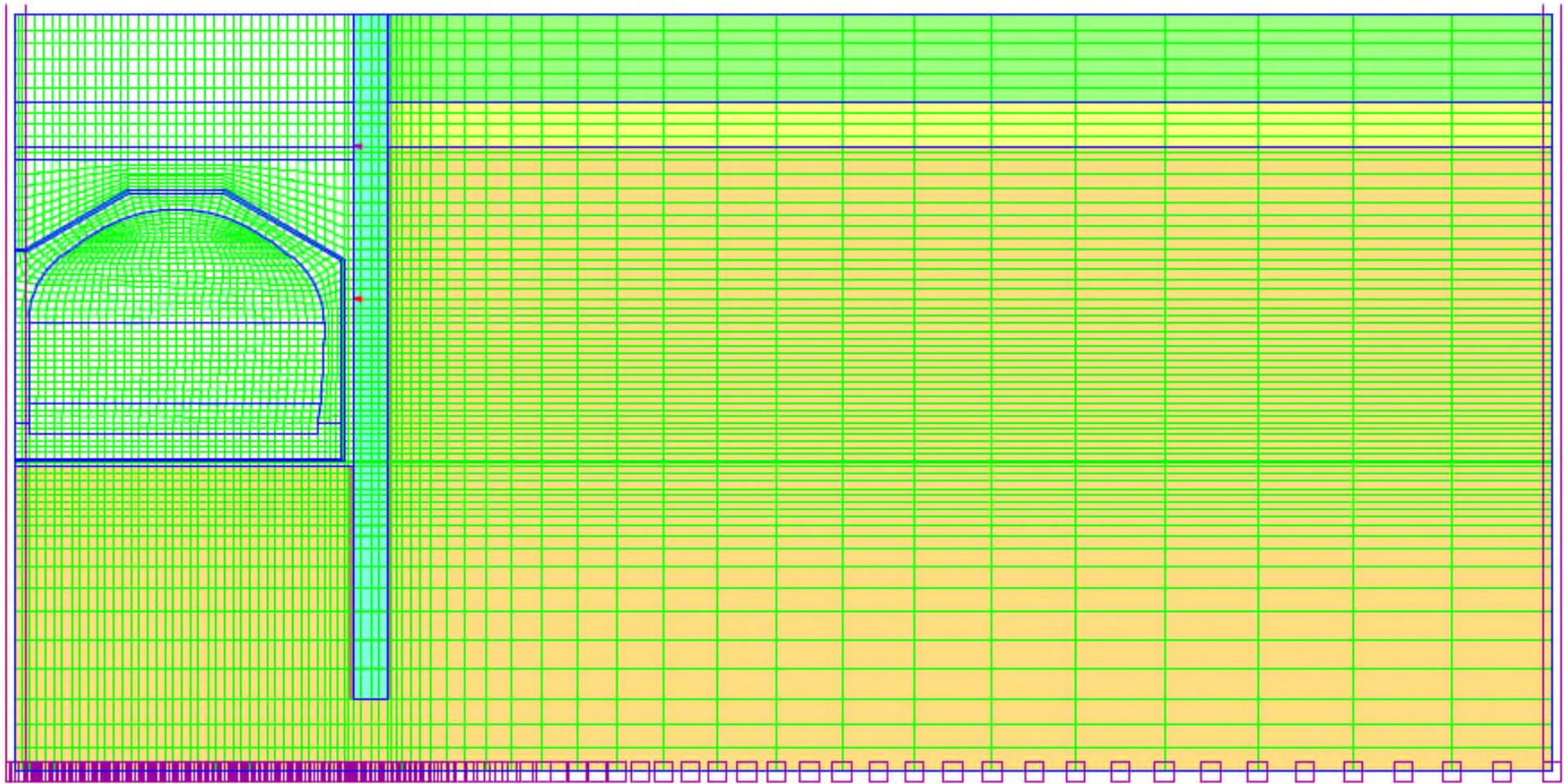


# Mesh Generation



**Initial Mesh**

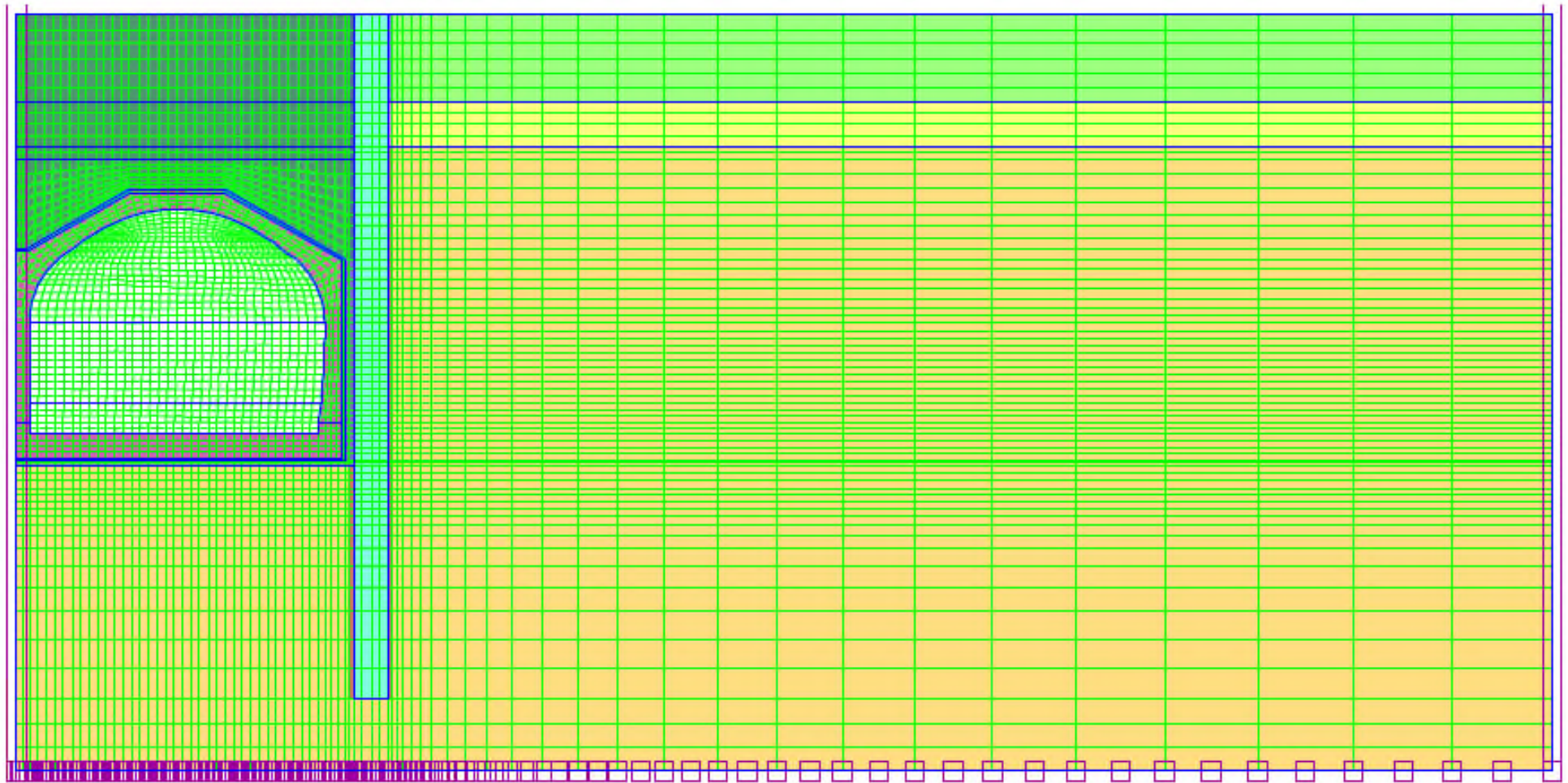
# Mesh Generation



**Prop and excavate to 15m depth**



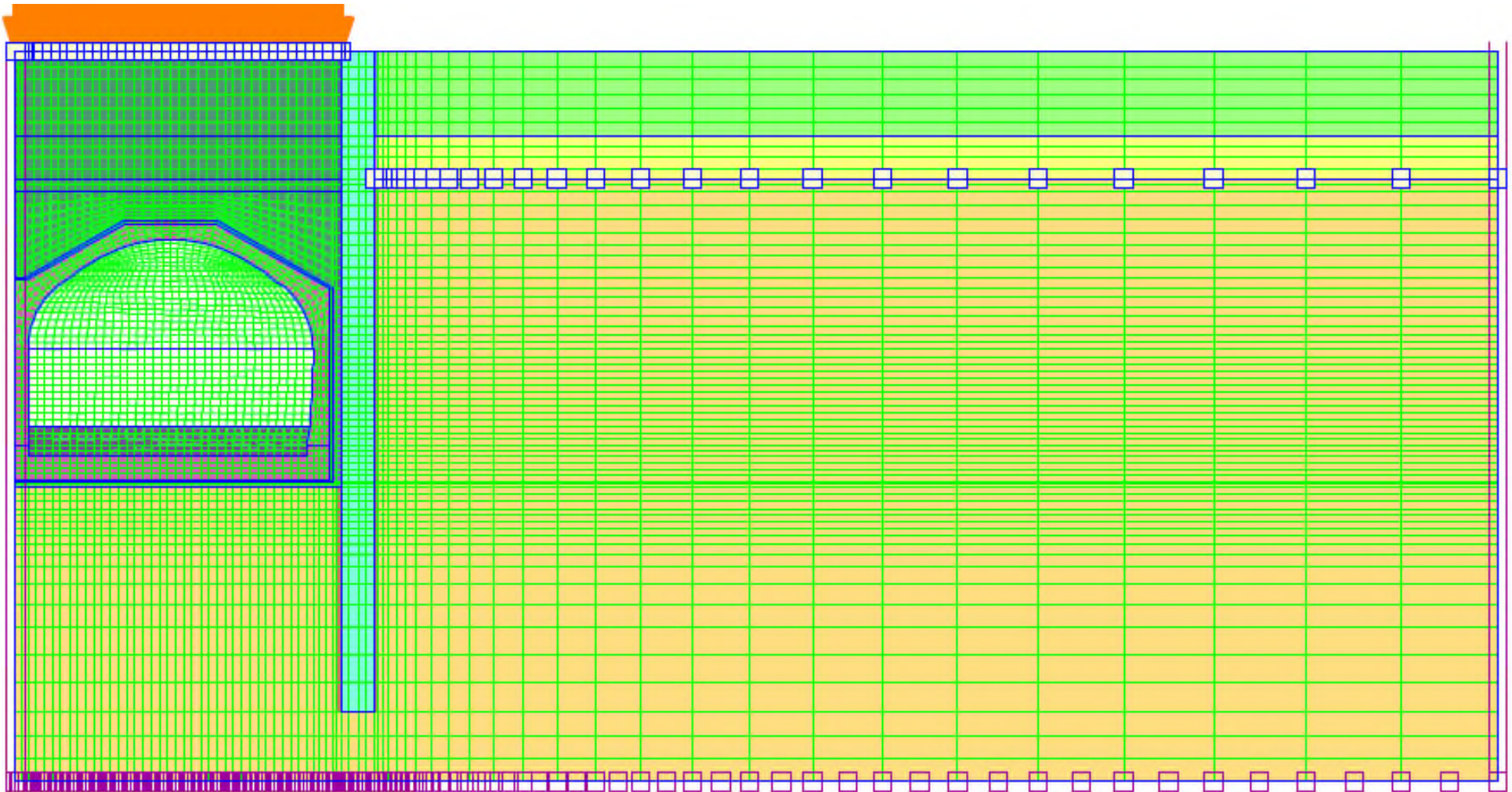
# Mesh Generation



Cast tunnel base slab, complete tunnel structure and backfill



# Mesh Generation

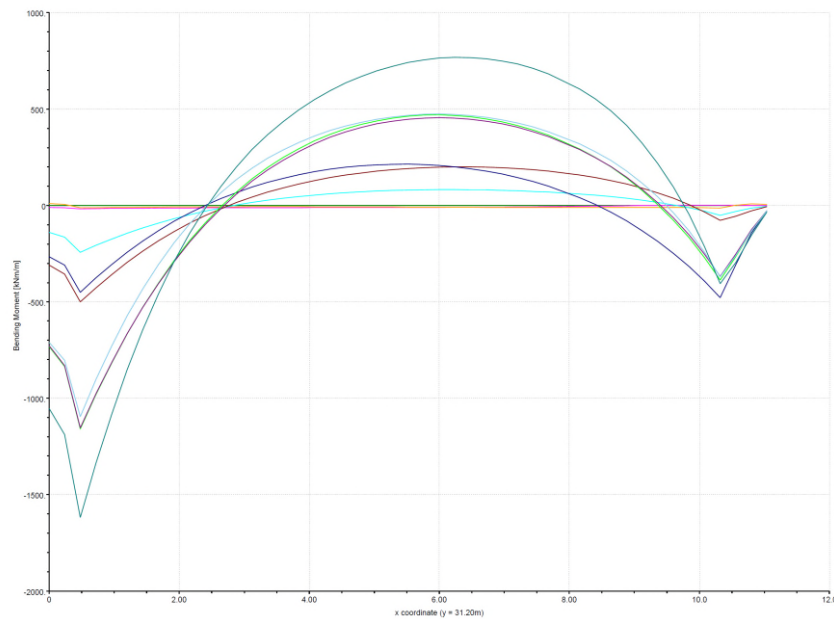


Long term ULS condition

# Results

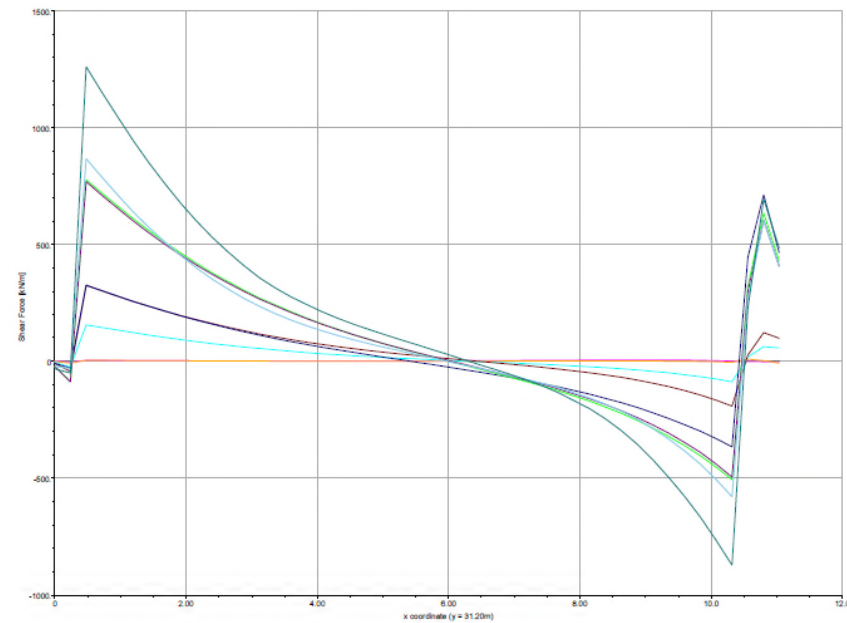
- Plotted graphs of bending moment, shear force, thrust, y displacement and x displacement along the centre line of the tunnel base slab

Bending Moment



Fully Drained Bending Moments

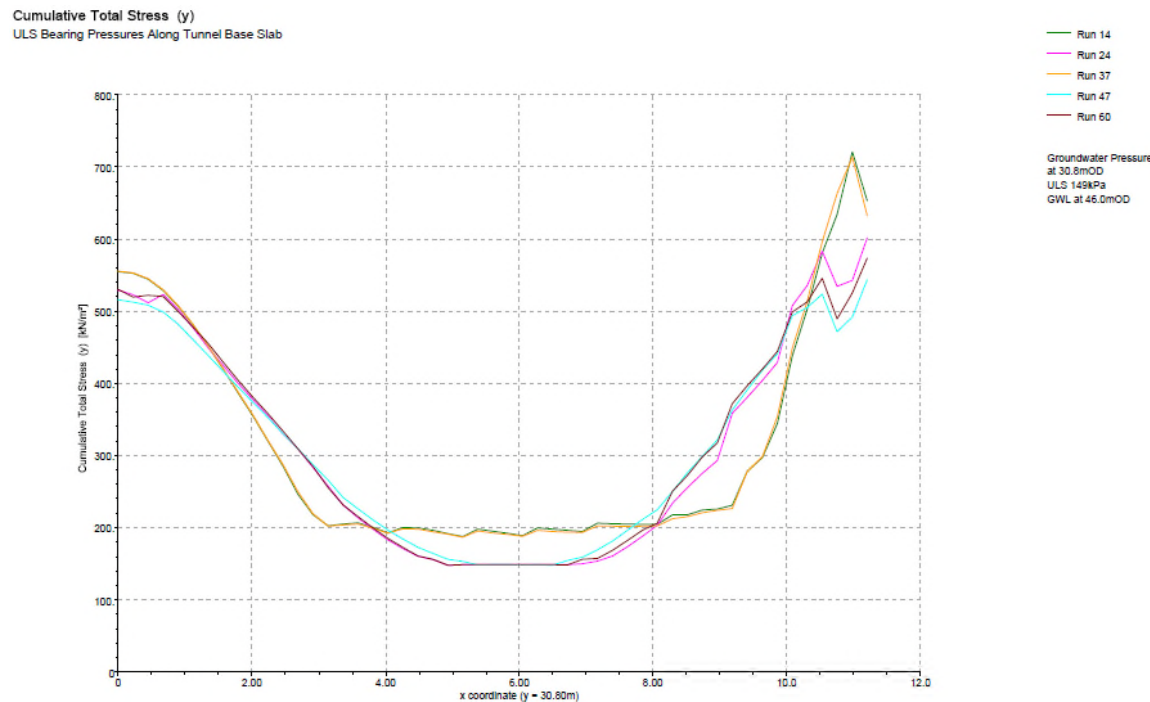
Shear Force



Fully Drained Shear Force

# Results

- Plotted graphs of bending moment, shear force, thrust, y displacement and x displacement along the centre line of the tunnel base slab
- Bearing pressure plots along the base of the slab



ULS Bearing Pressure along tunnel base slab