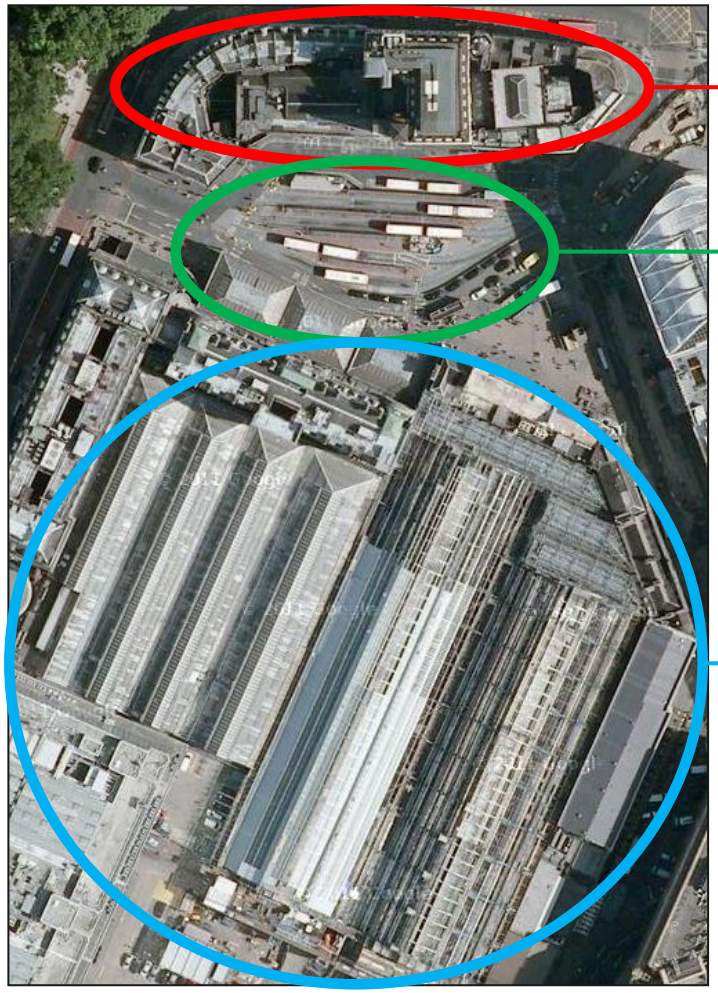
BIM bei der Bestandssicherung im innerstädtischen Tunnelbau – Beispiel

Dipl.-Ing. Paul Pandrea
Keller Holding GmbH

Verkehrsknoten Victoria Underground Station London

KELLER

Verkehrsknoten Victoria Underground Station London



U-Bahn - Circle/District/Victoria Line

Bus - Zentrum/Umgebung

Zug - Flughafen Gatwick/Umgebung

Quelle: Google Maps & www.metro.co.uk

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Verkehrsknoten Victoria Underground Station London

Quellen: Google Maps & www.metro.co.uk

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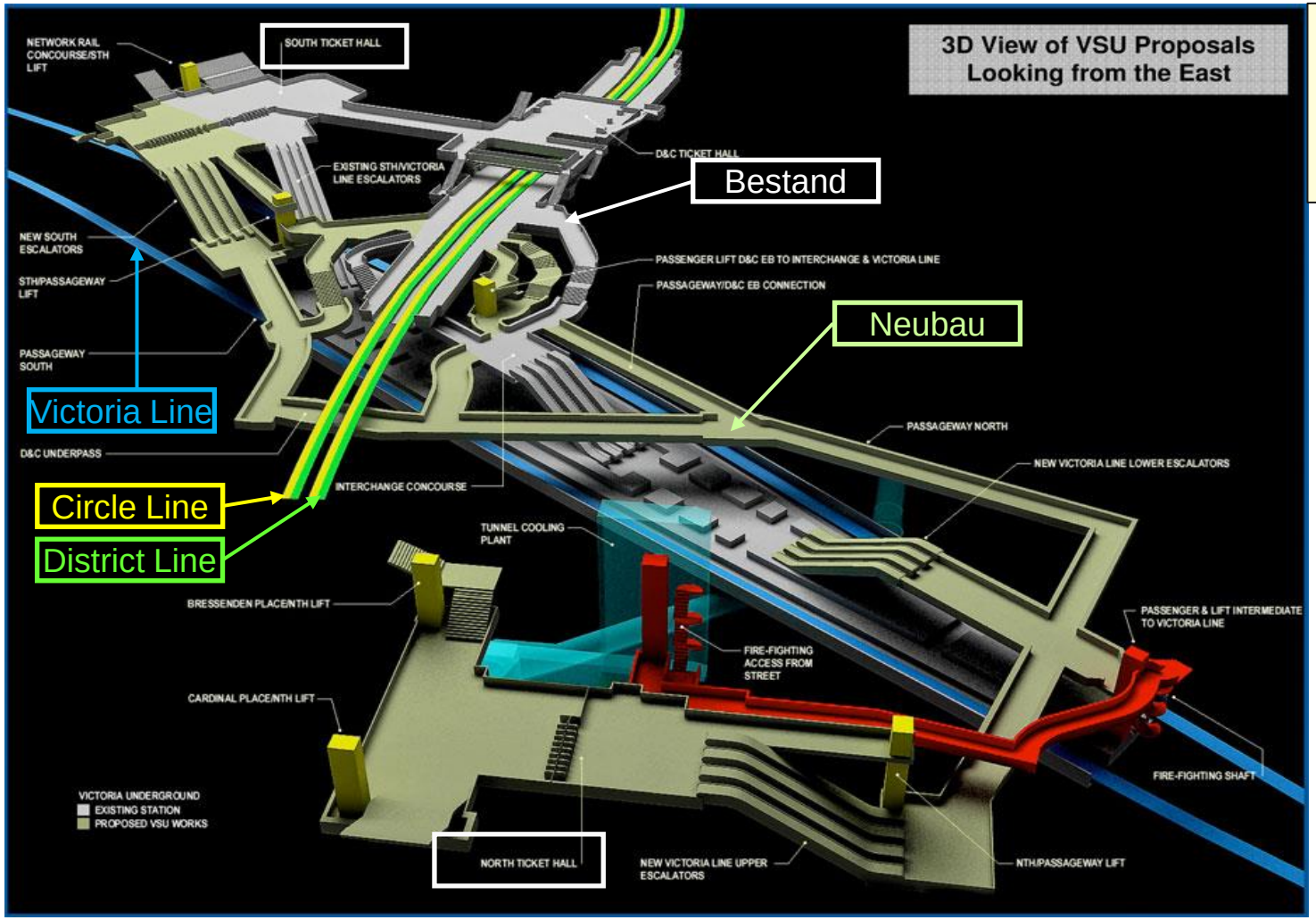
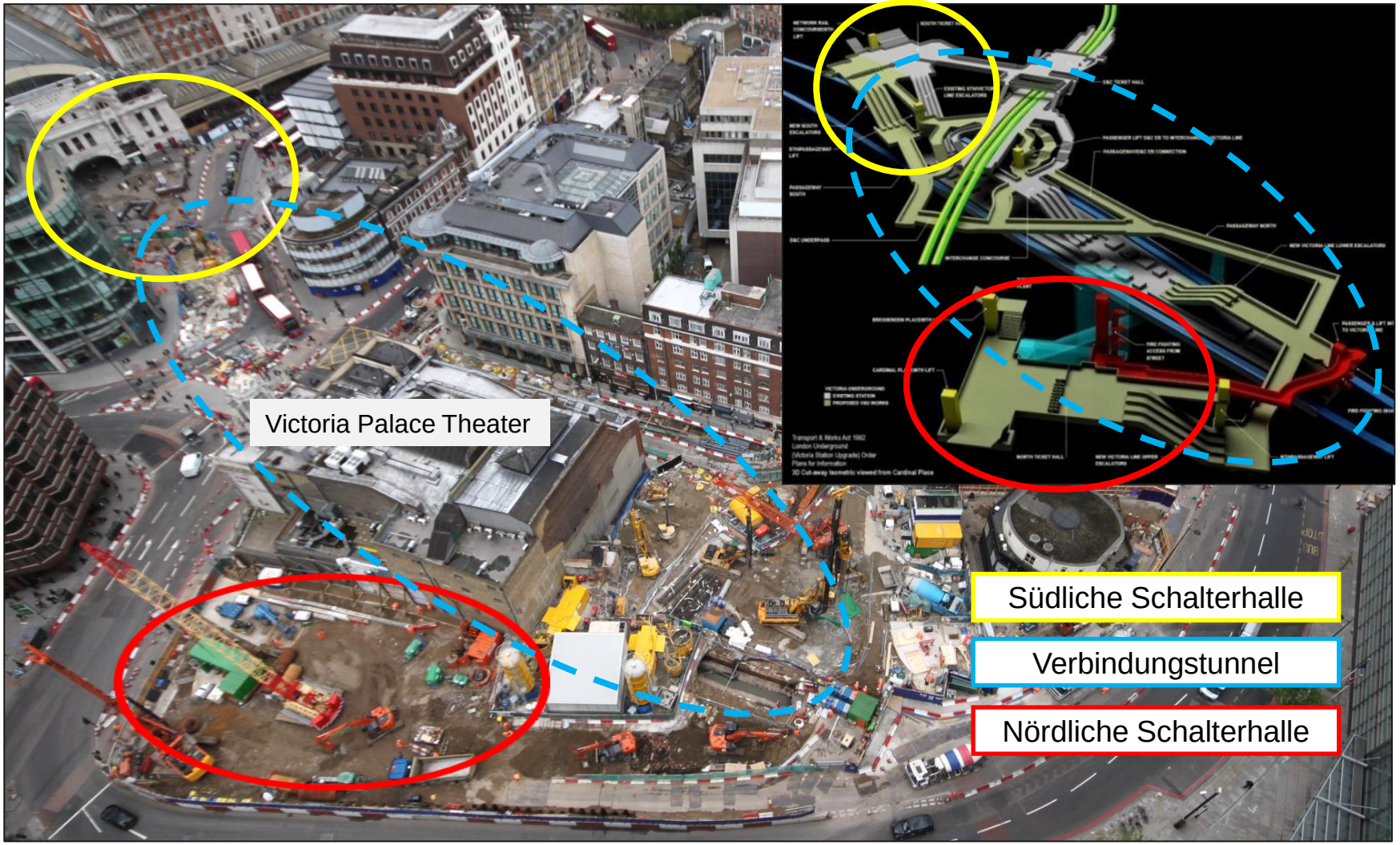
KONZEPT UND PLANUNG



Konzept und Planung



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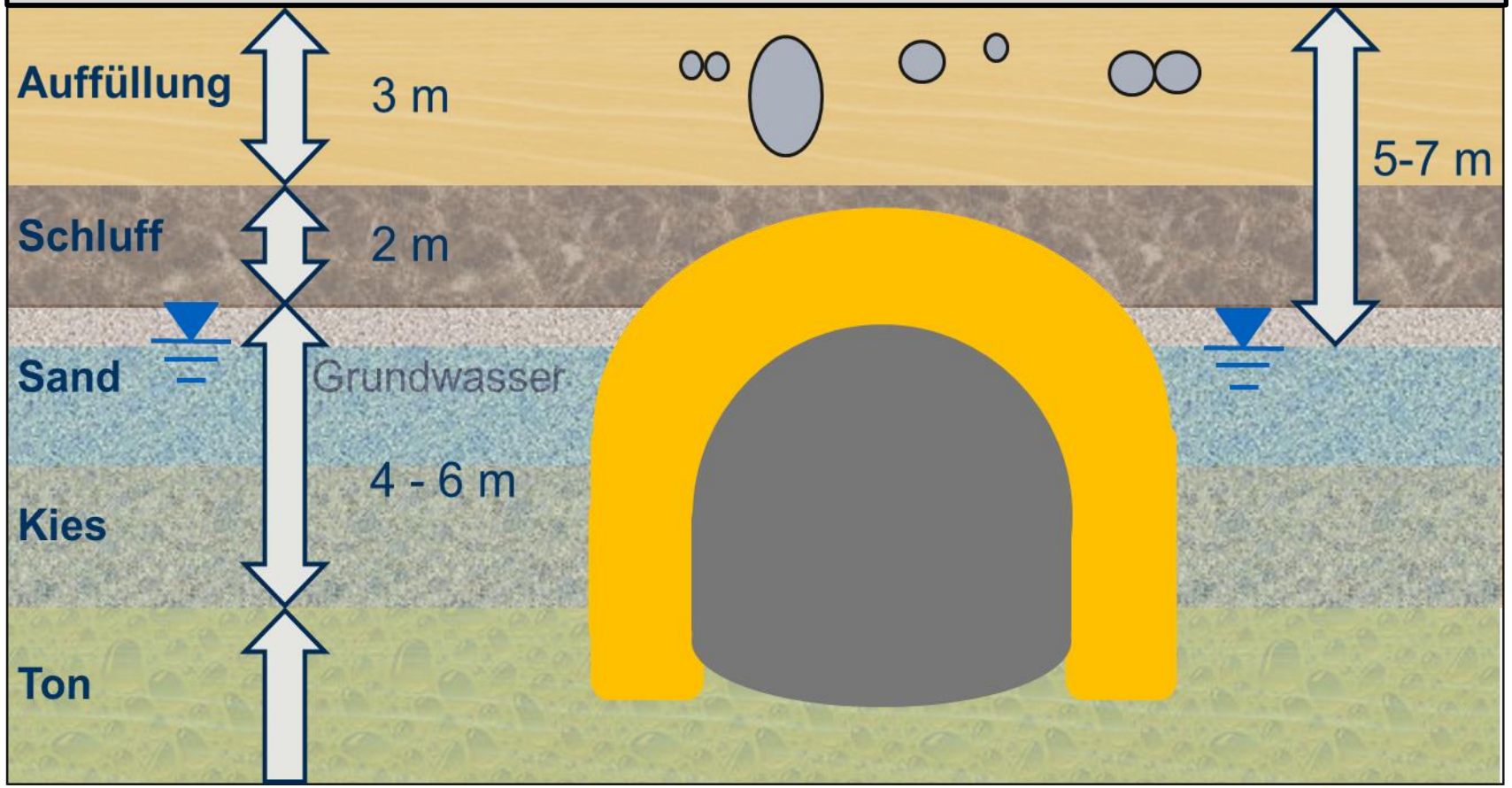
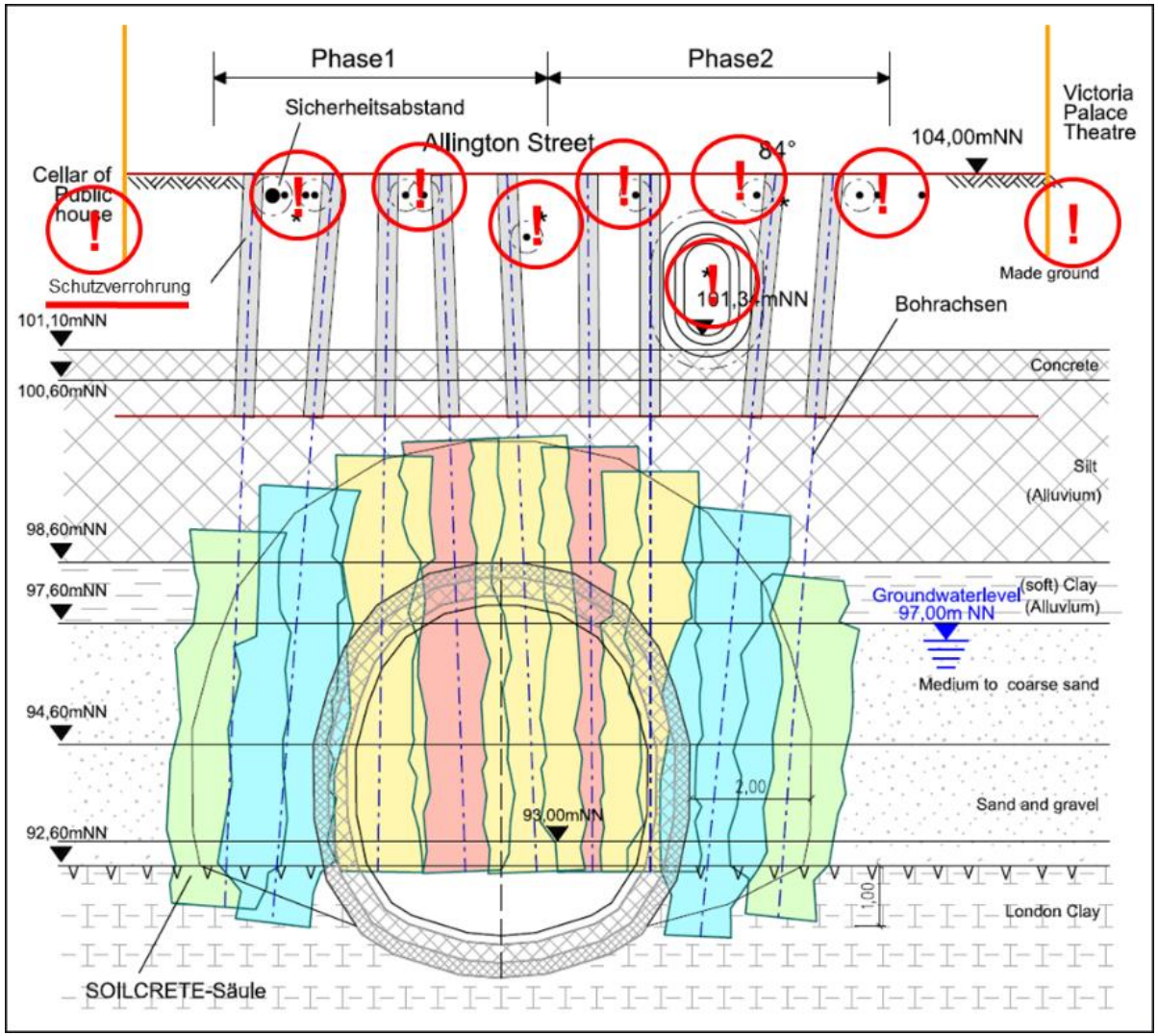
GEOLOGIE UND HÖHENLAGE

Druckfestigkeit 95% > 1 MN/m² und 85% < 10 MN/m²
Minimale Gewölbedicke 2 m
1 m Einbindung in den Ton



FULL FACE DESIGN



VORHANDENE LEITUNGEN, EINBAUTEN UND GEBÄUDE

→ STATISCH ERFORDERLICHER QUERSCHNITT

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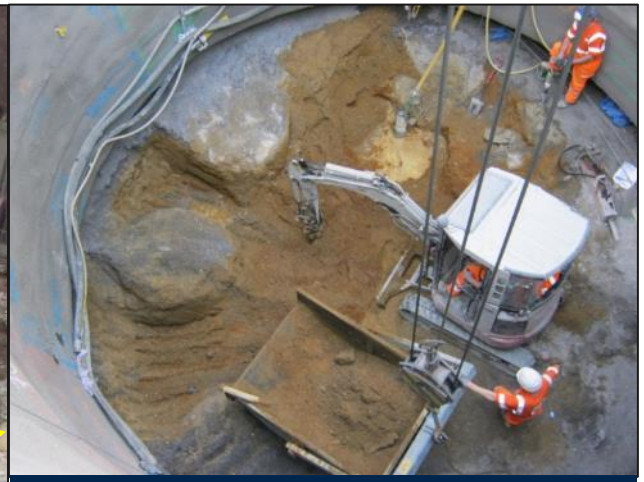
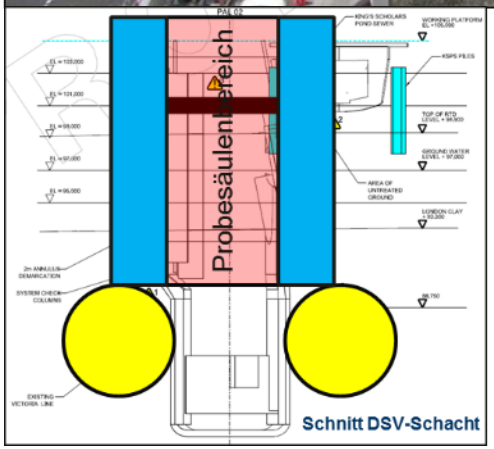
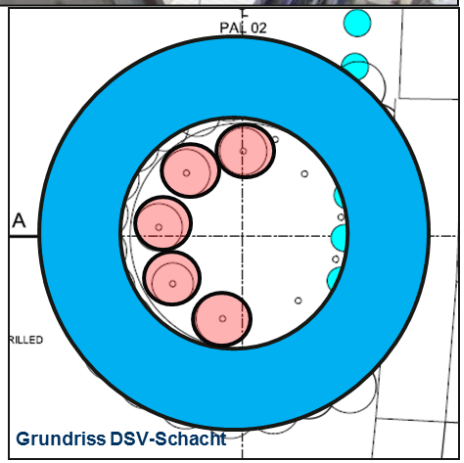
VERSUCHSFELD





PROBEFELD IM DSV-SCHACHT



DSV-Schacht

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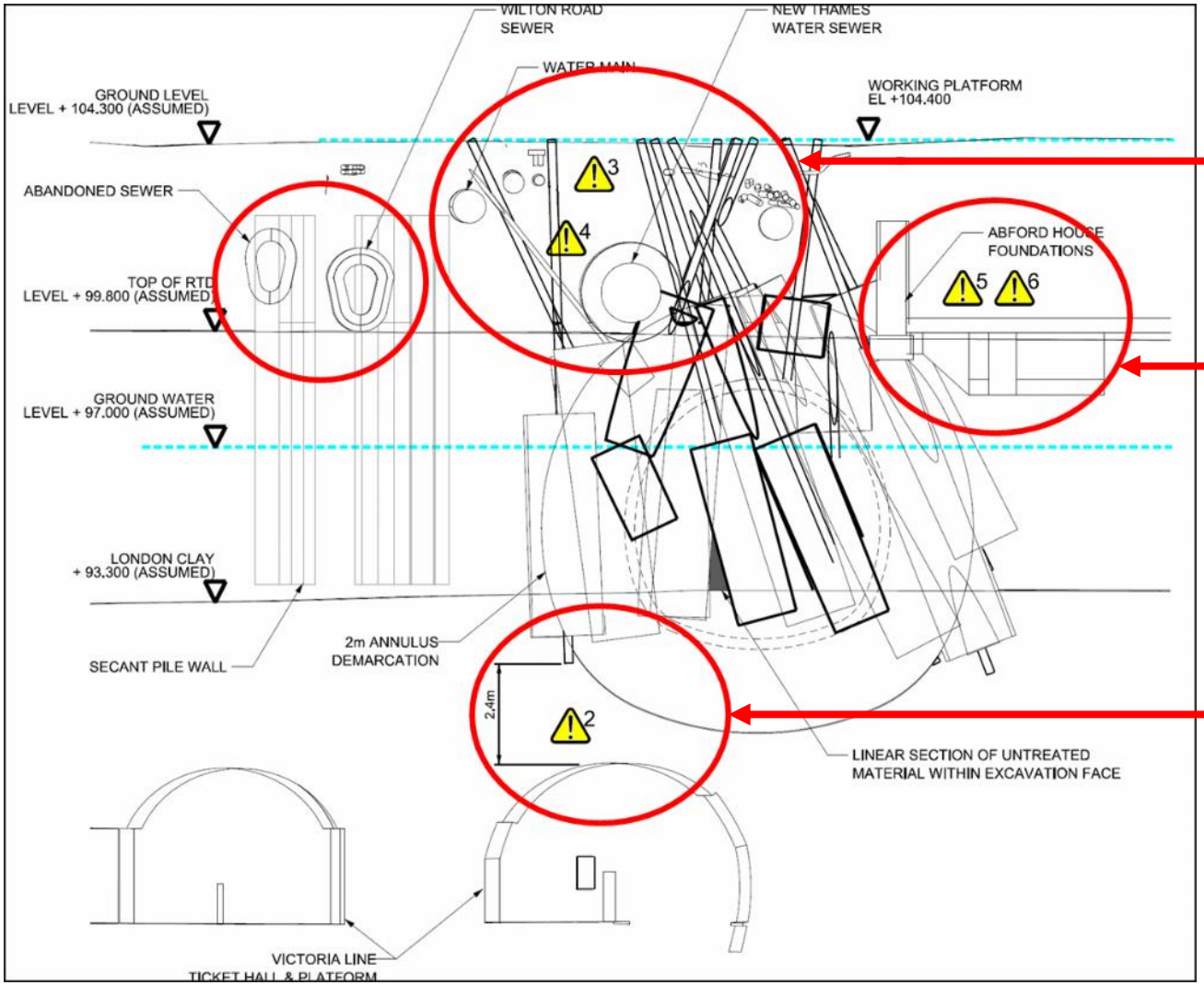
RANDBEDINGUNG - EINBAUTEN



Leitungen und Kanäle

Gebäude, Kellerräume und Gründungen

vorhandene U-Bahn

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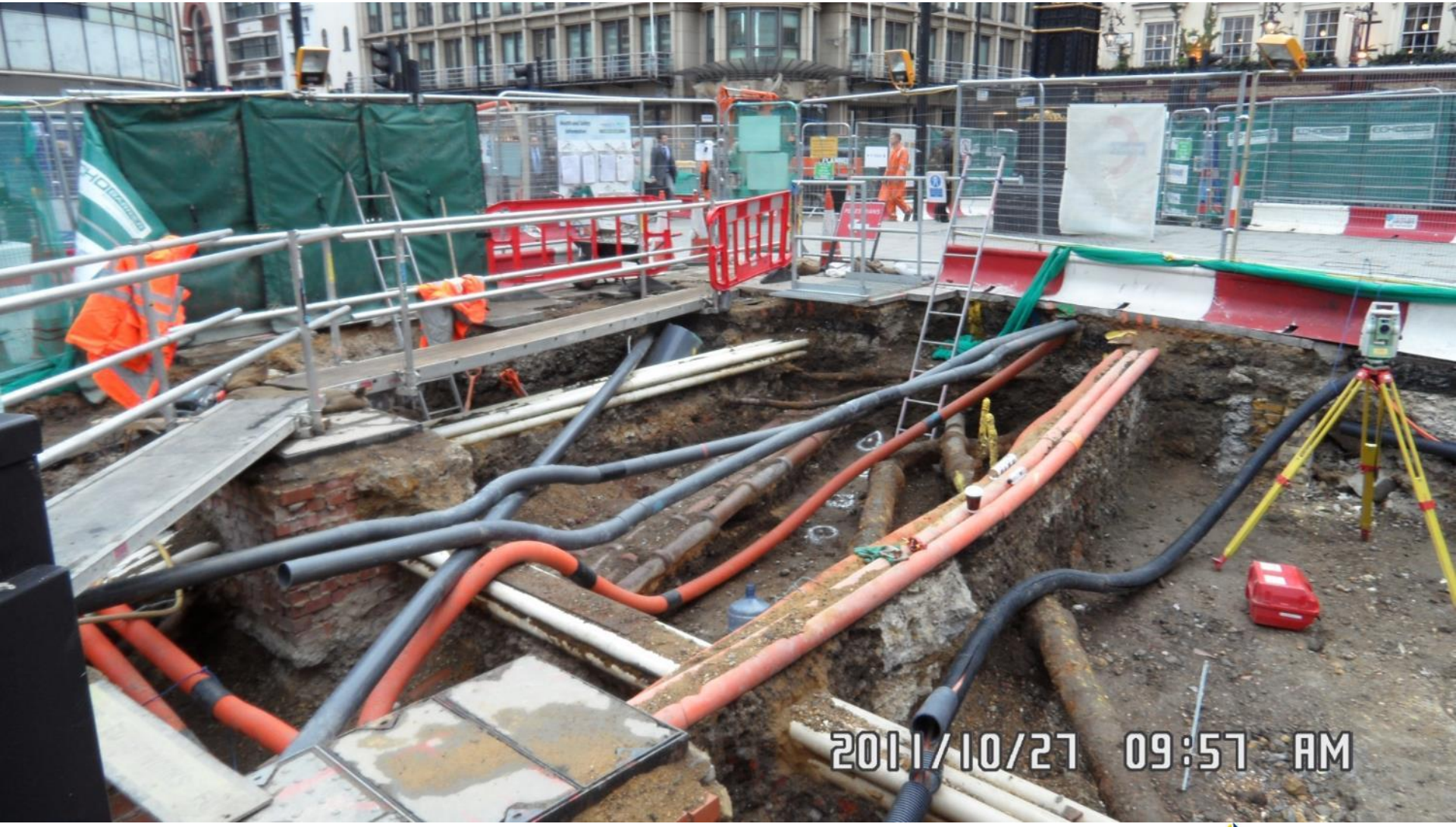
RANDBEDINGUNG - EINBAUTEN



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RANDBEDINGUNG - EINBAUTEN

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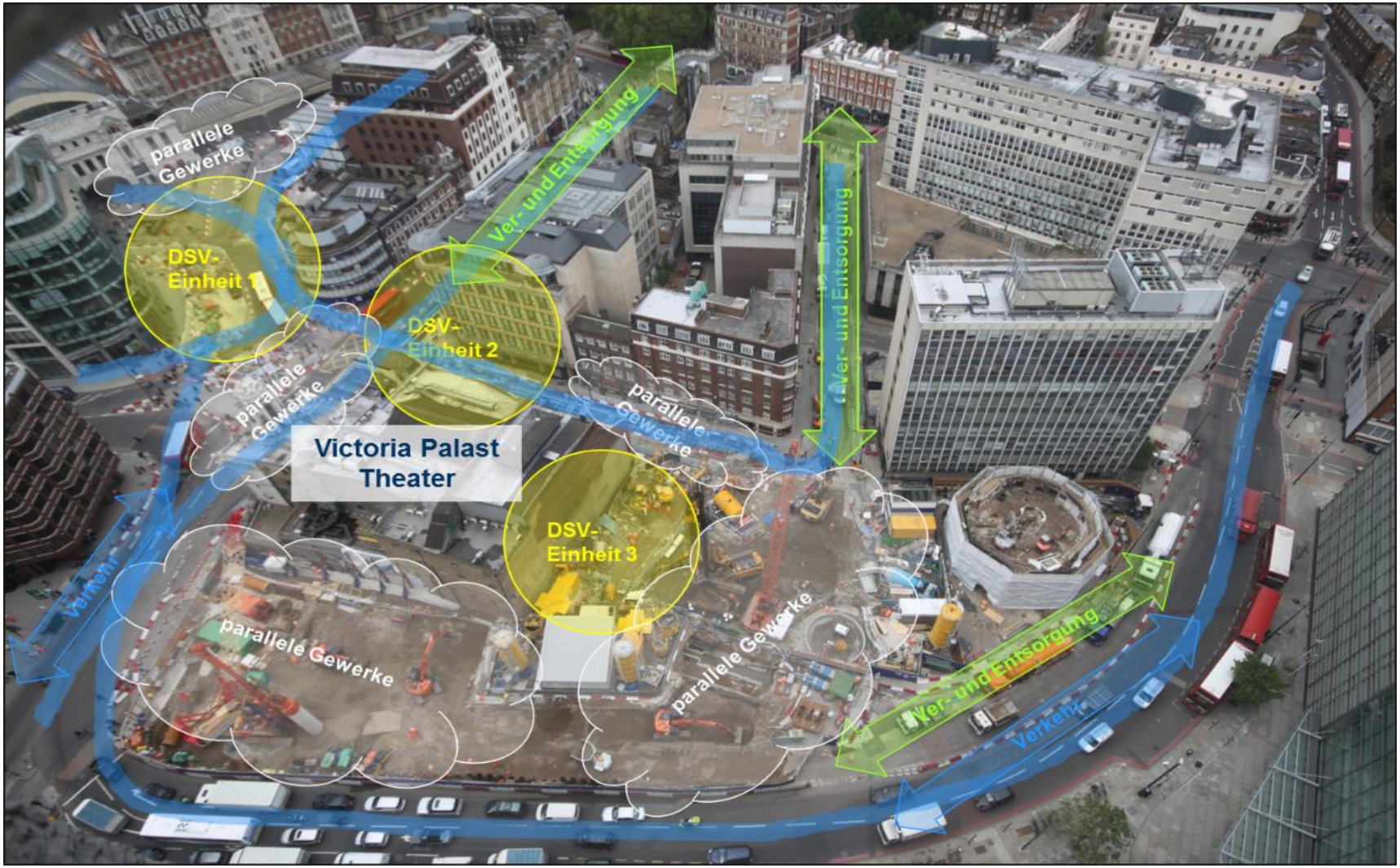
LOGISTIK - BAUSTELLENEINRICHTUNG



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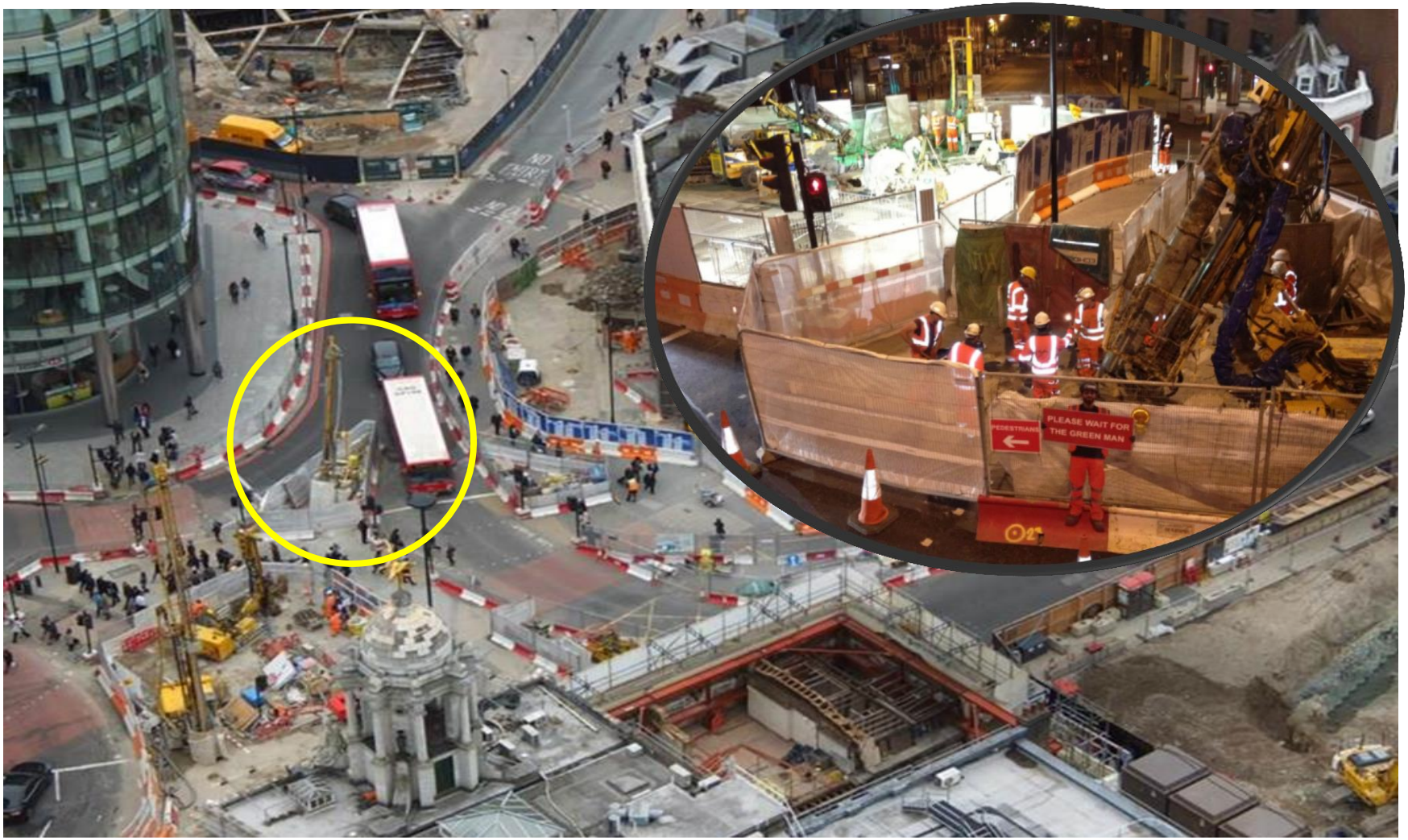
BAUSTELLENEINRICHTUNG



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LOGISTIK - BAUSTELLENEINRICHTUNG

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NACHBARBEBAUUNG

MONITORING - DEFORMATIONEN

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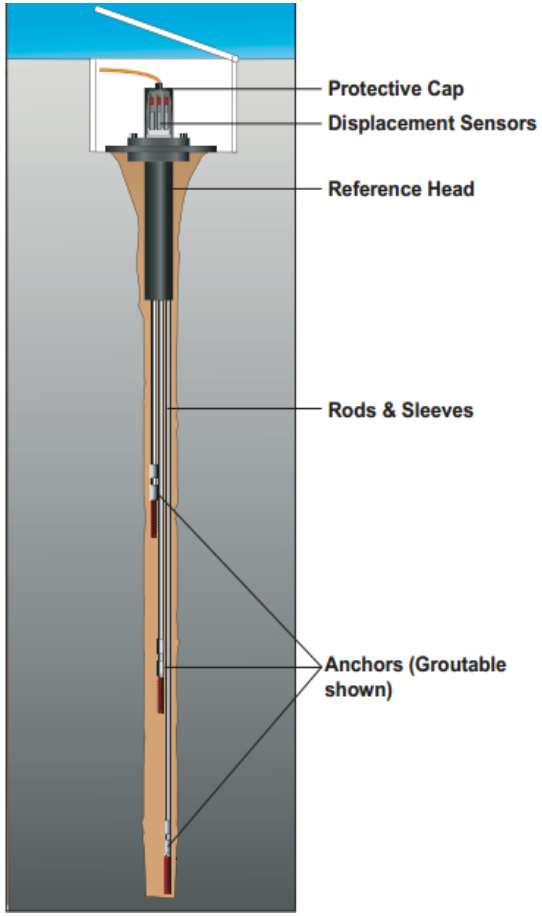
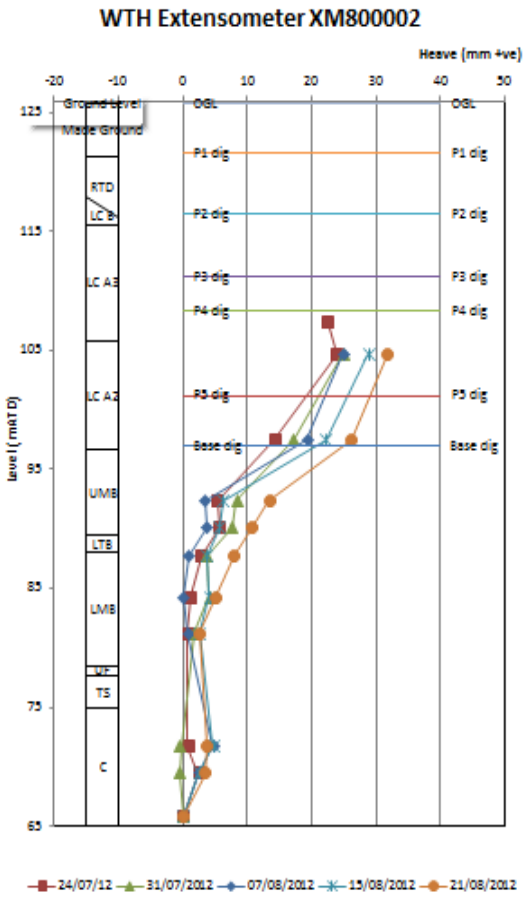
MONITORING - DEFORMATIONEN





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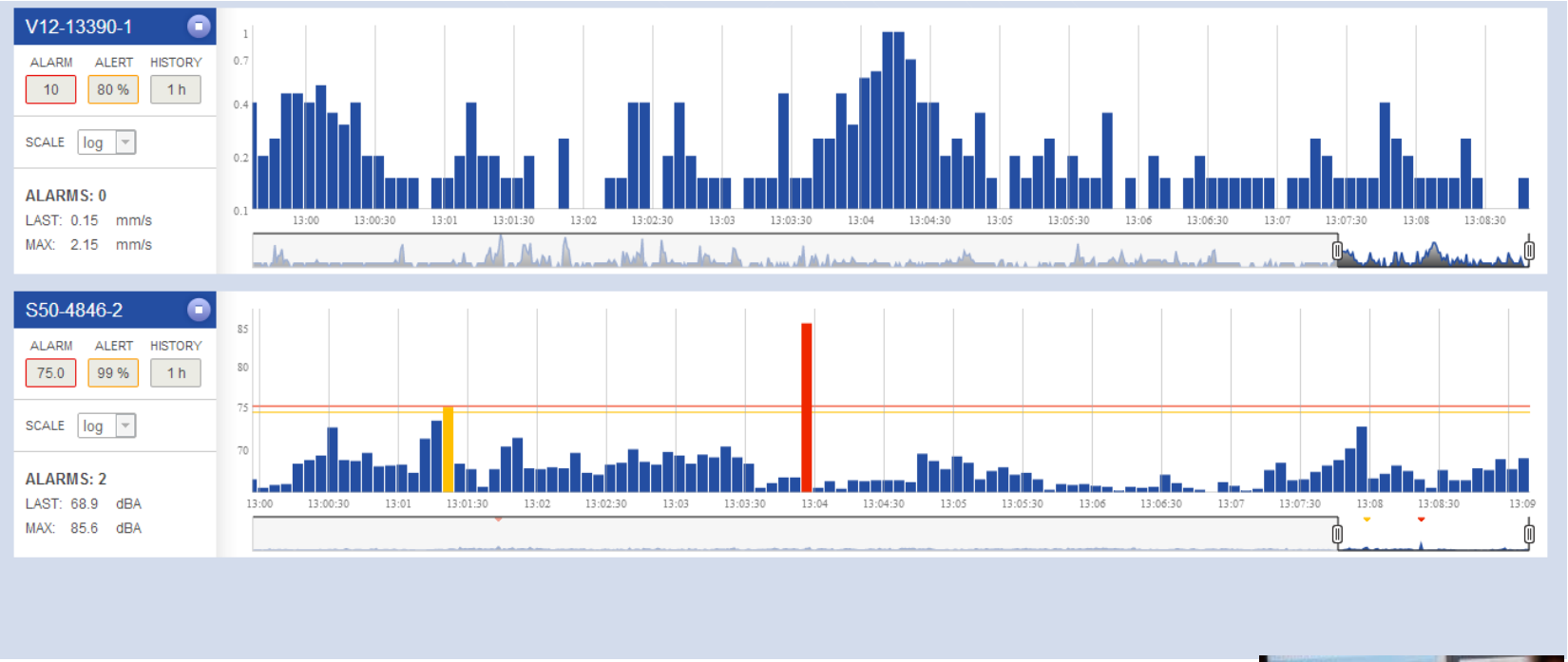
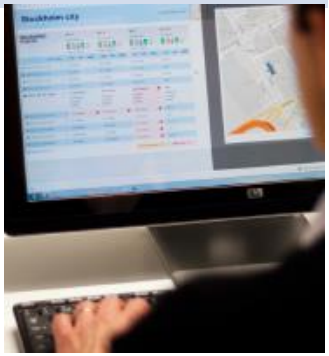
MONITORING - ERSCHÜTTERUNG – STAUB/LÄRM





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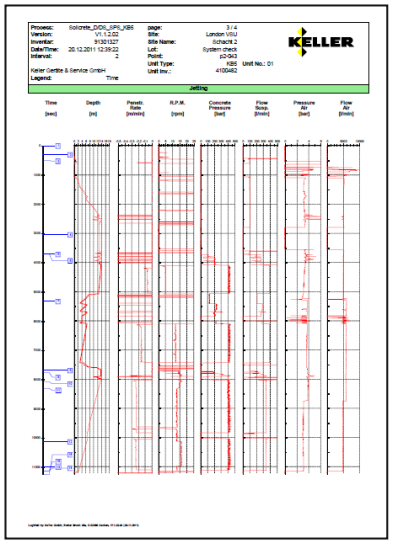
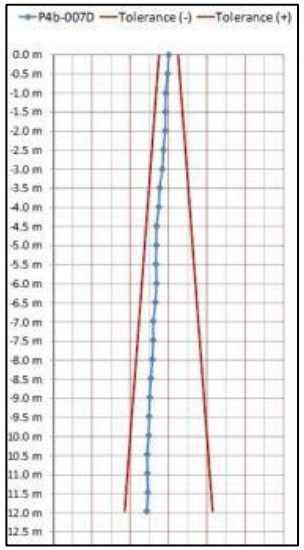
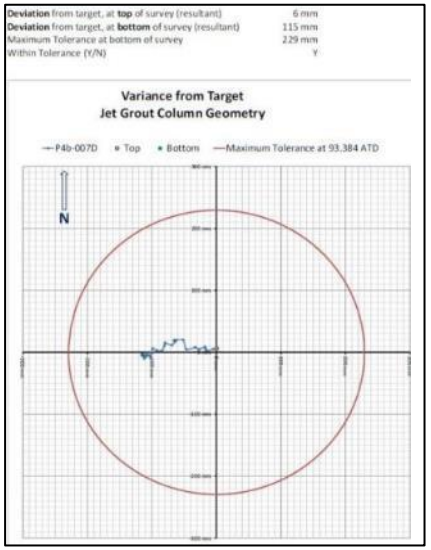
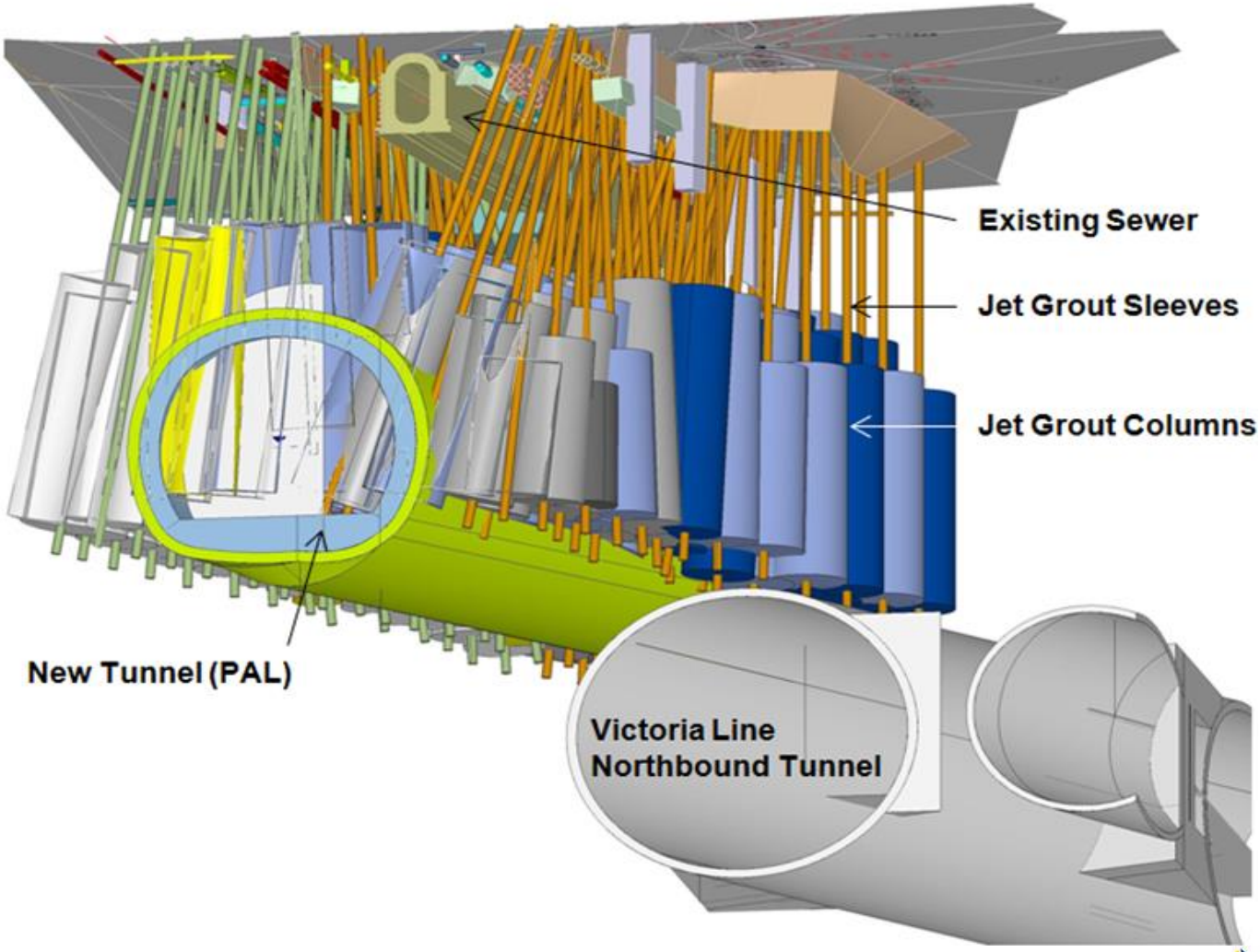
QUALITÄTSSICHERUNG





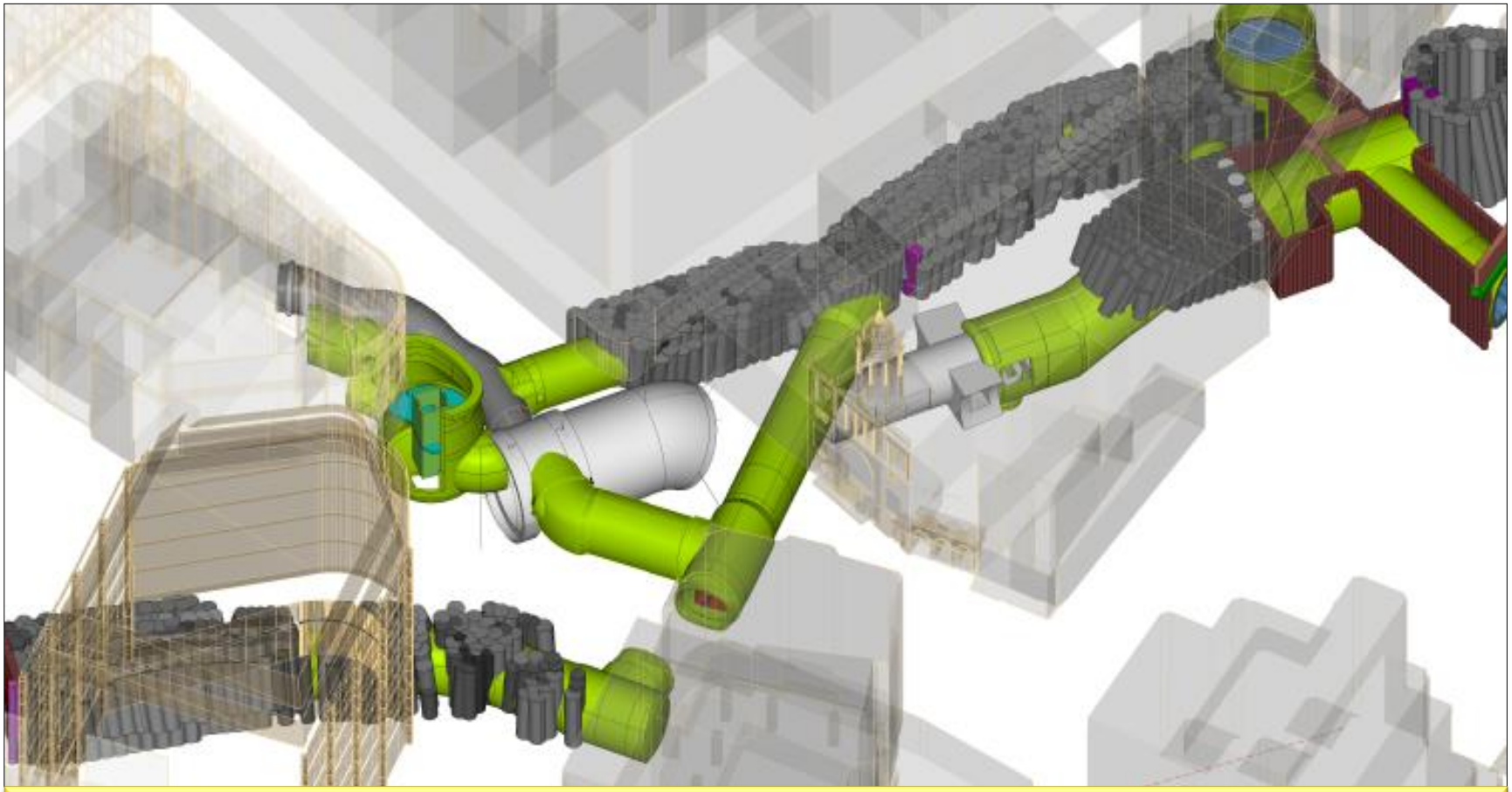


BIM


Existing Sewer
Jet Grout Sleeves
Jet Grout Columns
New Tunnel (PAL)
Victoria Line
Northbound Tunnel

KELLER

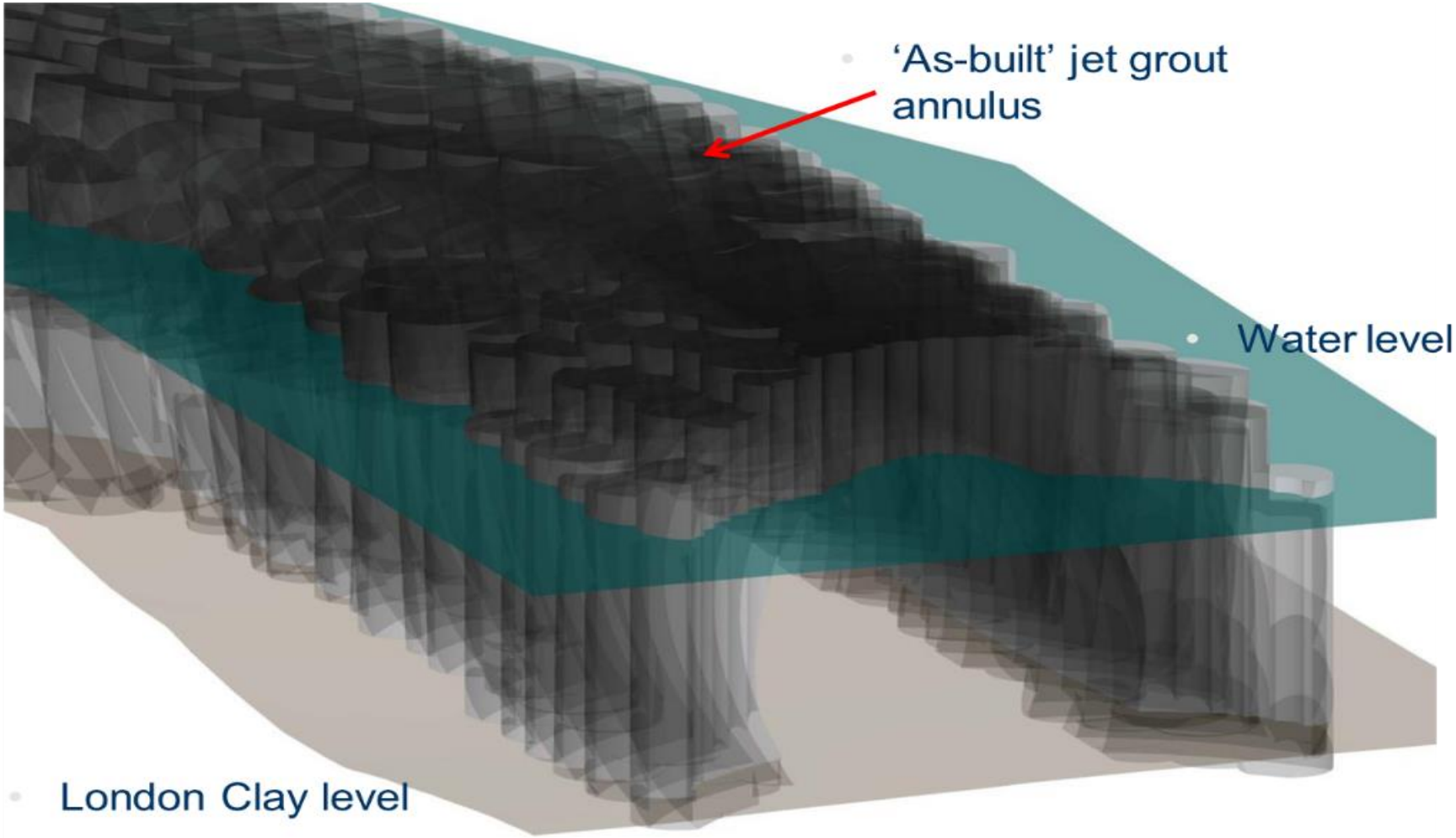
BIM



2.200 Säulen, 26.180 m Bohren, 16.060 m Düsen

KELLER

BIM - Abschlag für Abschlag



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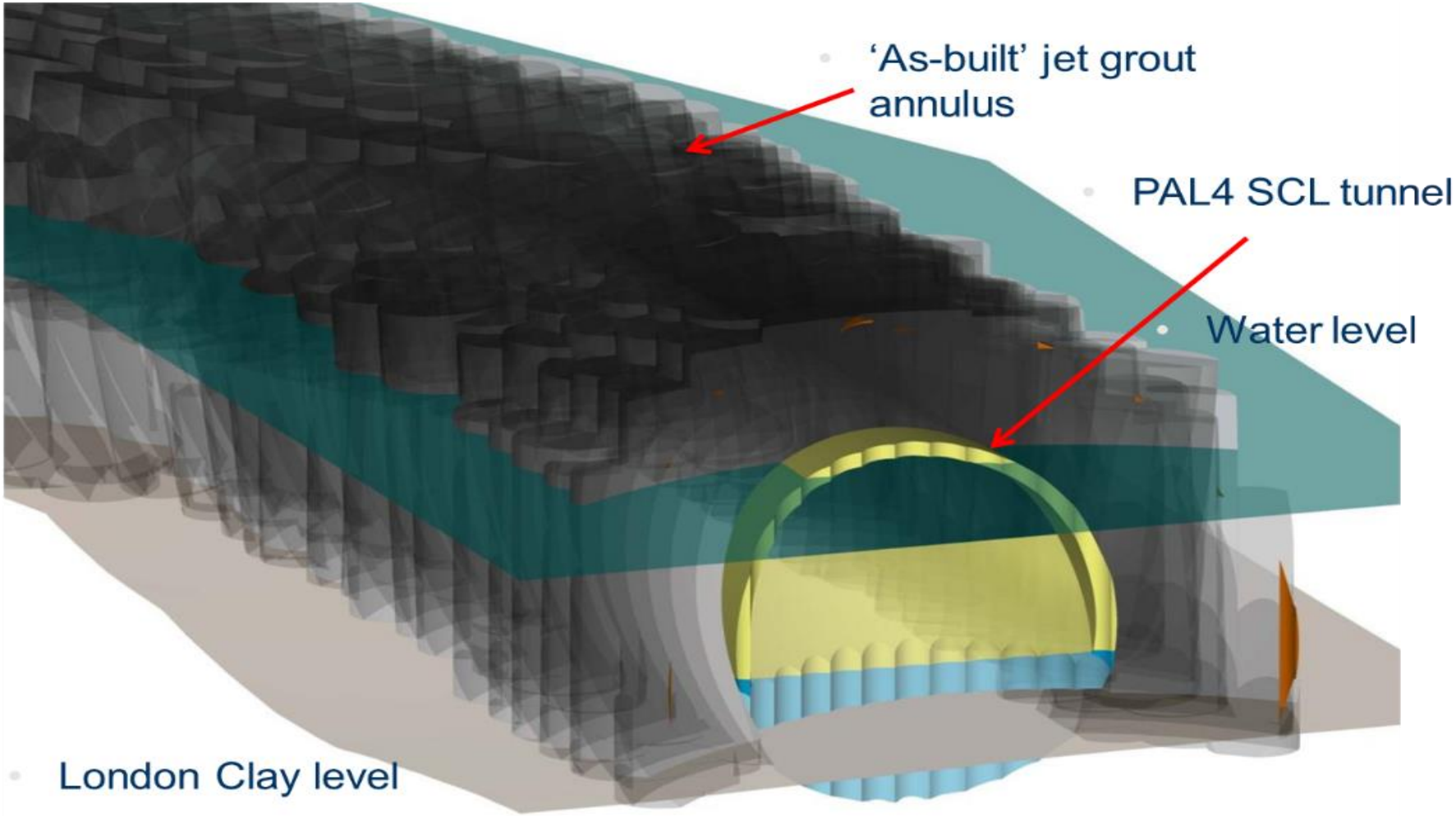

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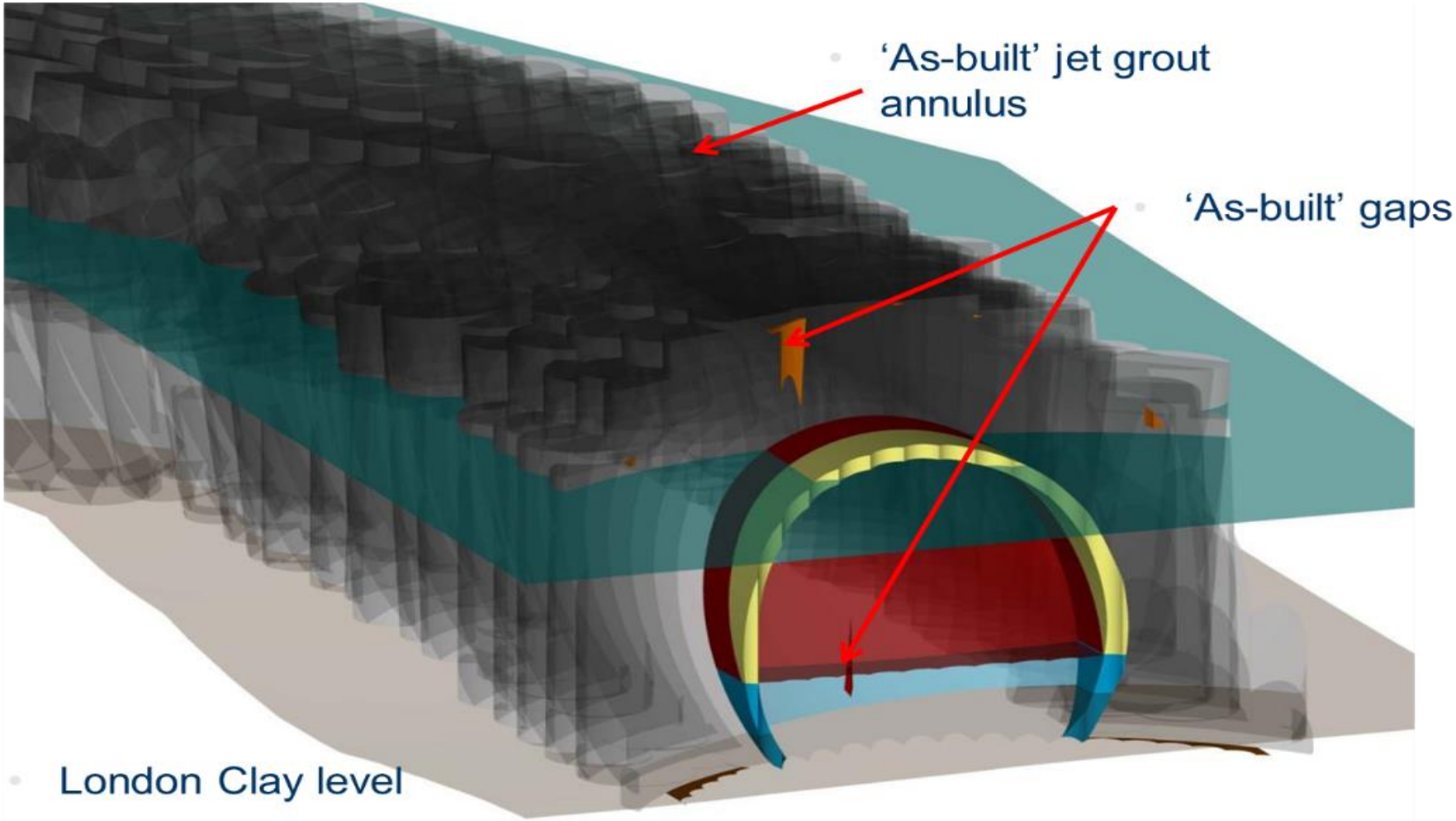

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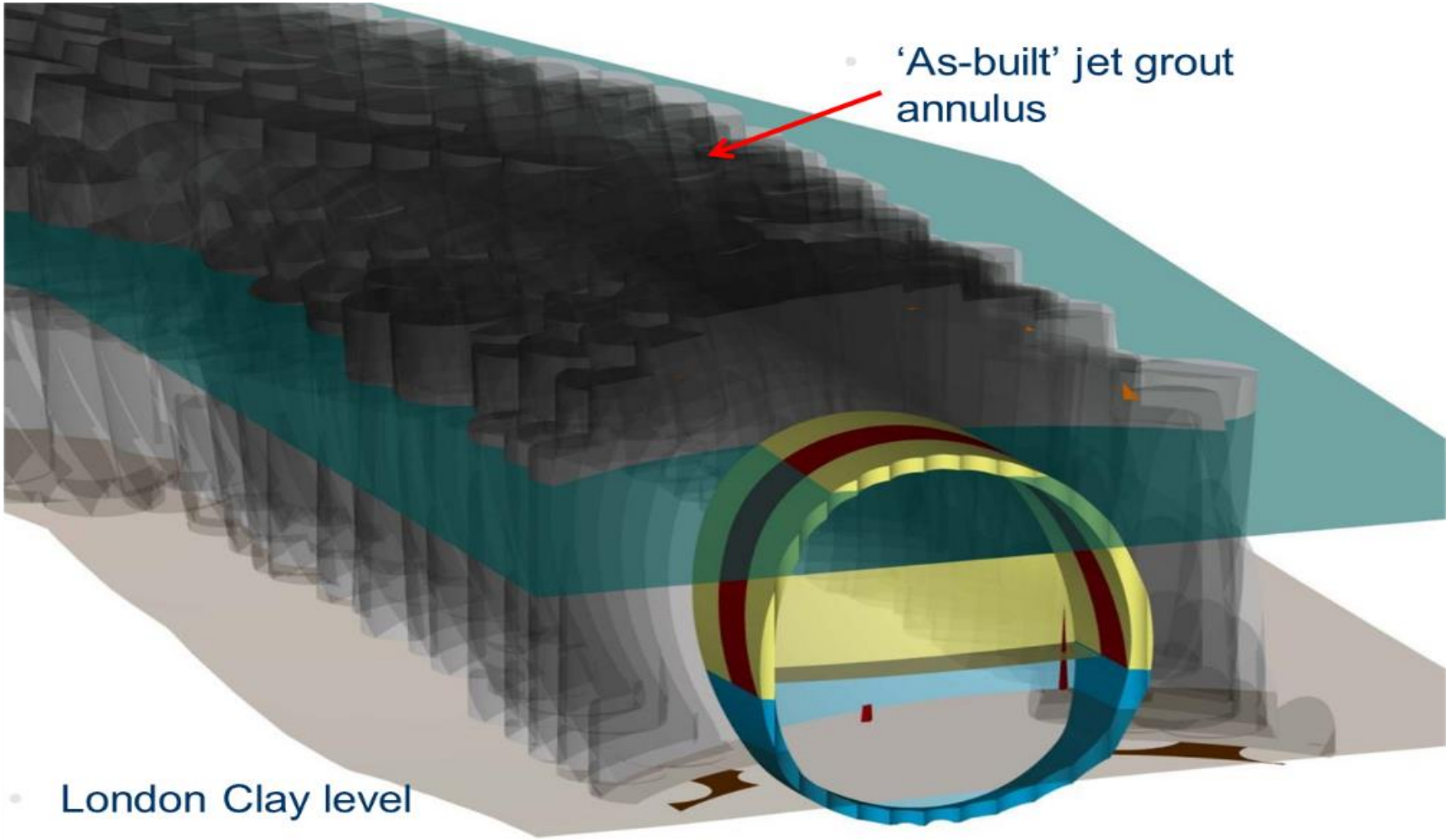

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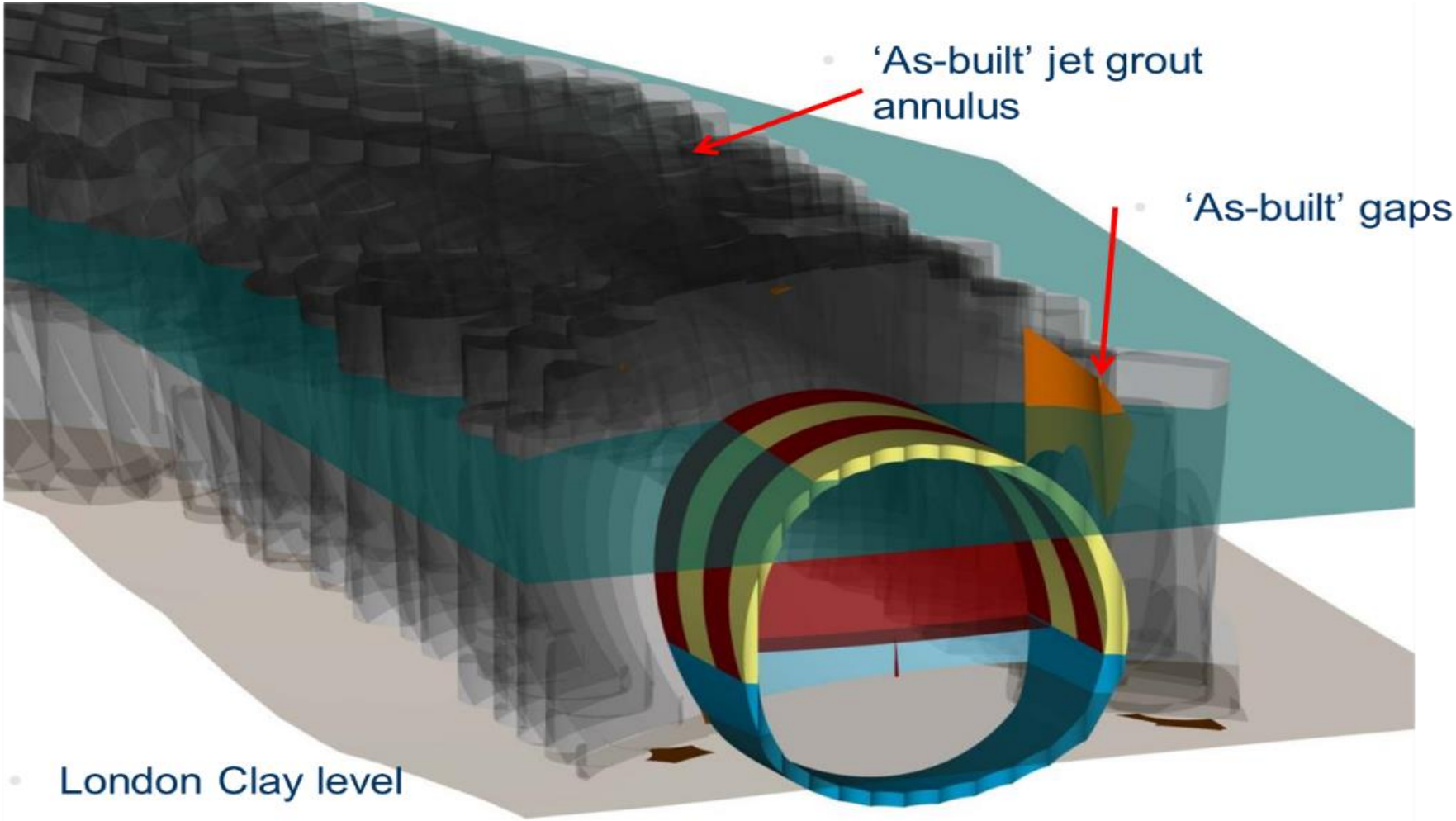

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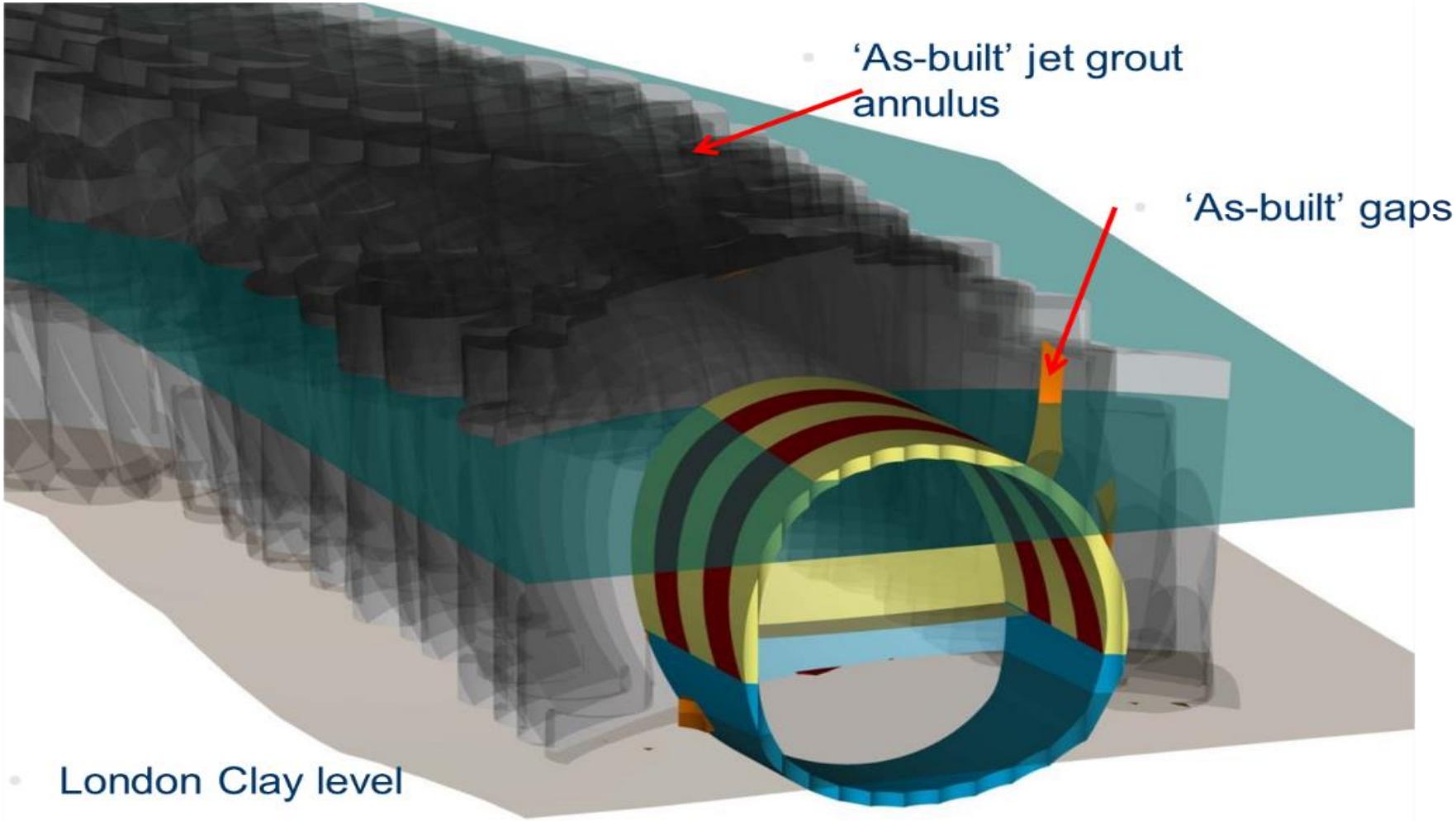

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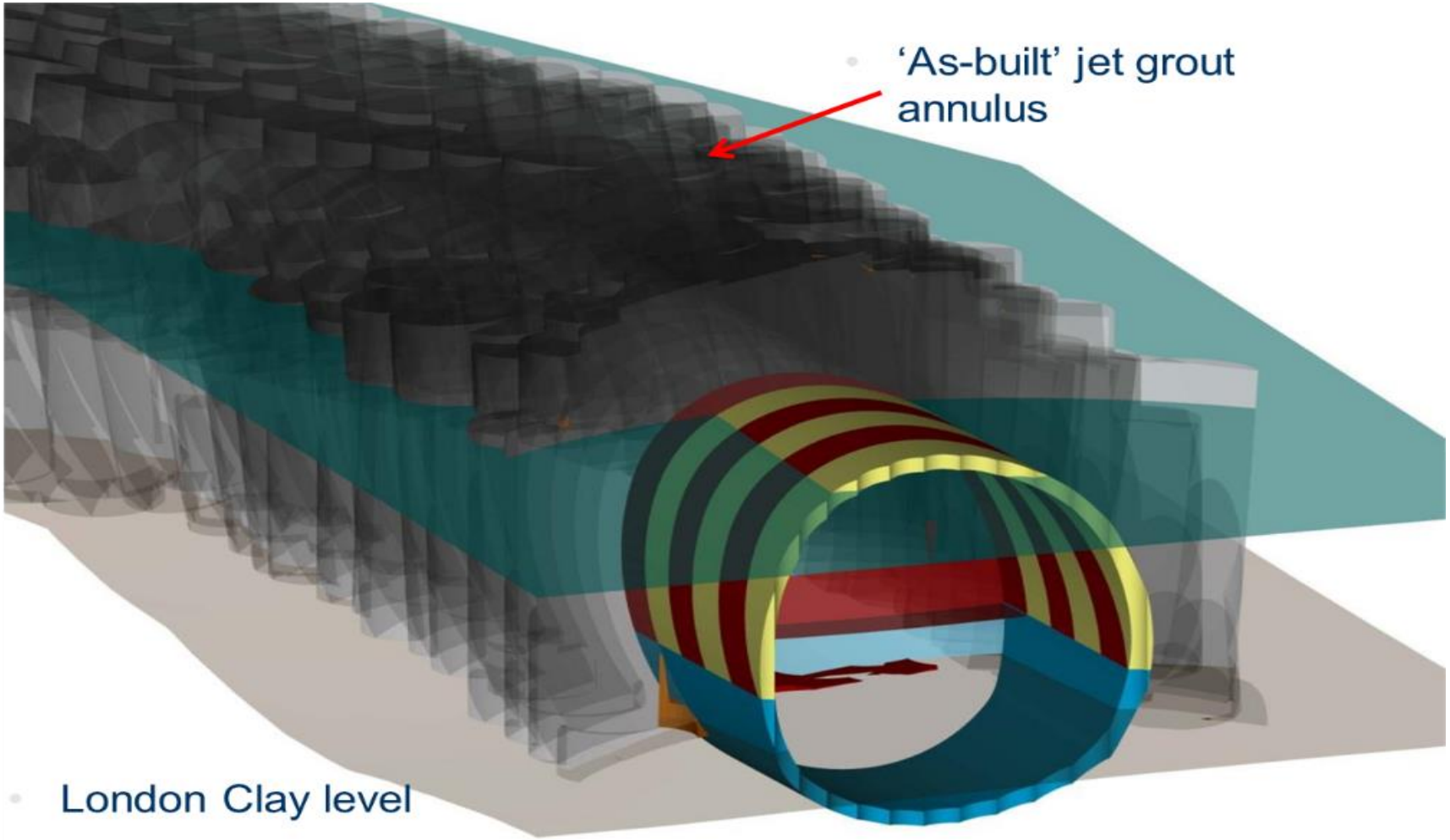

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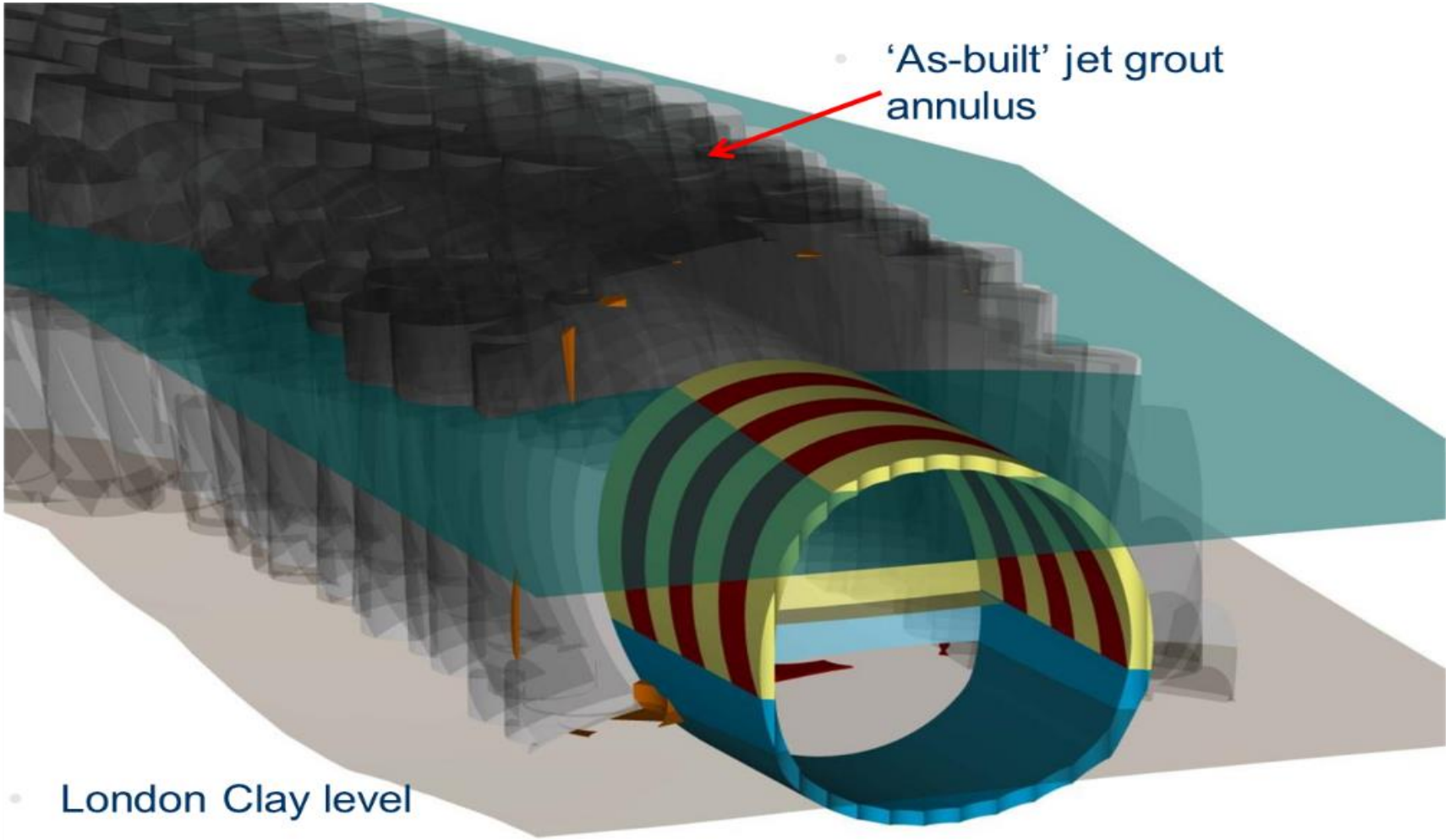

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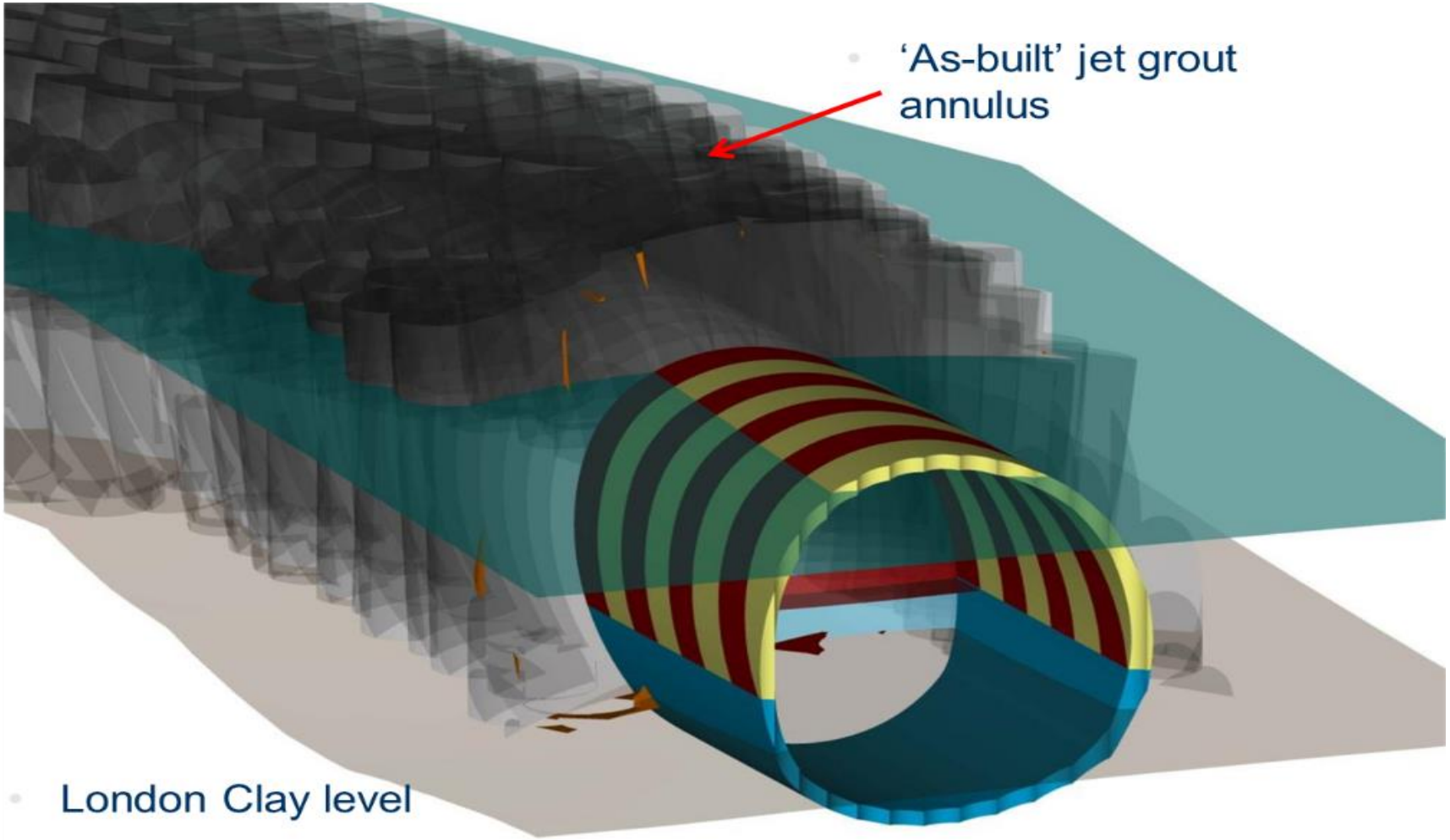

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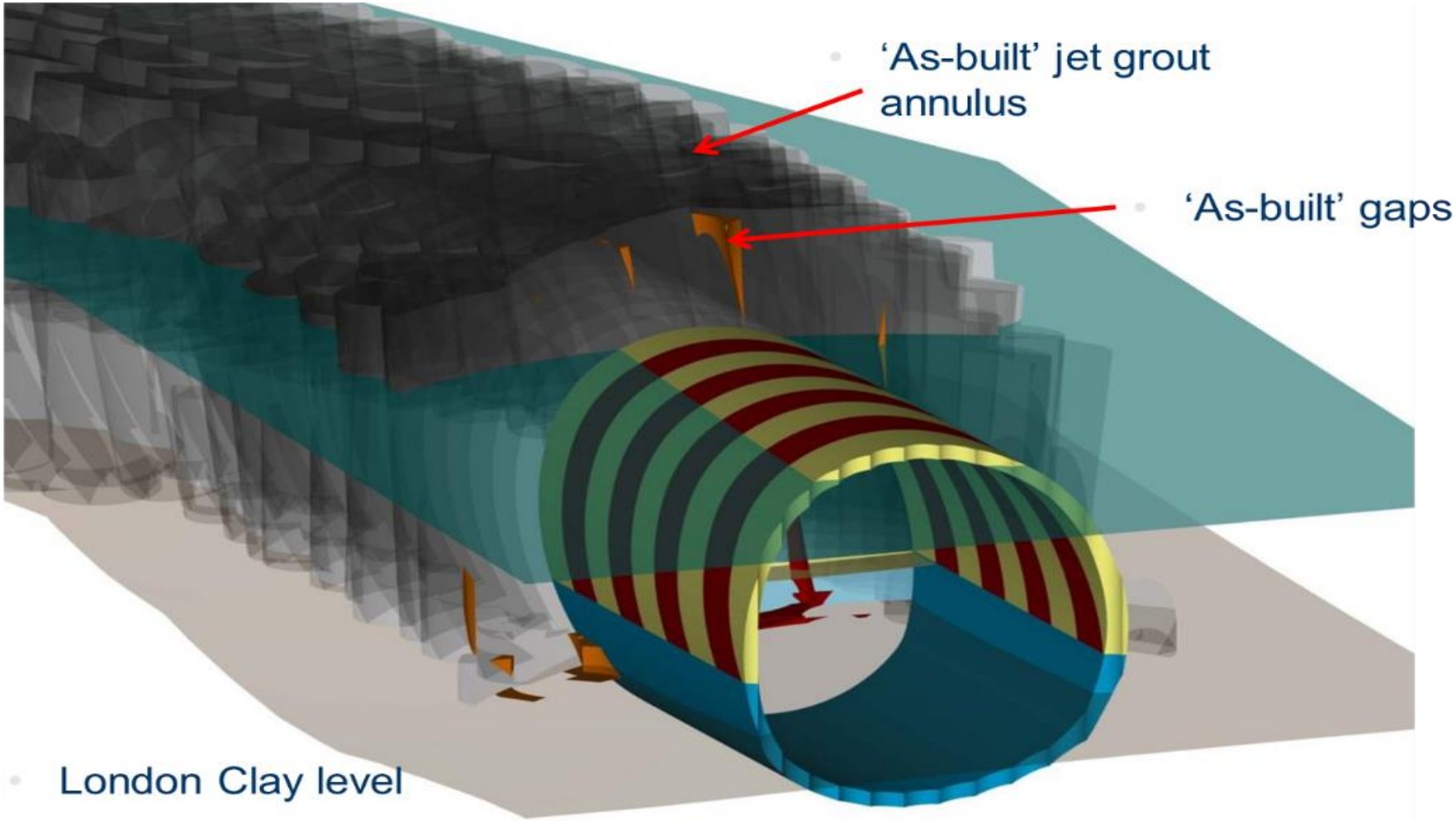

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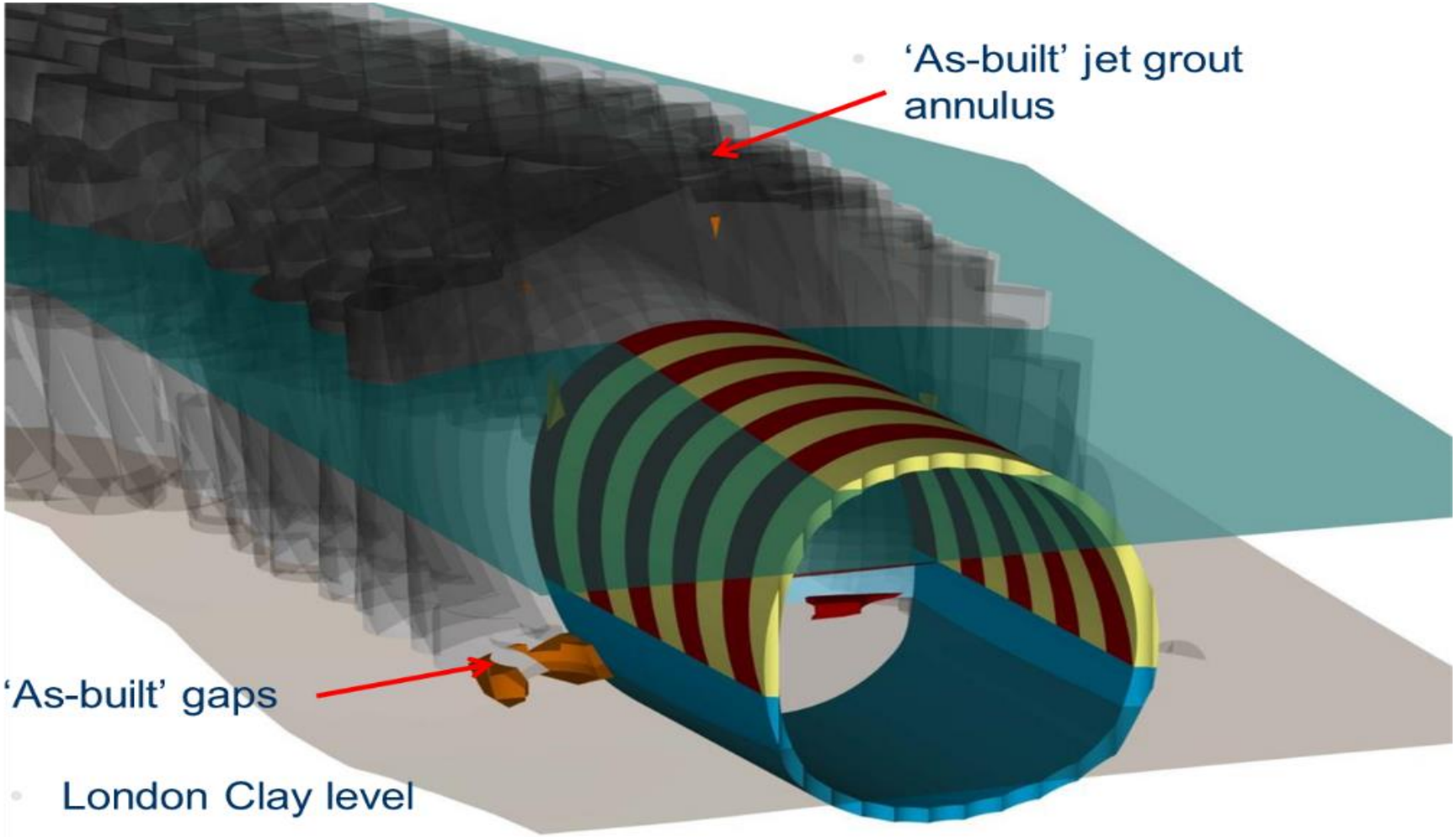

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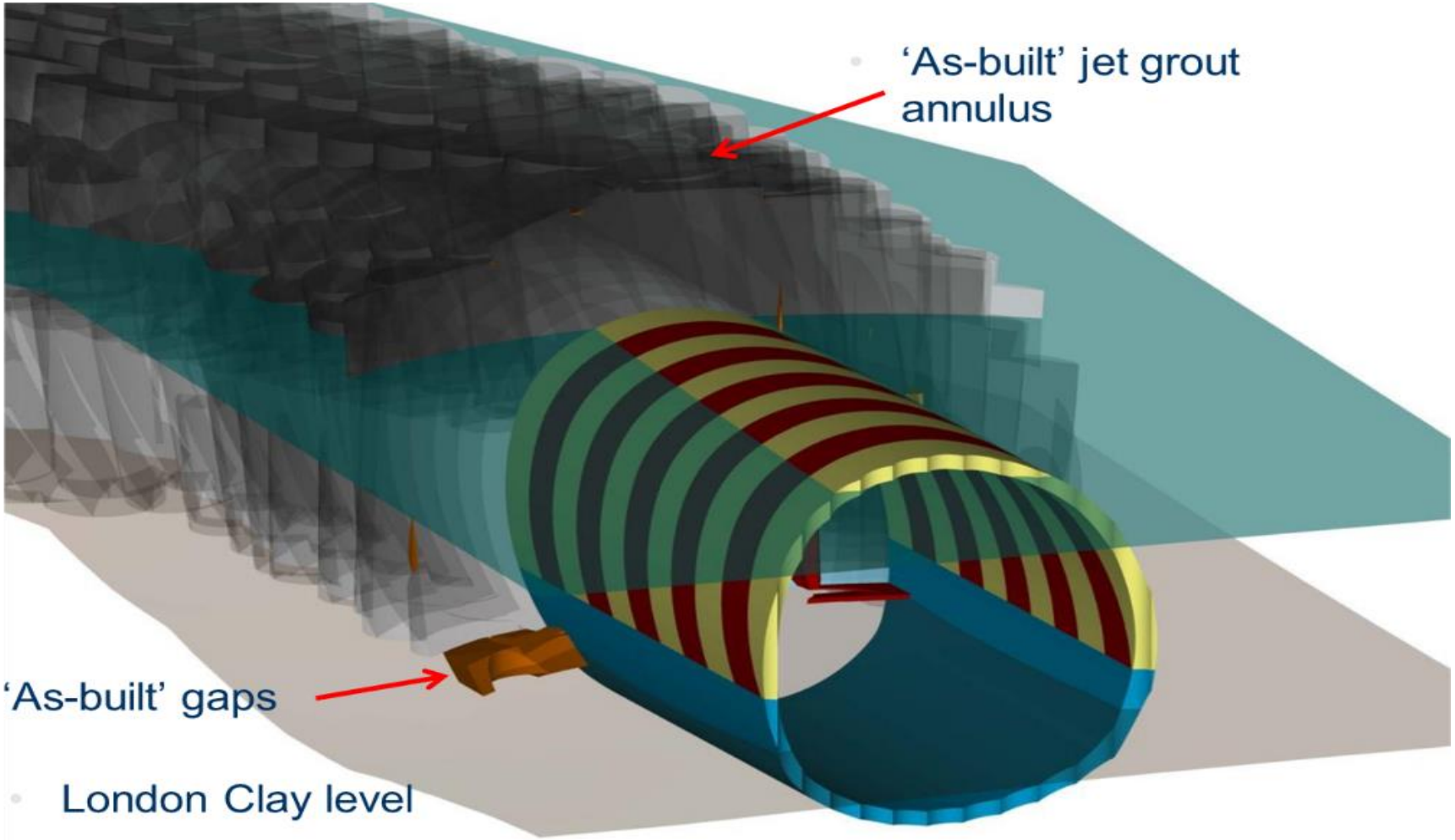

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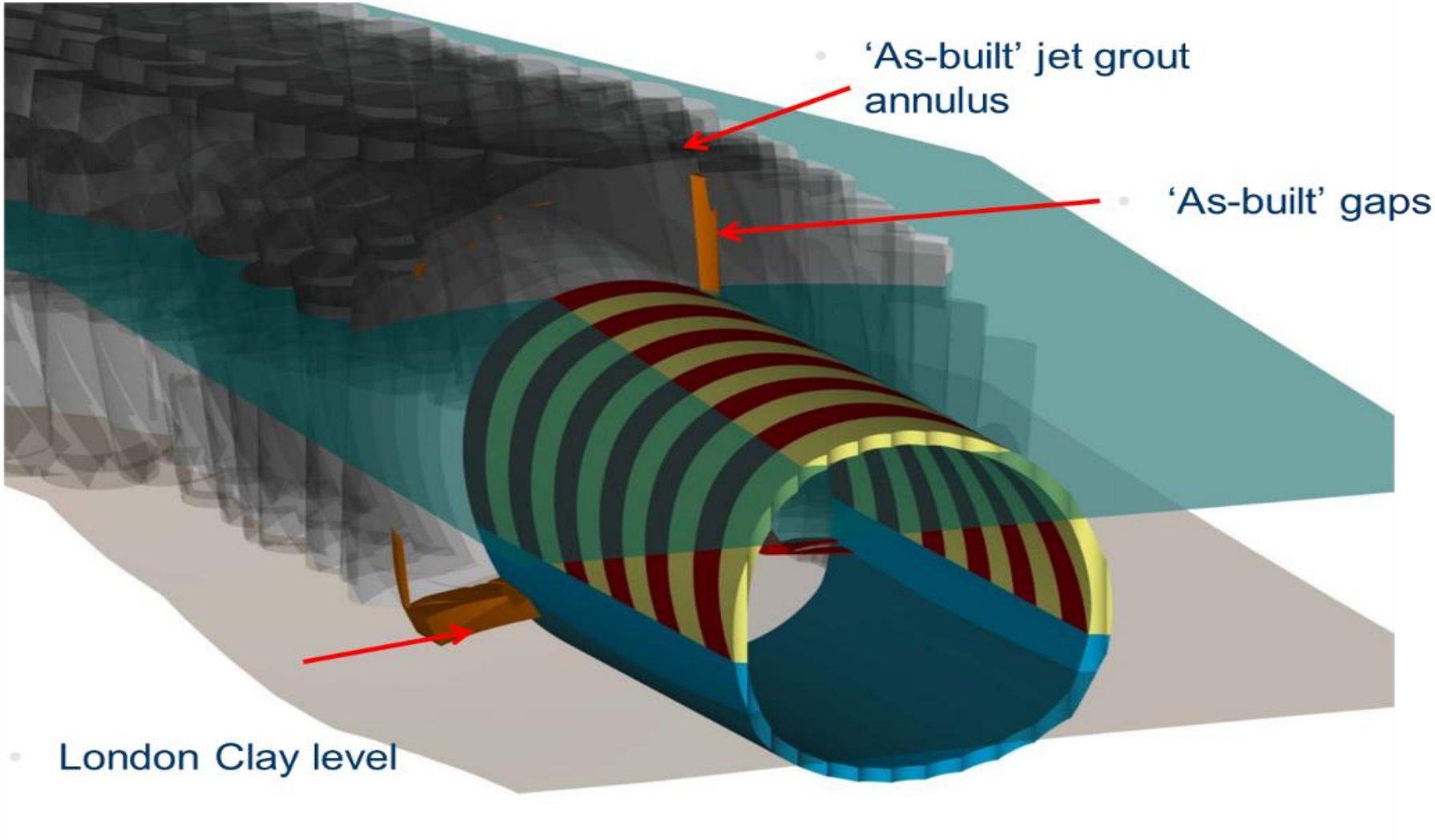

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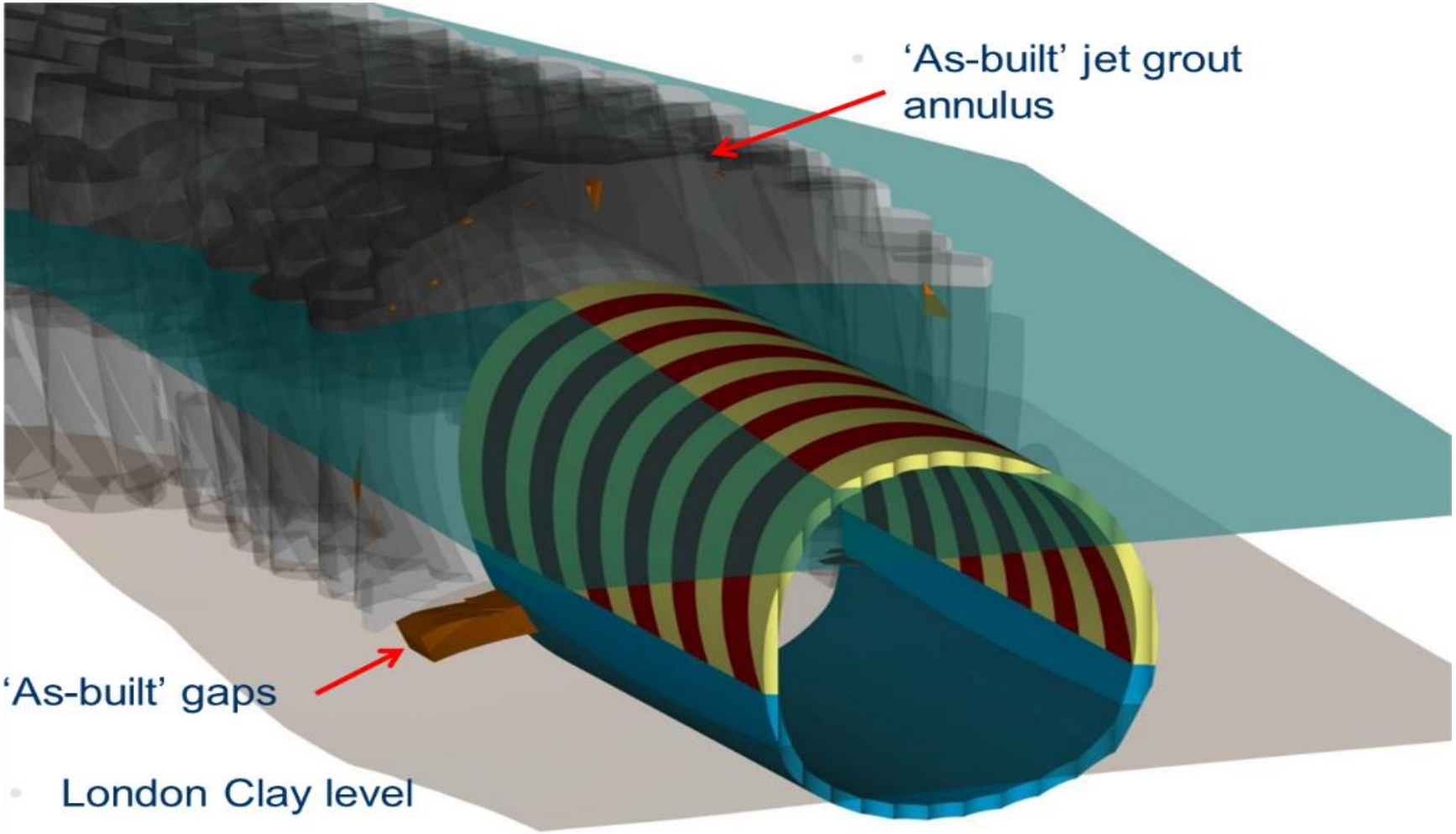

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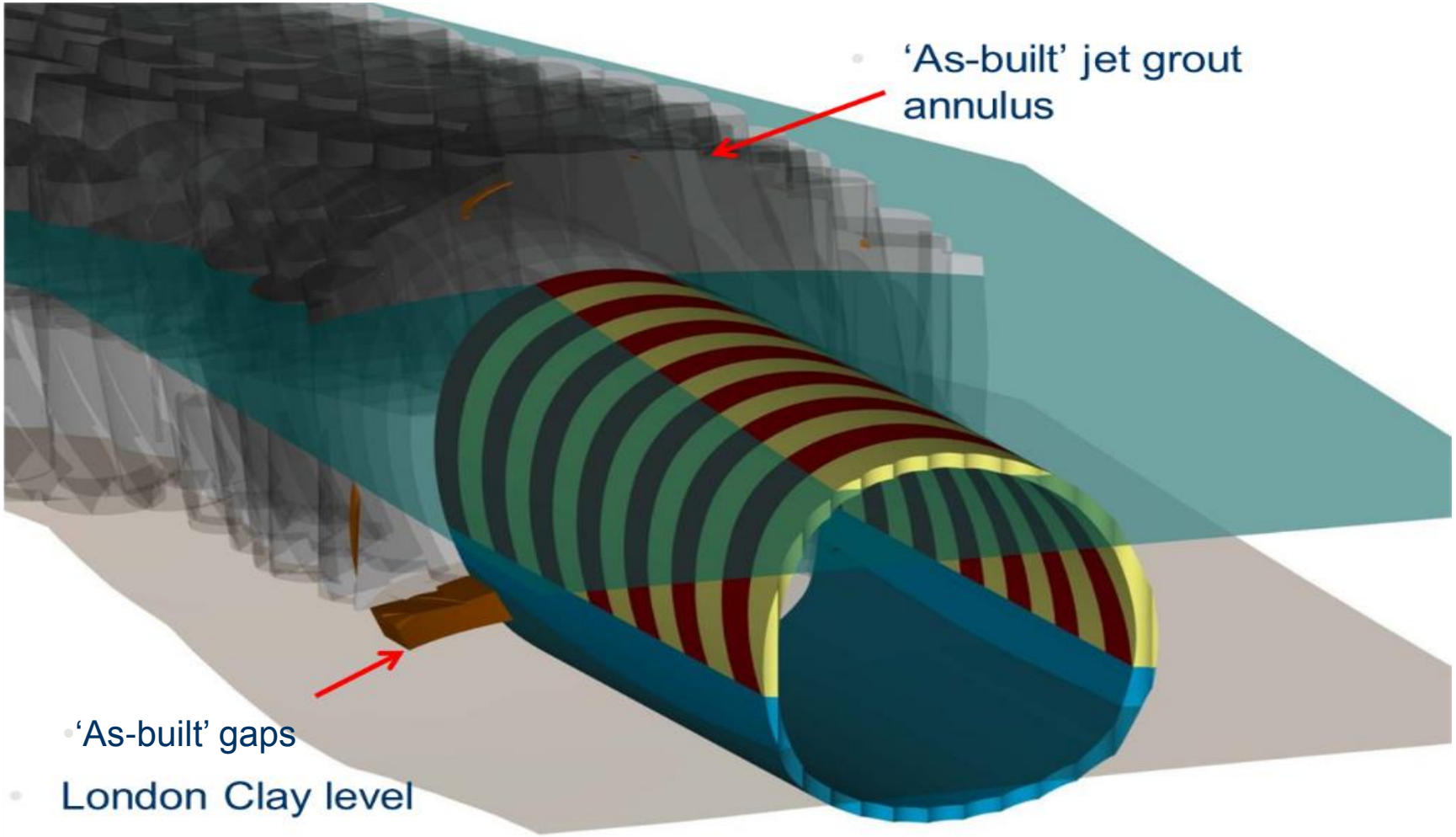

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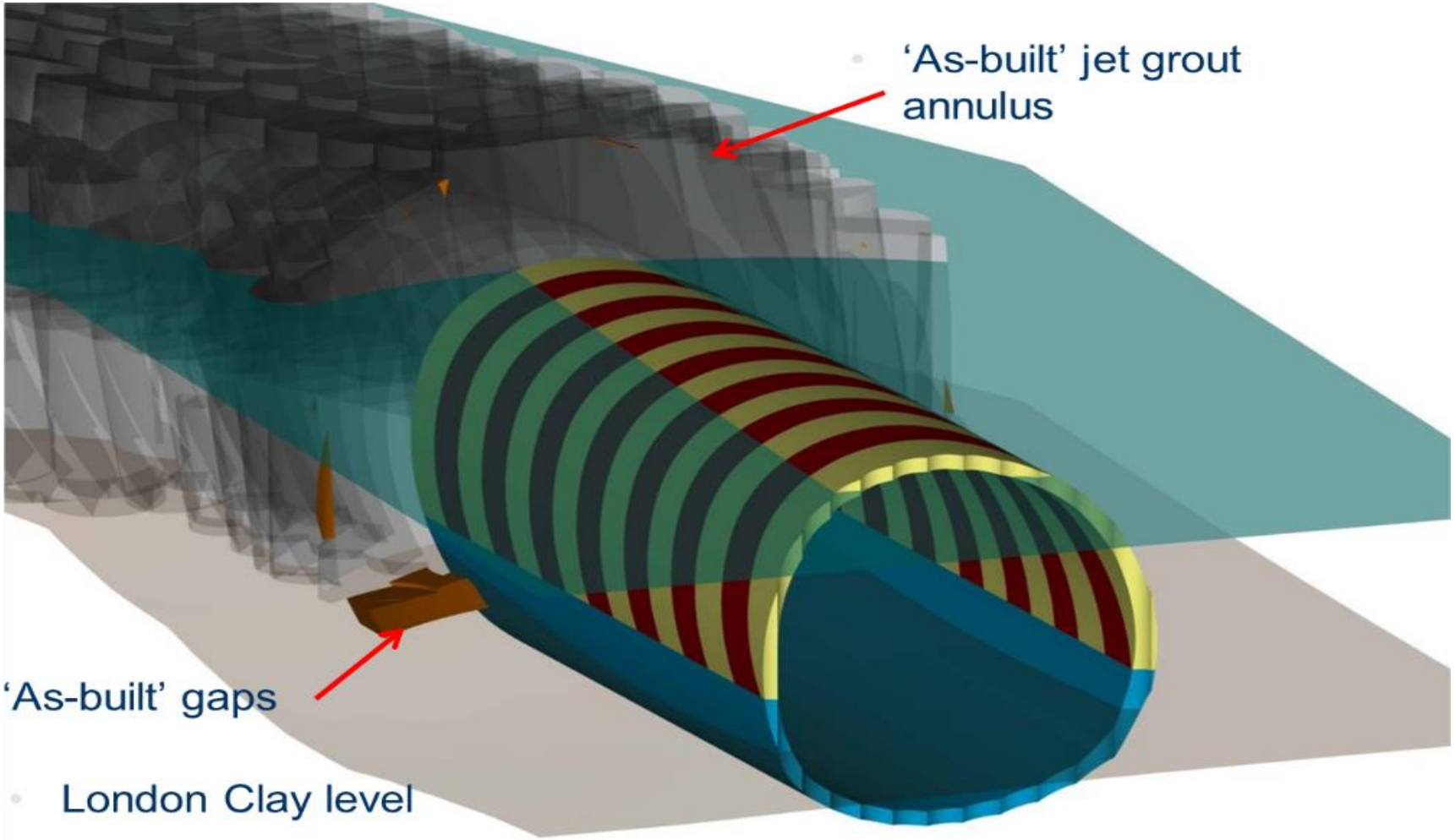

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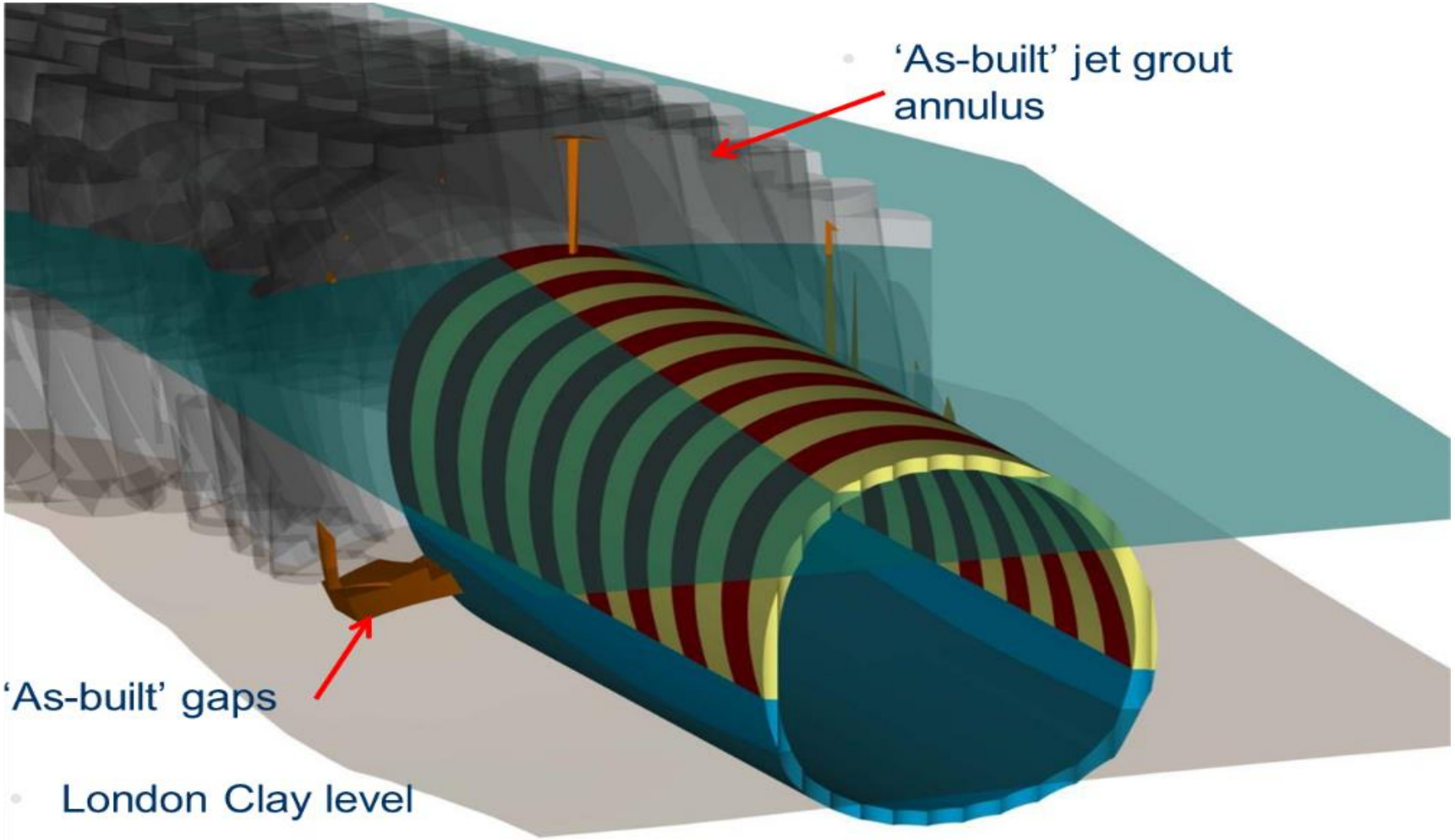

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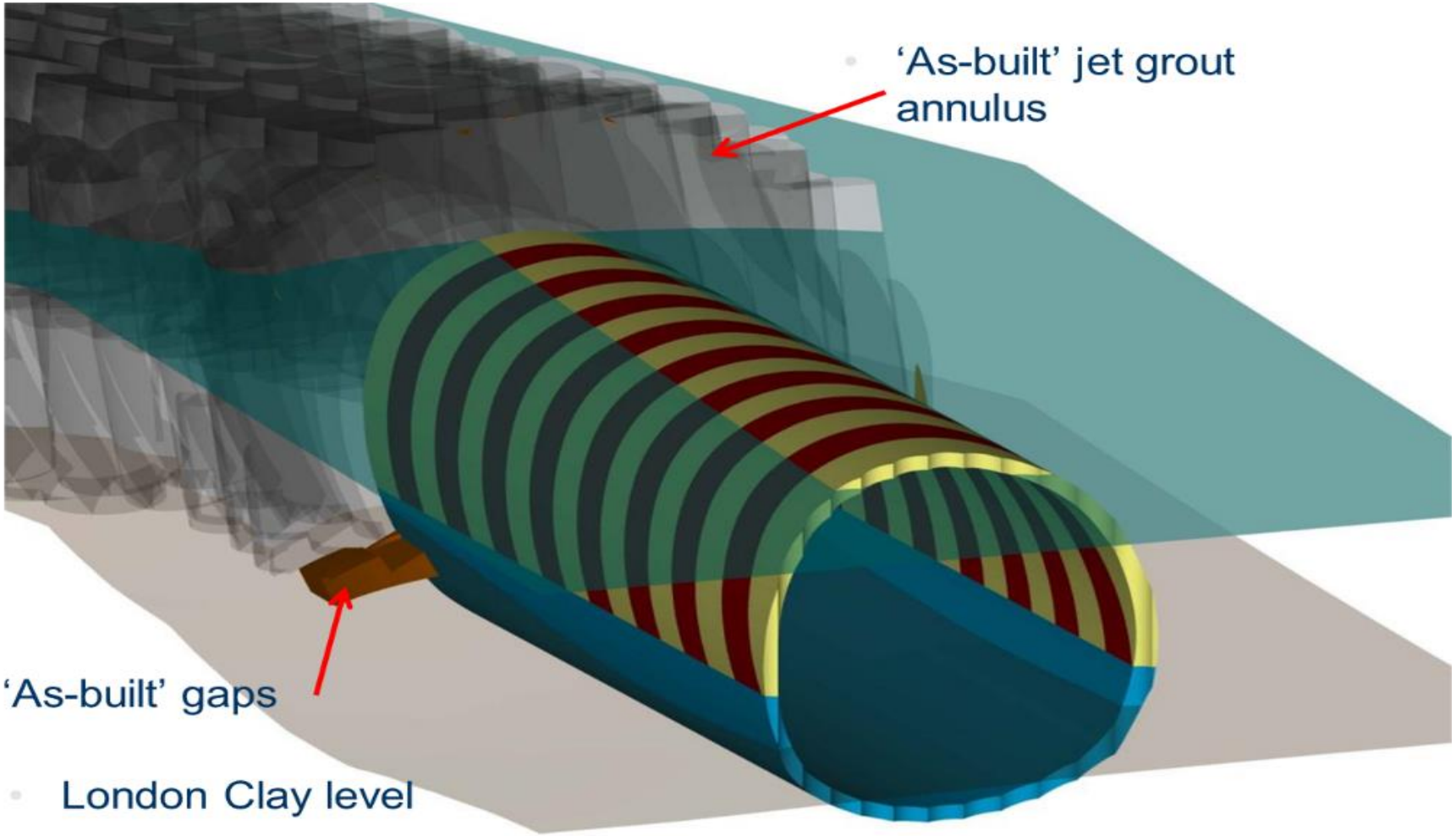

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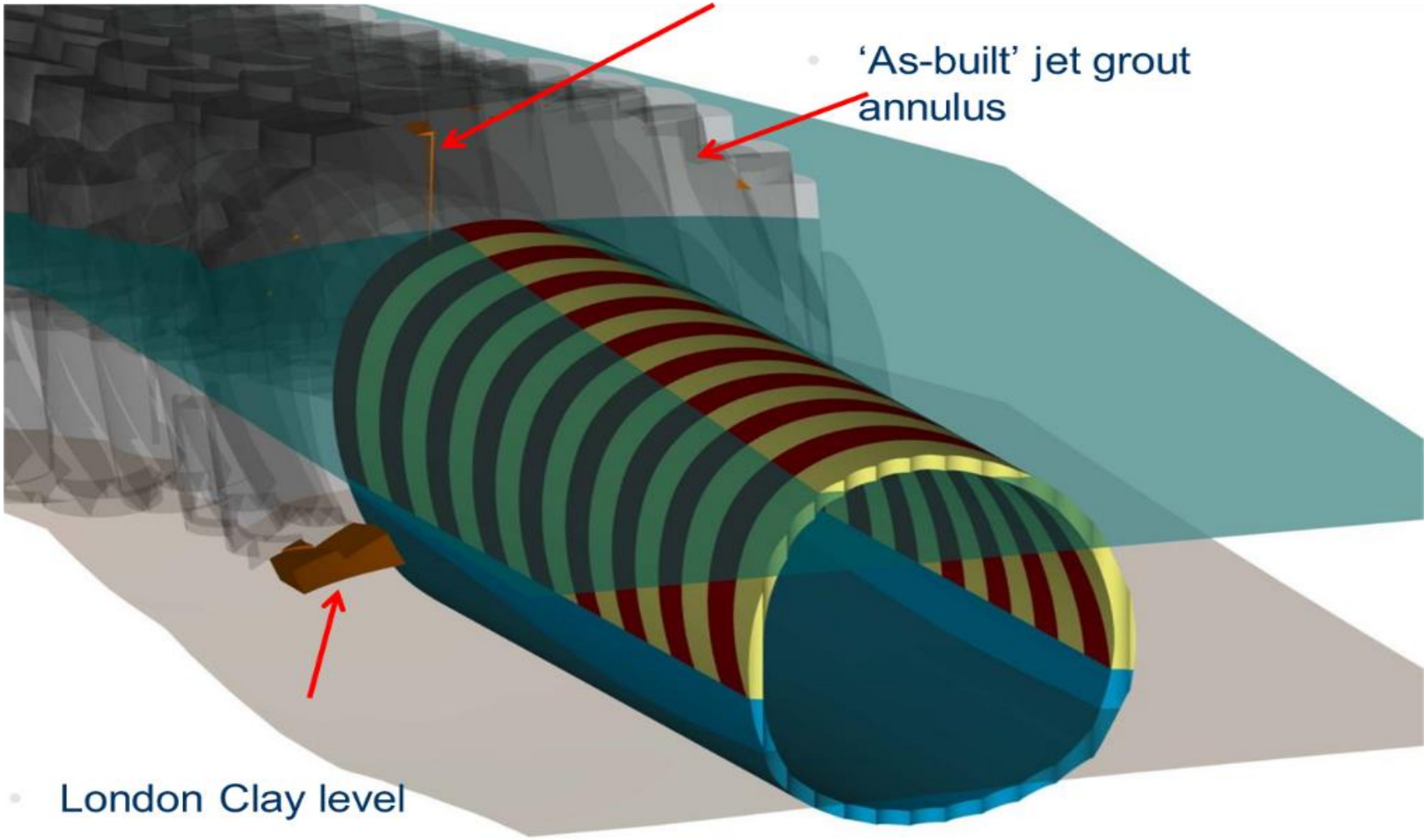

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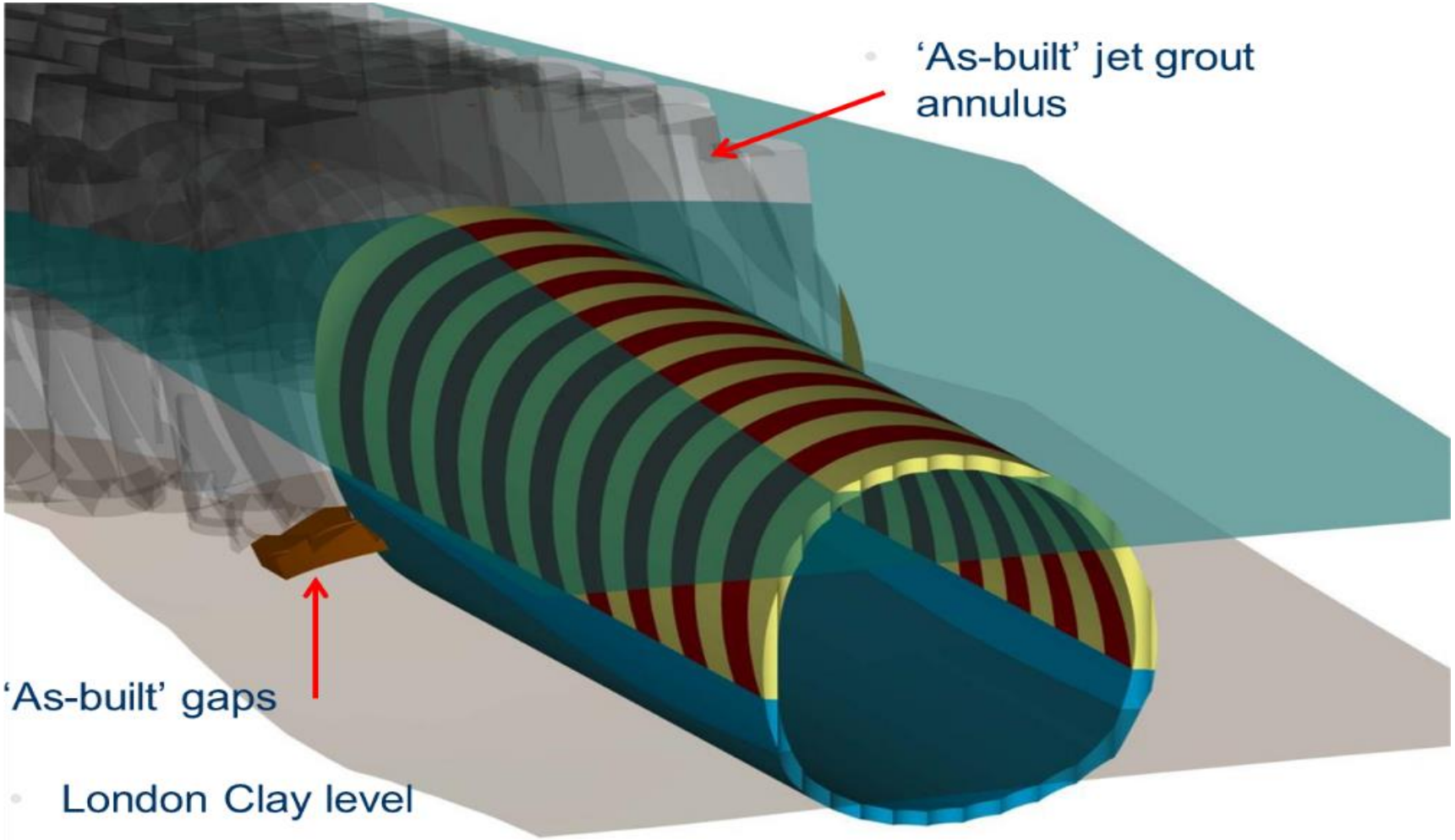

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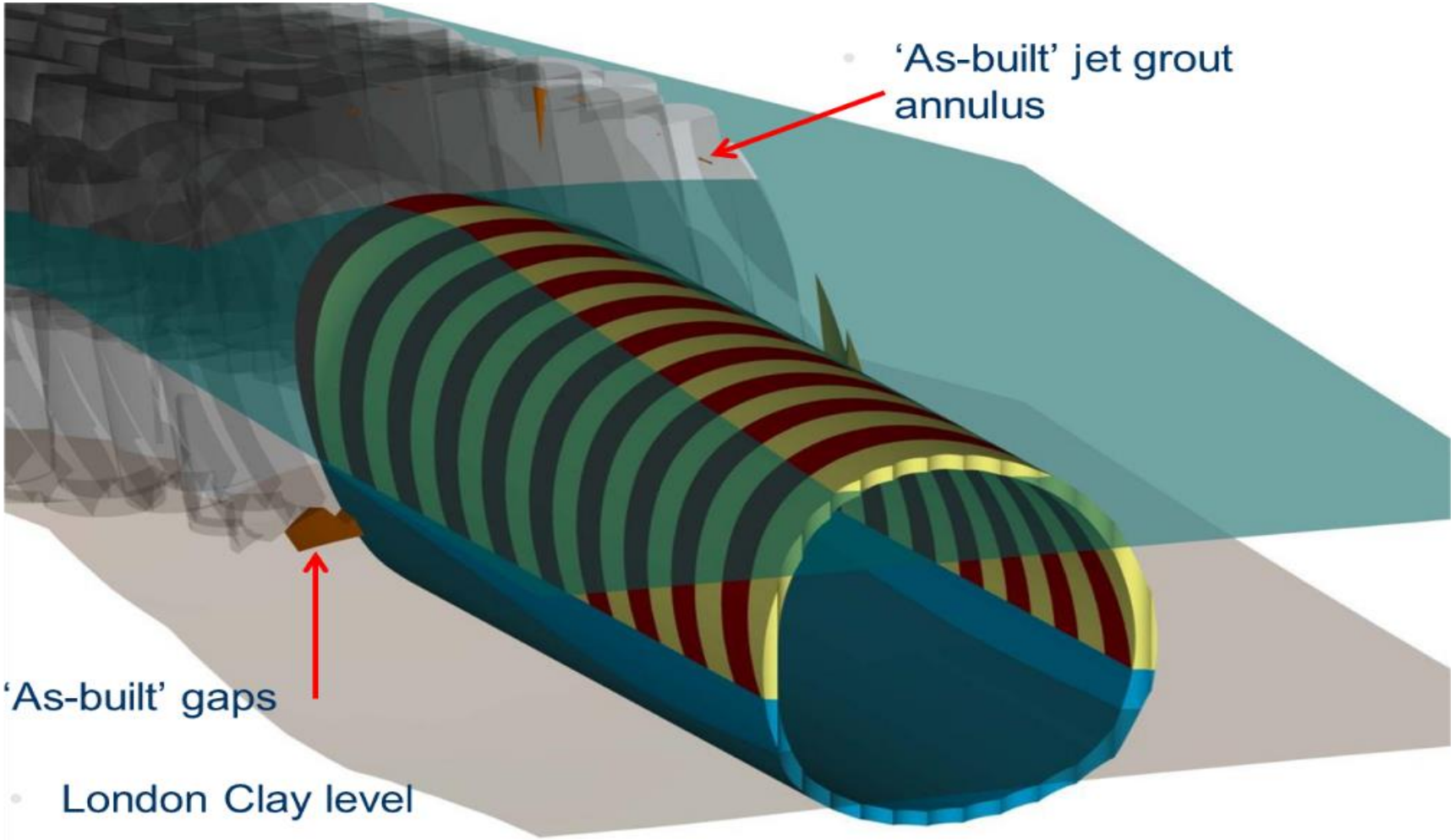

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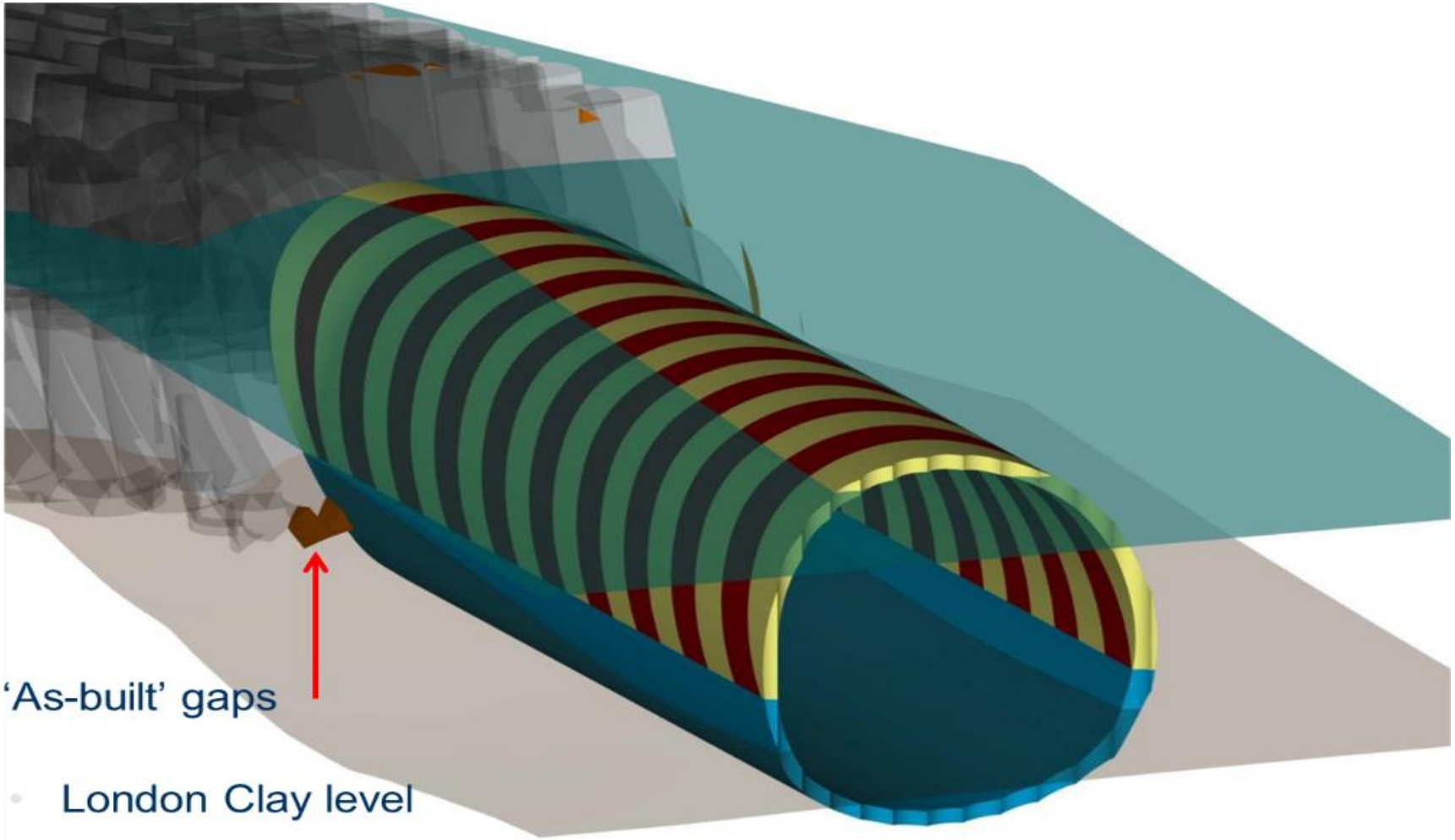

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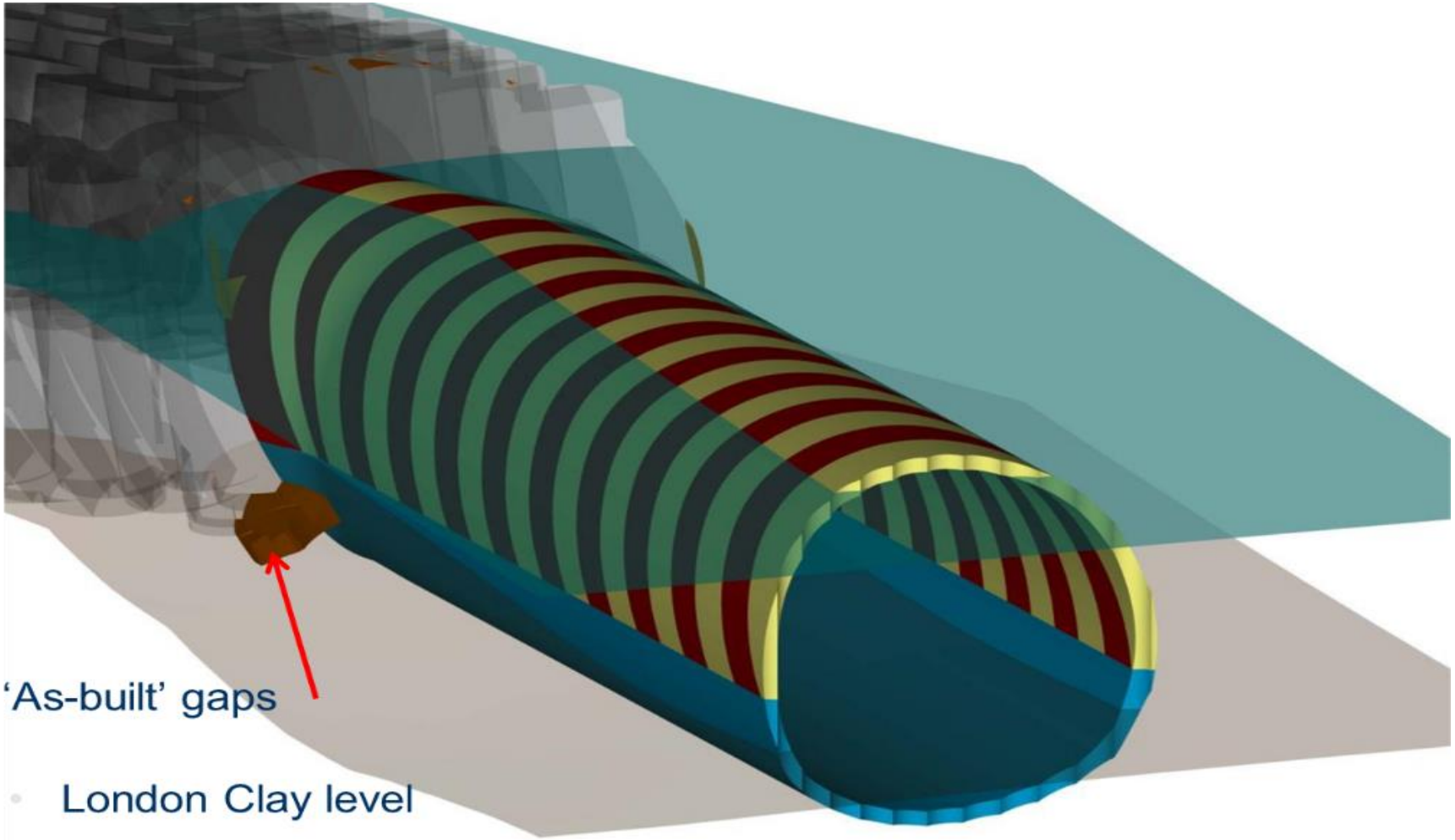

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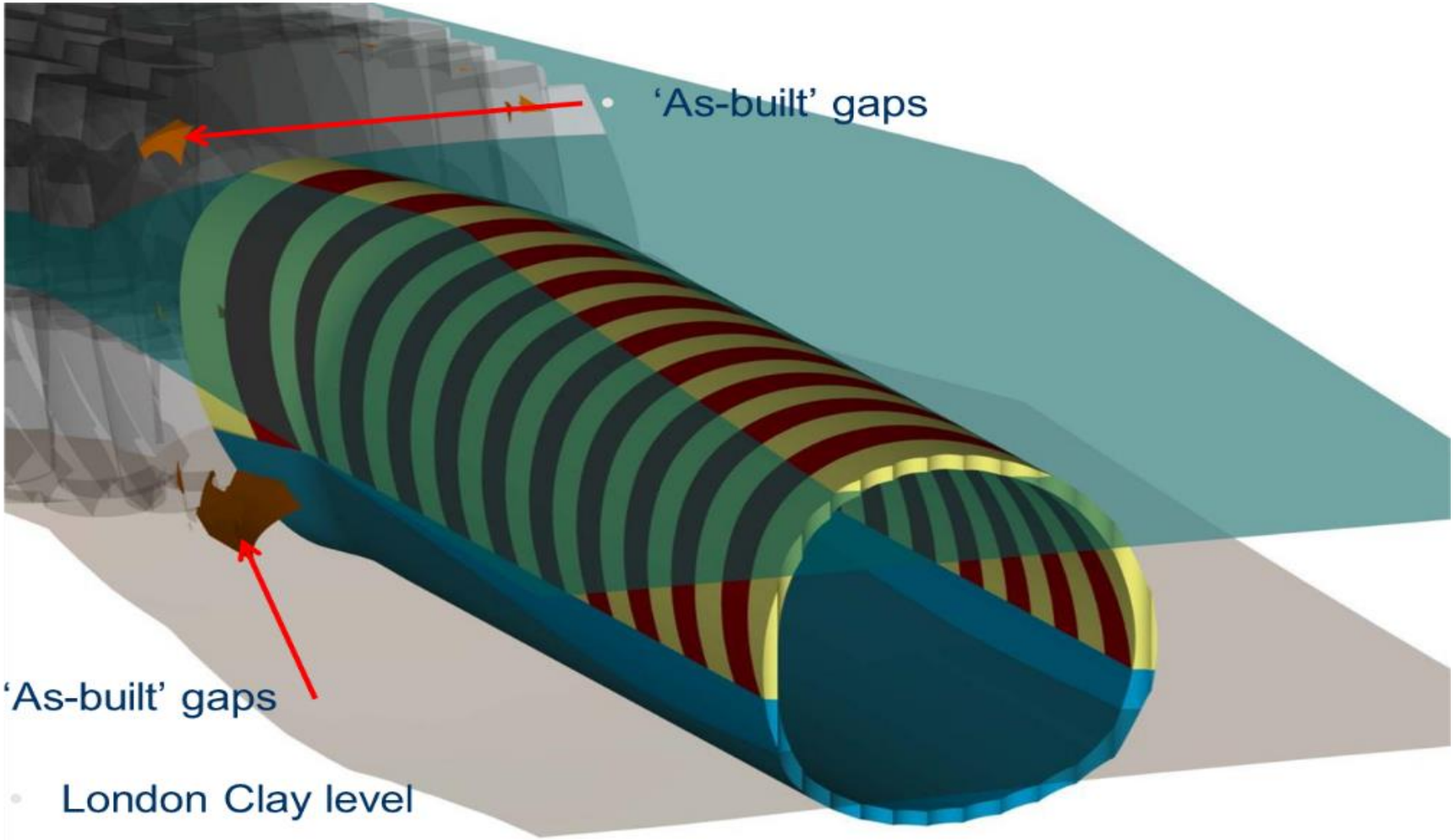

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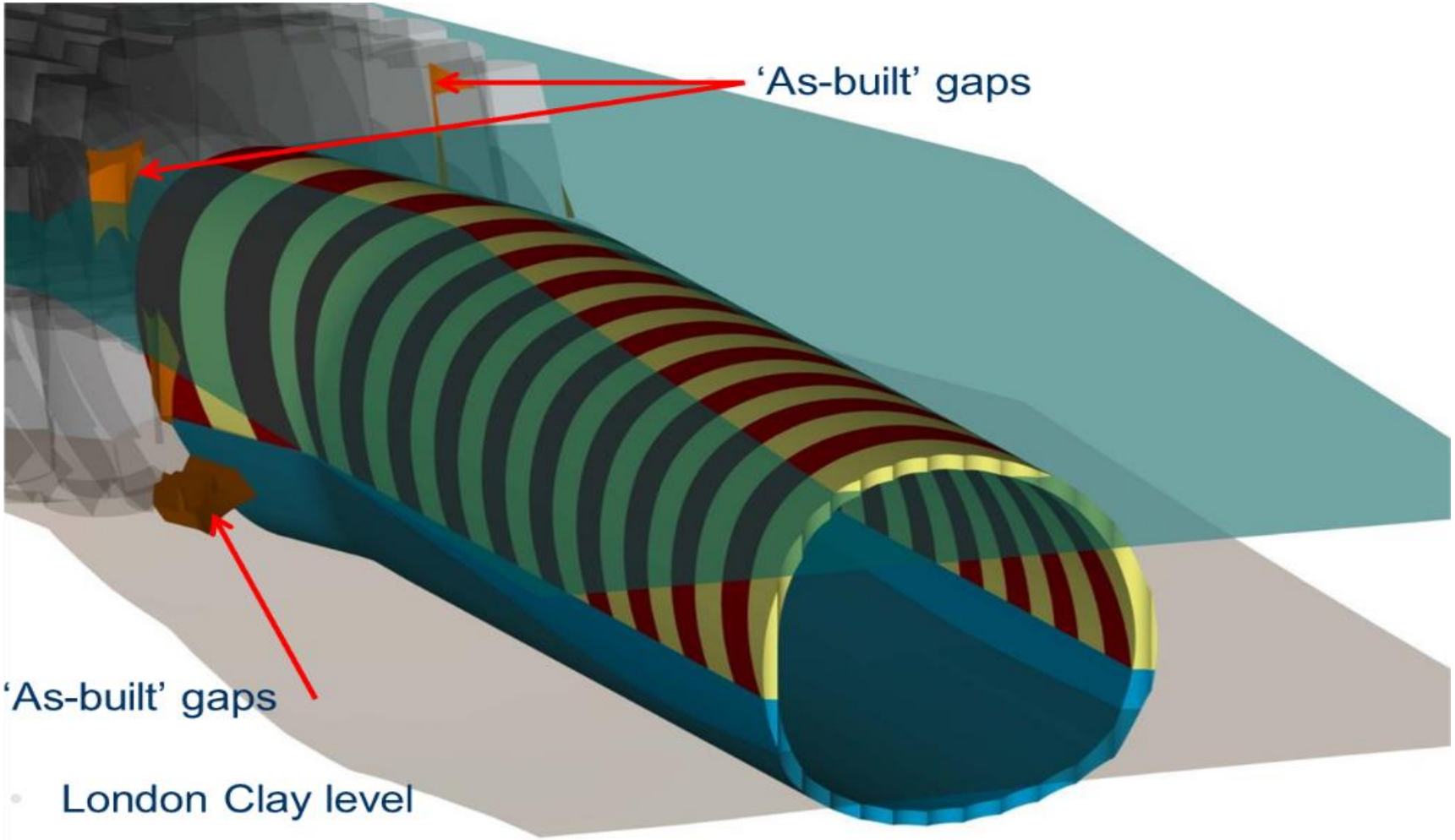

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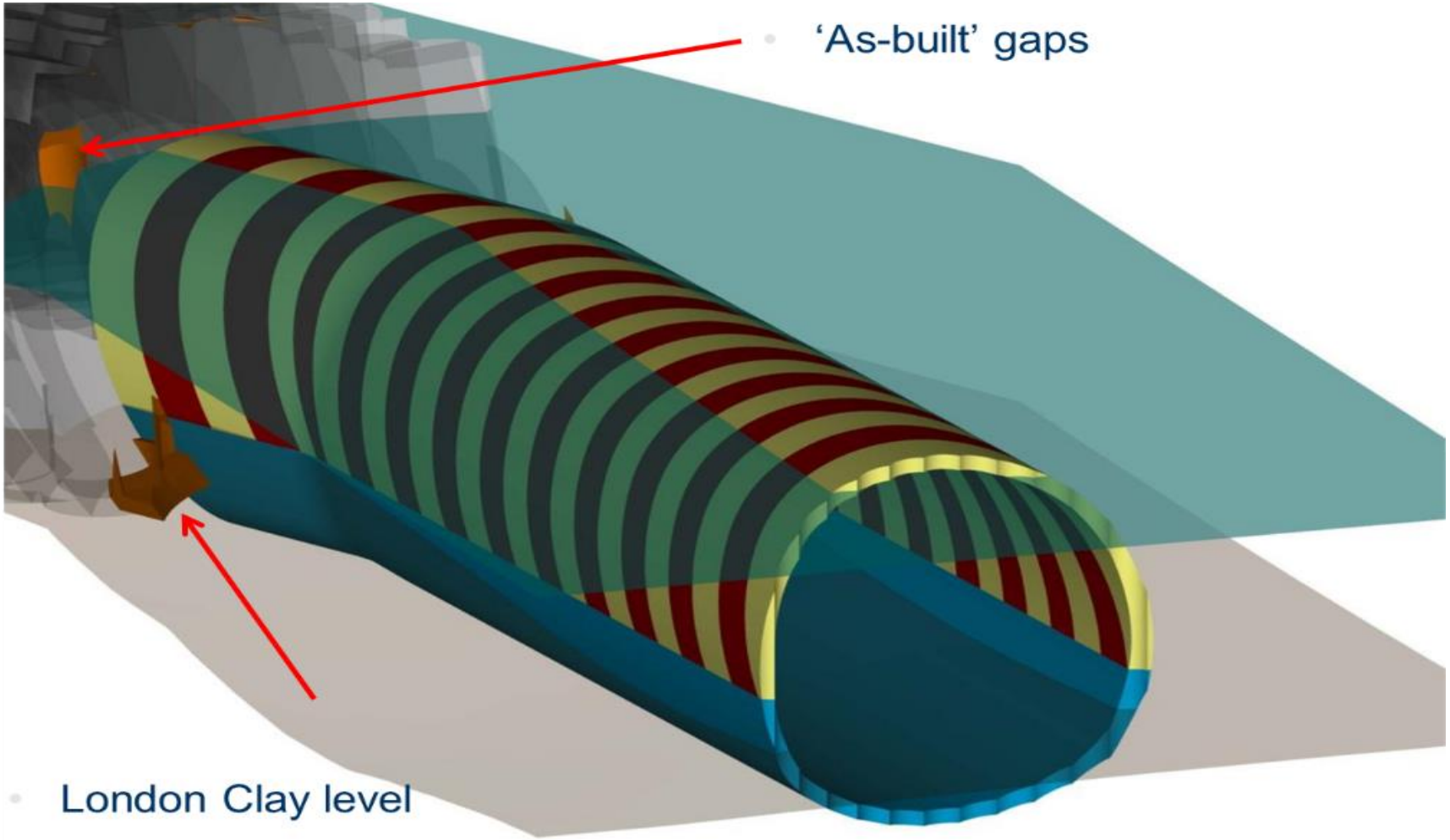

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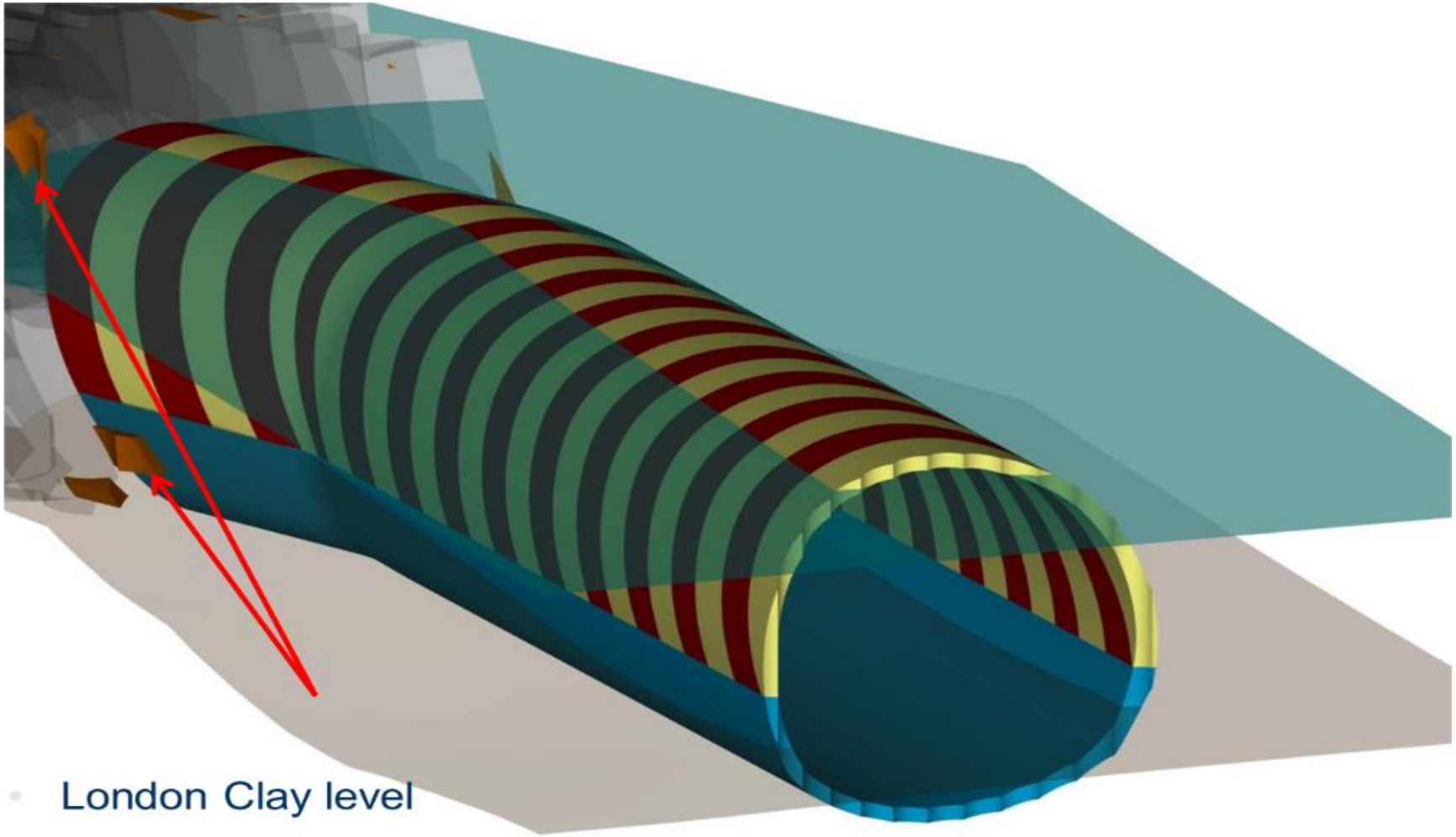

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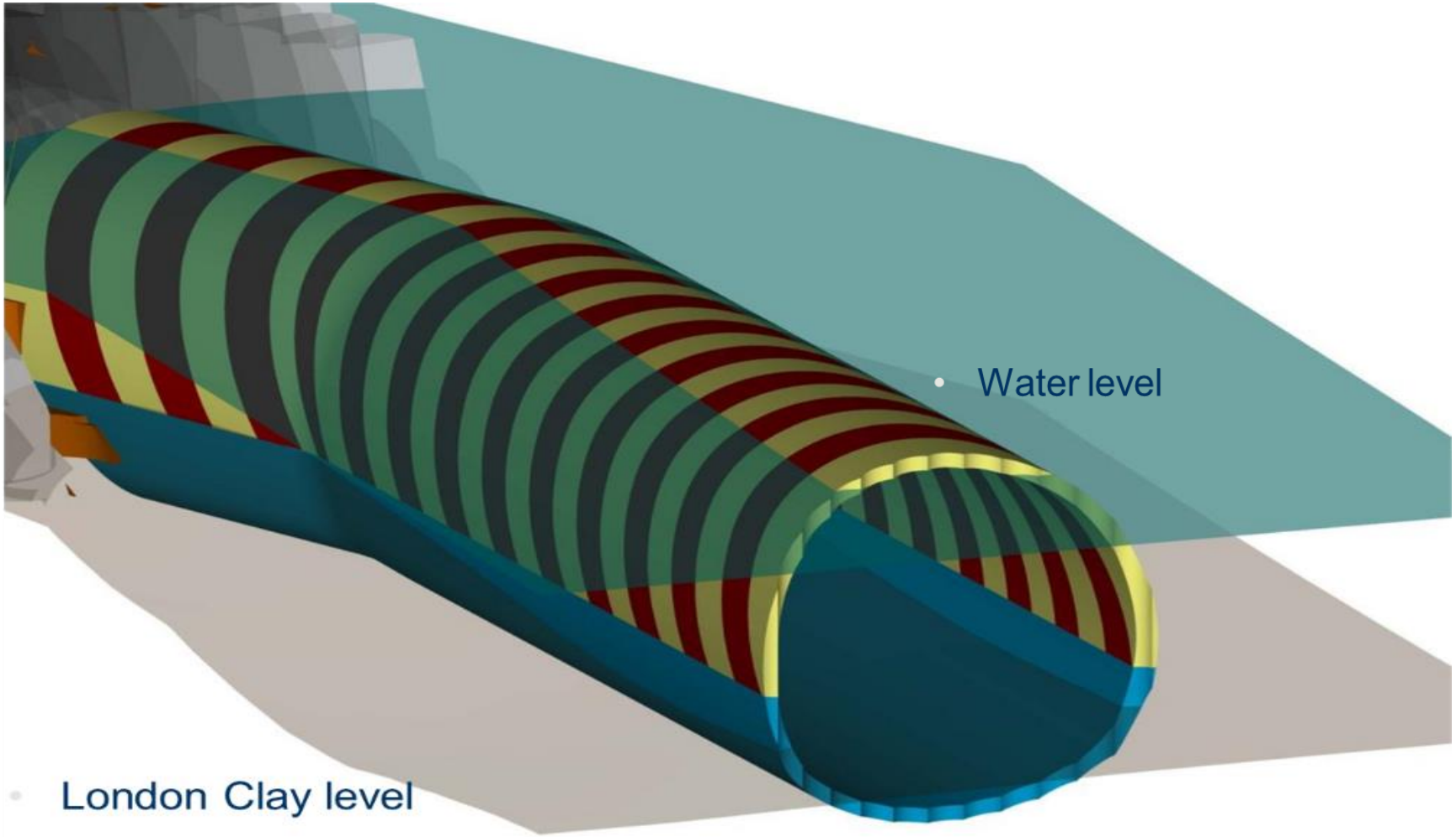
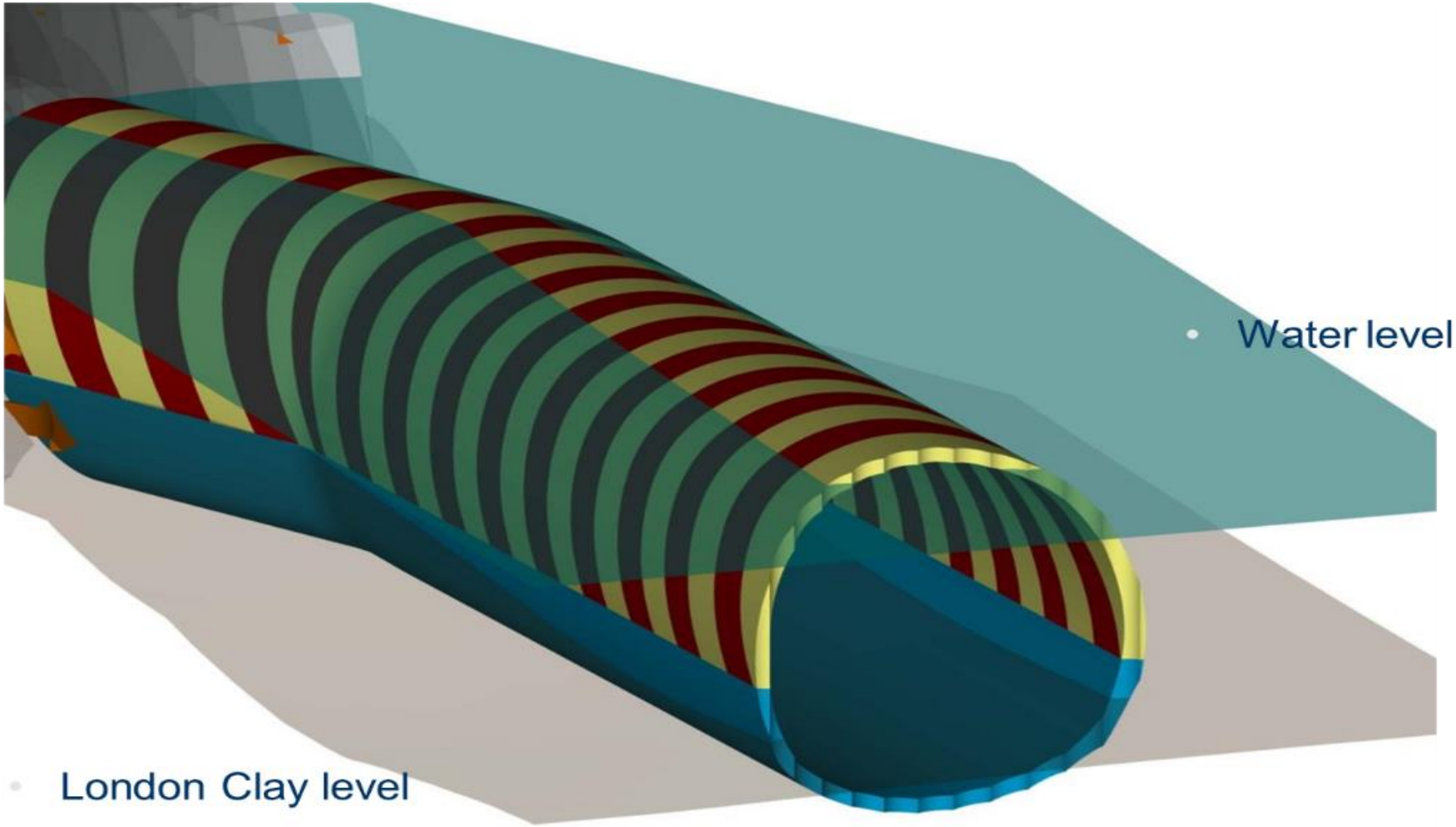
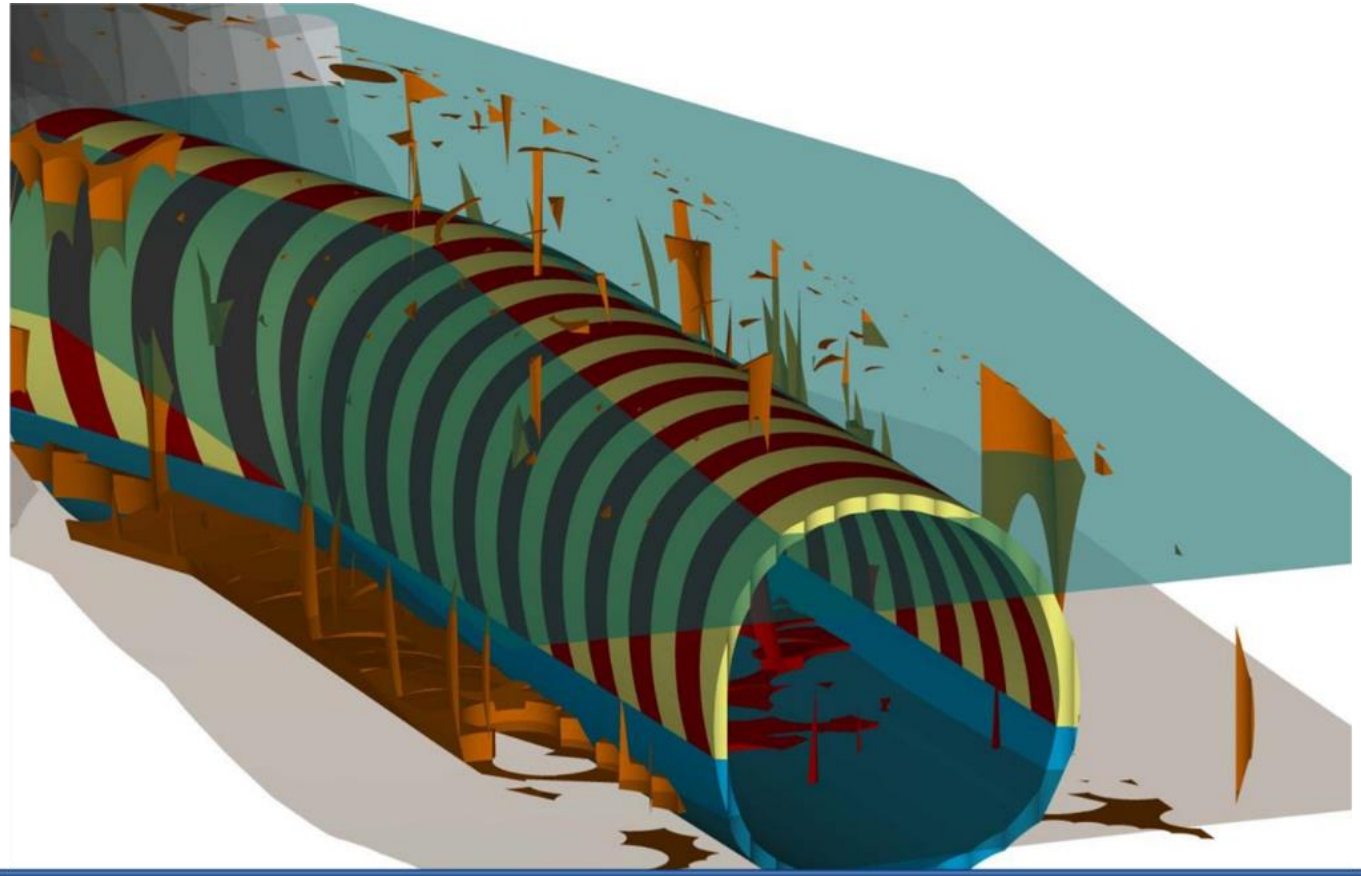


BIM - Abschlag für Abschlag



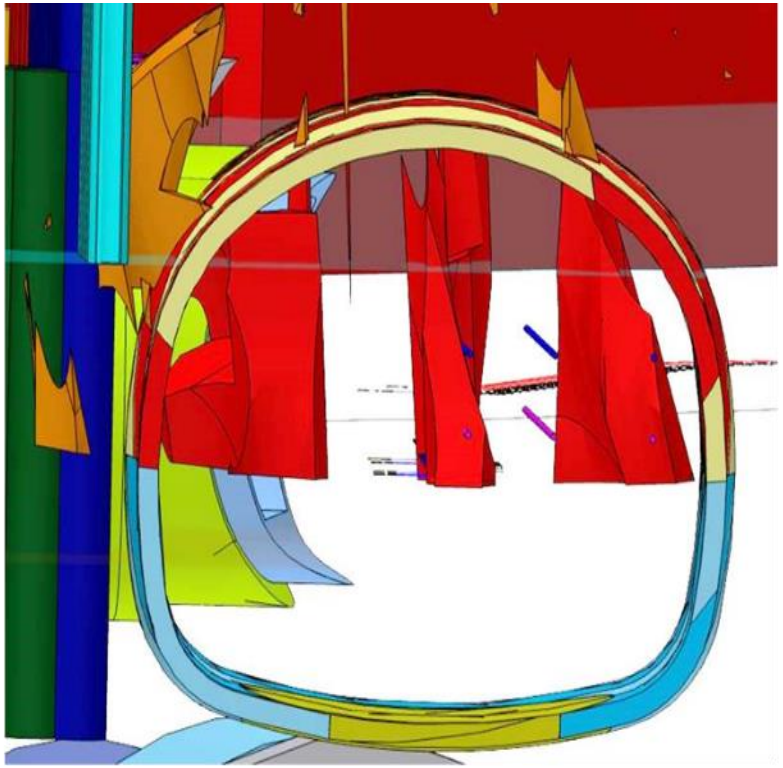
BIM - Abschlag für Abschlag



1.	Eingeschlossen im Tunnelquerschnitt	- Entwässerung, geringes Risiko
2.	Kleine Lücke ohne Verbindung zum GW	- Entwässerung, geringes Risiko
3.	Lücken in der Tunnelfirste oberhalb des GWSP	- potentiell instabil, aber begrenzt, daher geringes Risiko
4.	Lücken seitlich im Sand unterhalb des GWSP	- instabil, hohes Risiko

KELLER

BIM - Abschlag für Abschlag



- Warmes Wasser (Hydratationswärme) = „innere“ Fehlstellen = stabil nach Drainage
- Kaltes Wasser (Zustrom von Außen) = instabil = Zusatzmaßnahmen

KELLER

BIM - Ergebnis

< ½ Produktion, > ½ Büro

KELLER