




ILC Mechanical & Electrical Review and CFS Baseline Technical Review

from Wednesday, 21 March 2012 at **09:00** to Friday, 23 March 2012 at **18:00** (Europe/Zurich)
at **CERN (6-2-024 - BE Auditorium Meyrin)**

ILC

A yellow horizontal line with a yellow circular dot at its right end, extending across the slide.

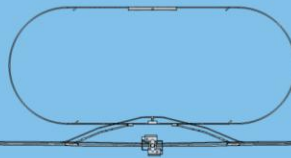
CFS update for Europe

TDR progress for Klycluster Scheme on the CERN Site

- Several machine lattice files received from DESY EDMS (Benno List) February 2012
- CERN draughtsman (Antoine Kosmicki) has spent 2 weeks putting these files together in order to generate a 3d model for the 500GeV machine
- Using this 3d model and Autocad files from FNAL for Kycluster scheme, an attempt has been made to size the underground enclosures, optimised for the CERN geology.
- Once 'approved' this new civil engineering layout will be costed by AMBERG Engineering (same company costed RDR for Europe, CLIC and also works on XFEL)
- Interaction Region Studies by ARUP for CERN site are now finished. Final report today.

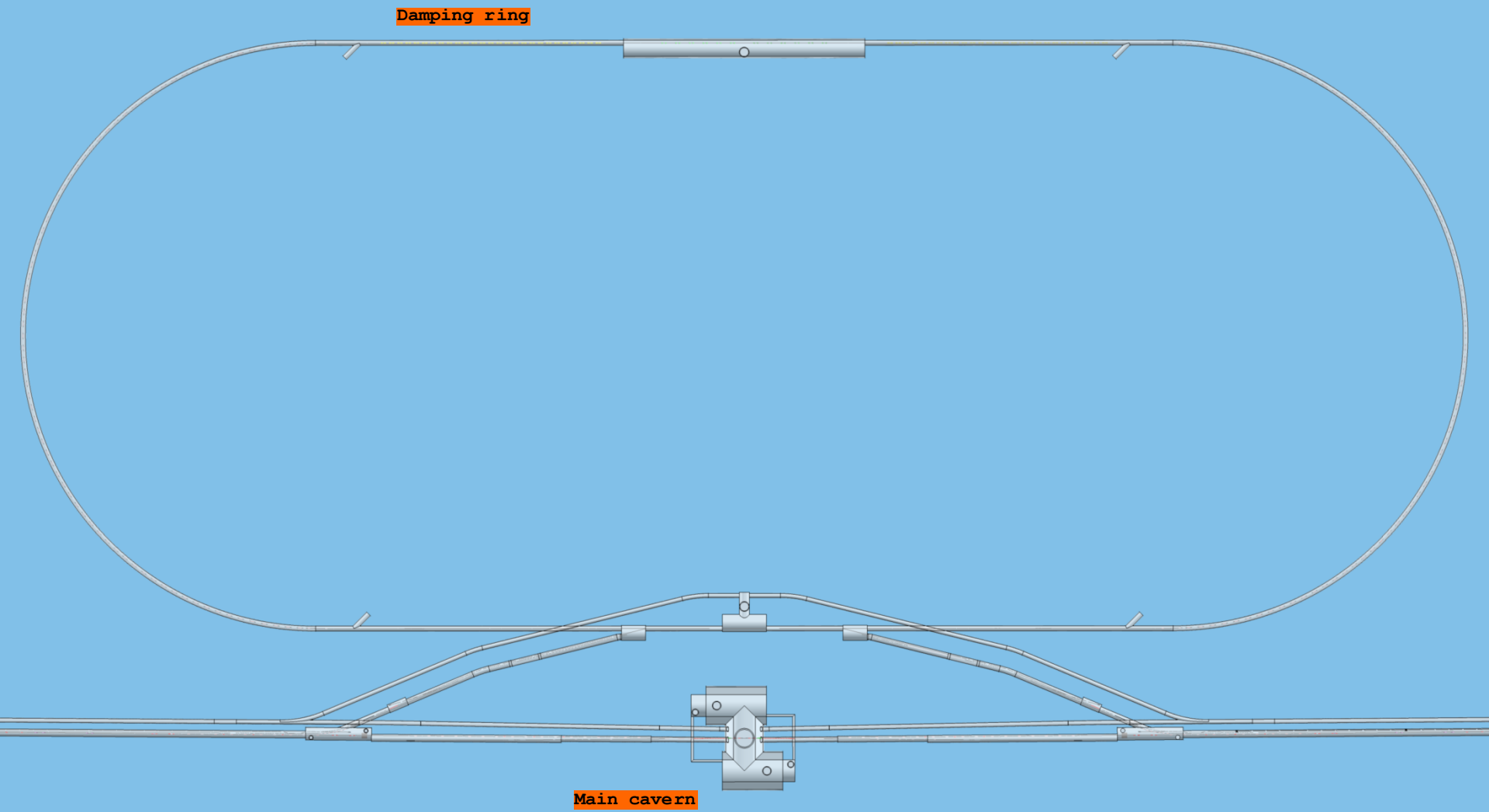
Only e- side fully modeled (Positron Source).
Impossible to model the entire machine in CATIA,
which is 'limited' to 15km.
Local co-ordinate systems needs to be created to
have the entire machine into one model.

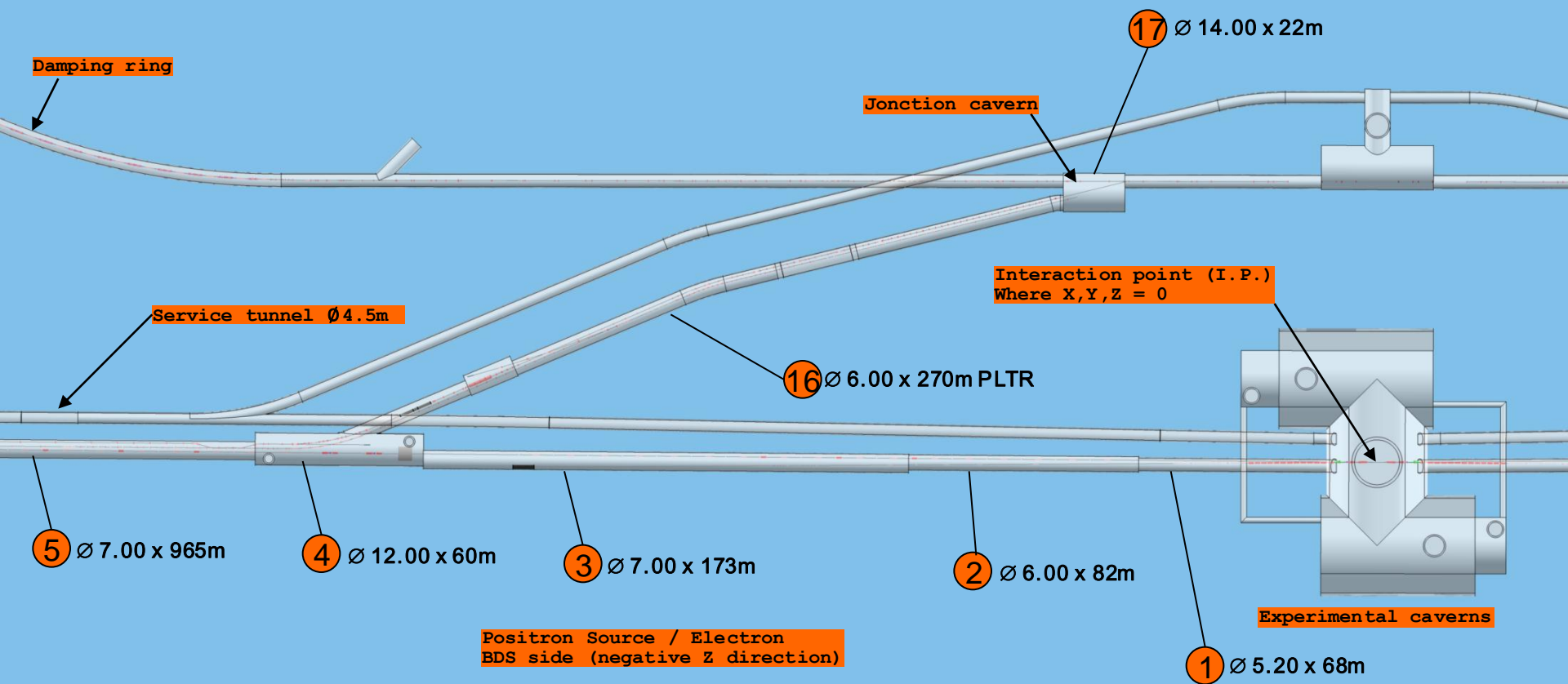
ILC Project

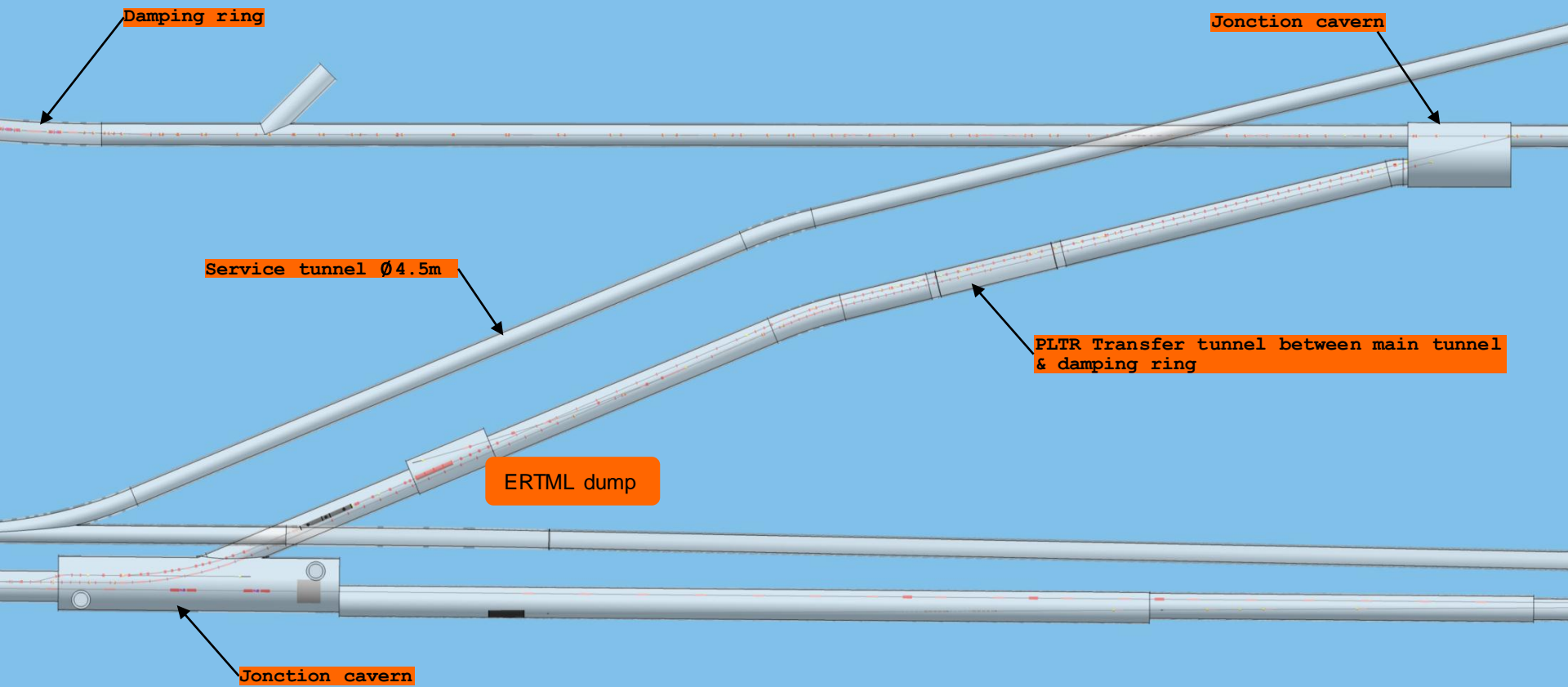


Damping ring

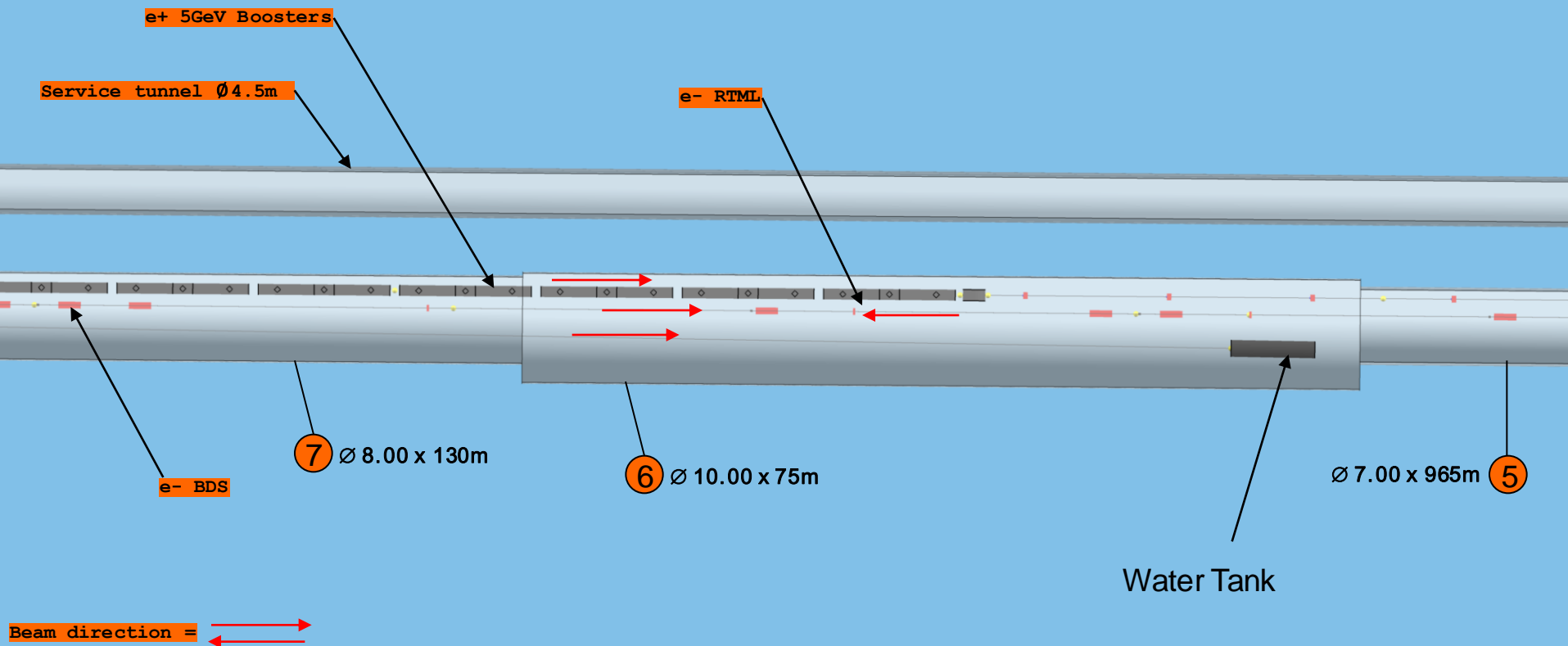
Main cavern

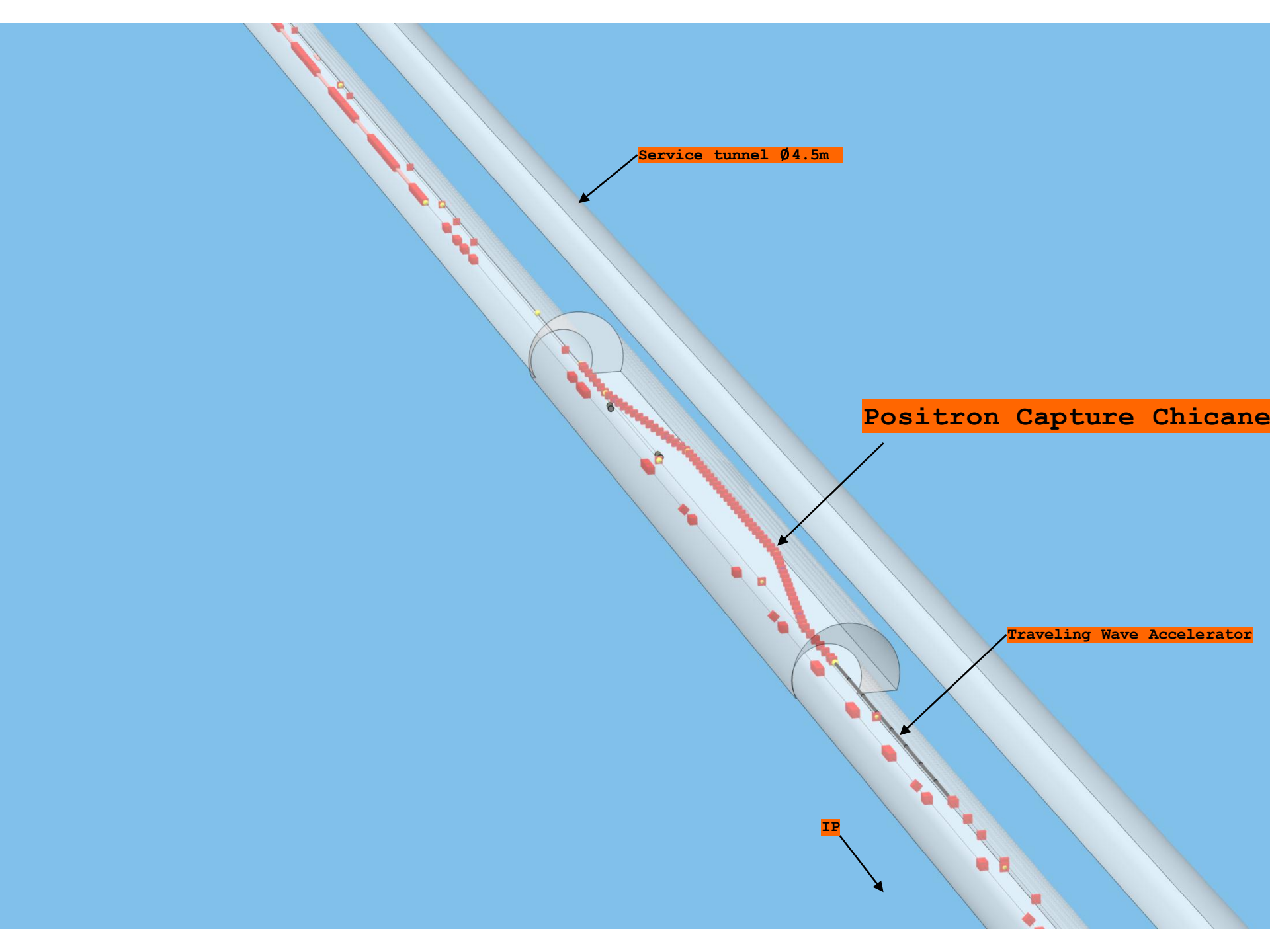






e- Tune-Up Dump





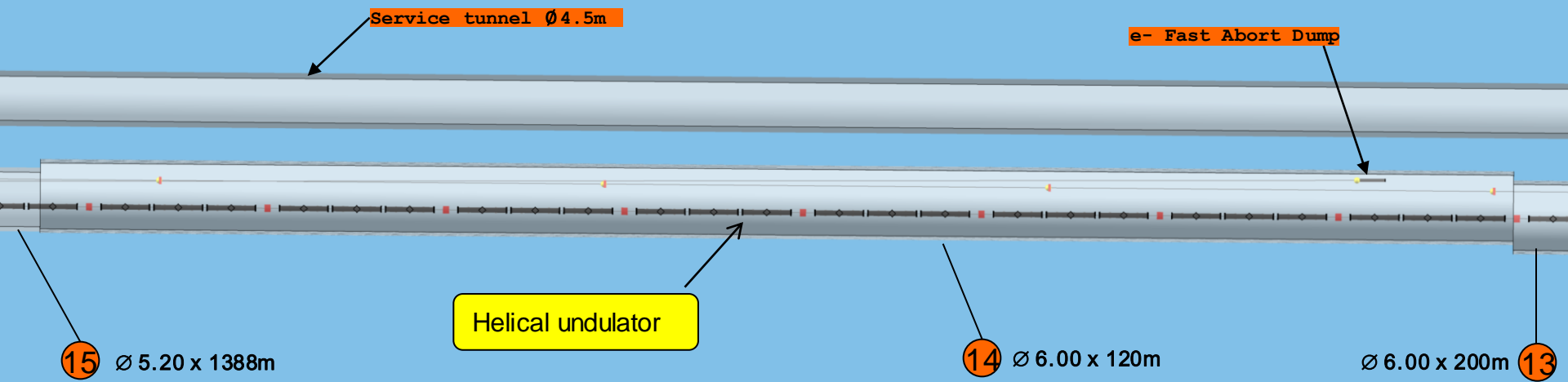
Service tunnel Ø4.5m

Positron Capture Chicane

Traveling Wave Accelerator

IP

E- Fast Abort Dump Cavern



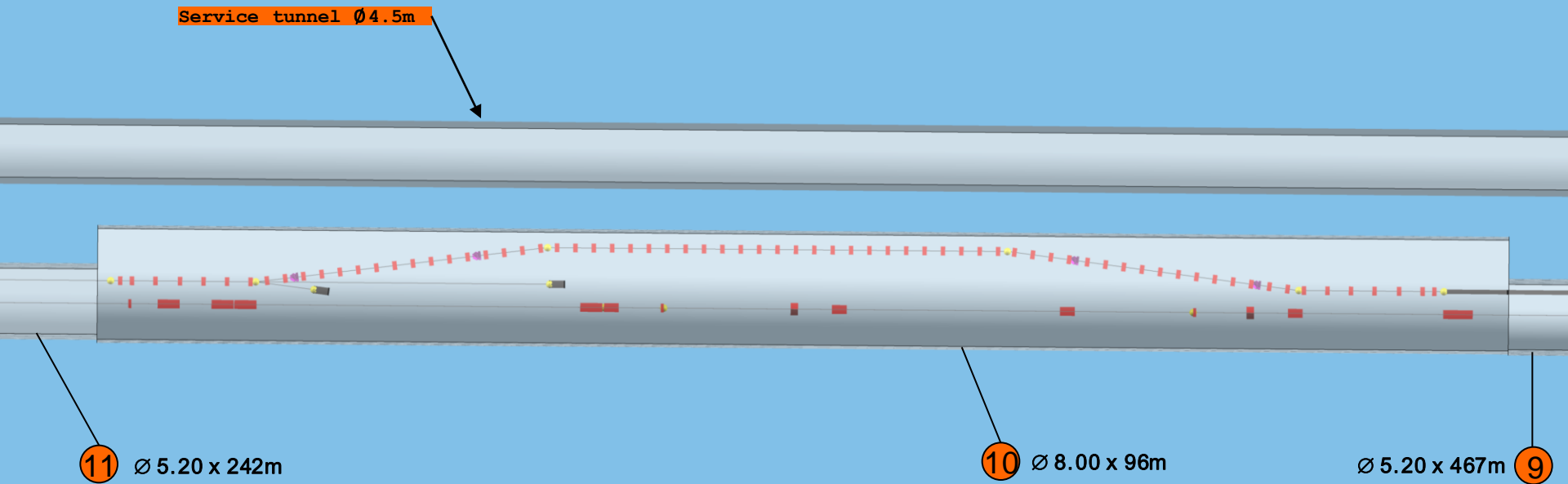
Photon Dump Cavern

Service tunnel Ø 4.5m

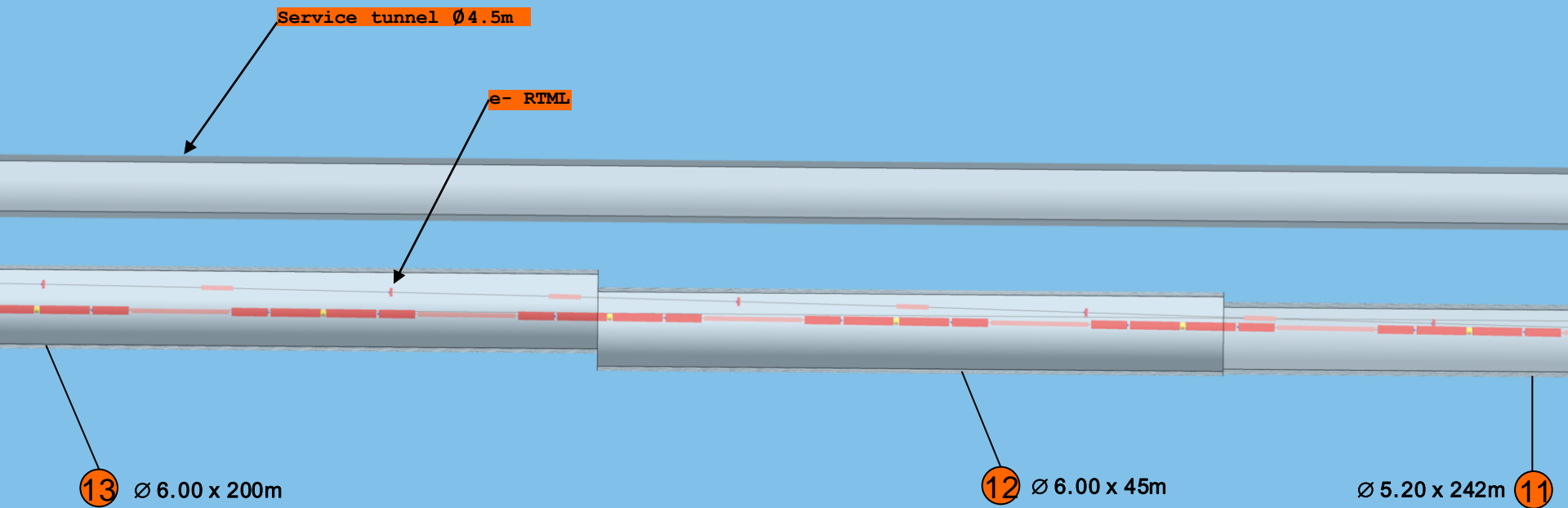
11 Ø 5.20 x 242m

10 Ø 8.00 x 96m

Ø 5.20 x 467m 9



Target bypass 'dog-leg' area

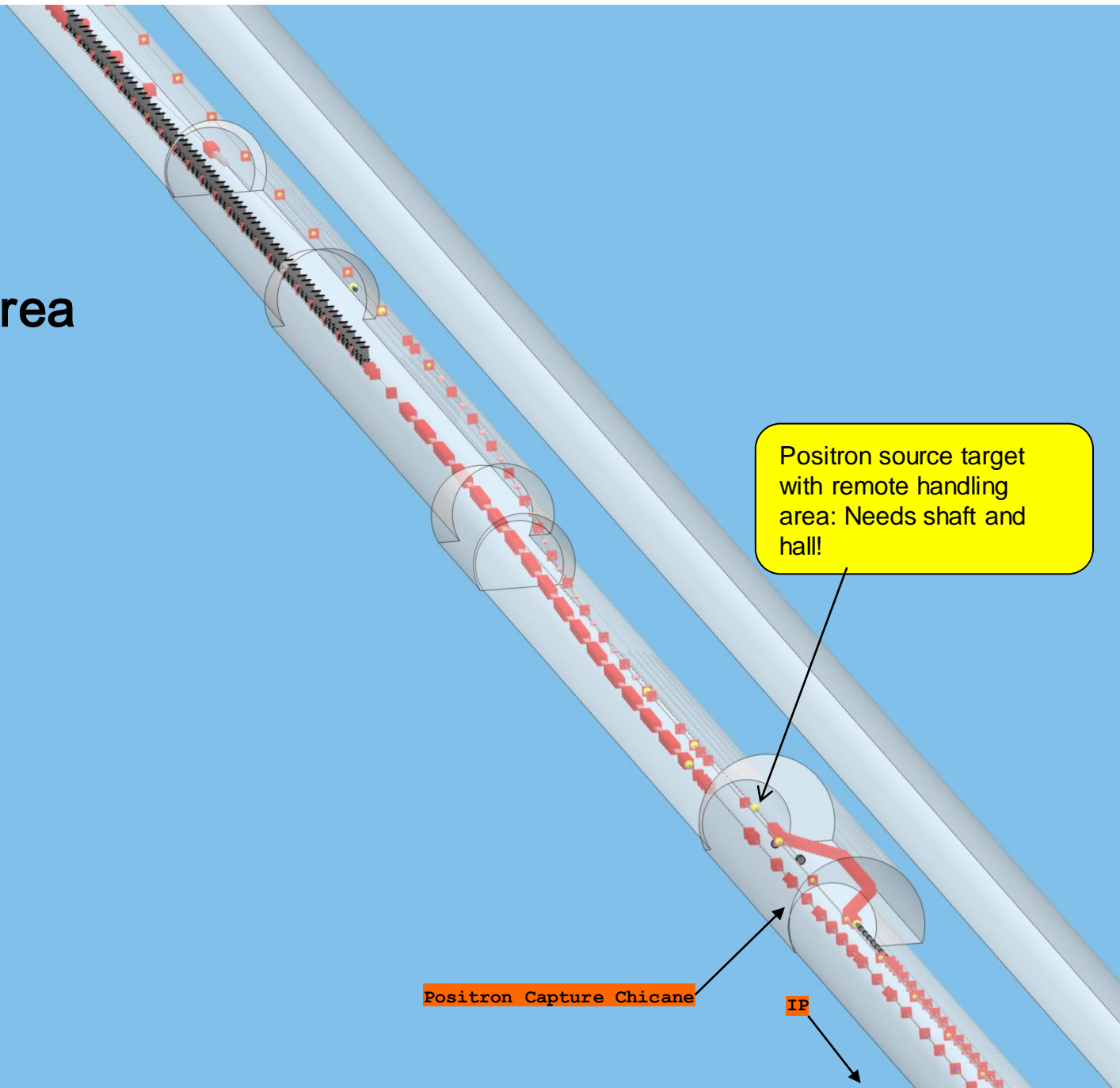


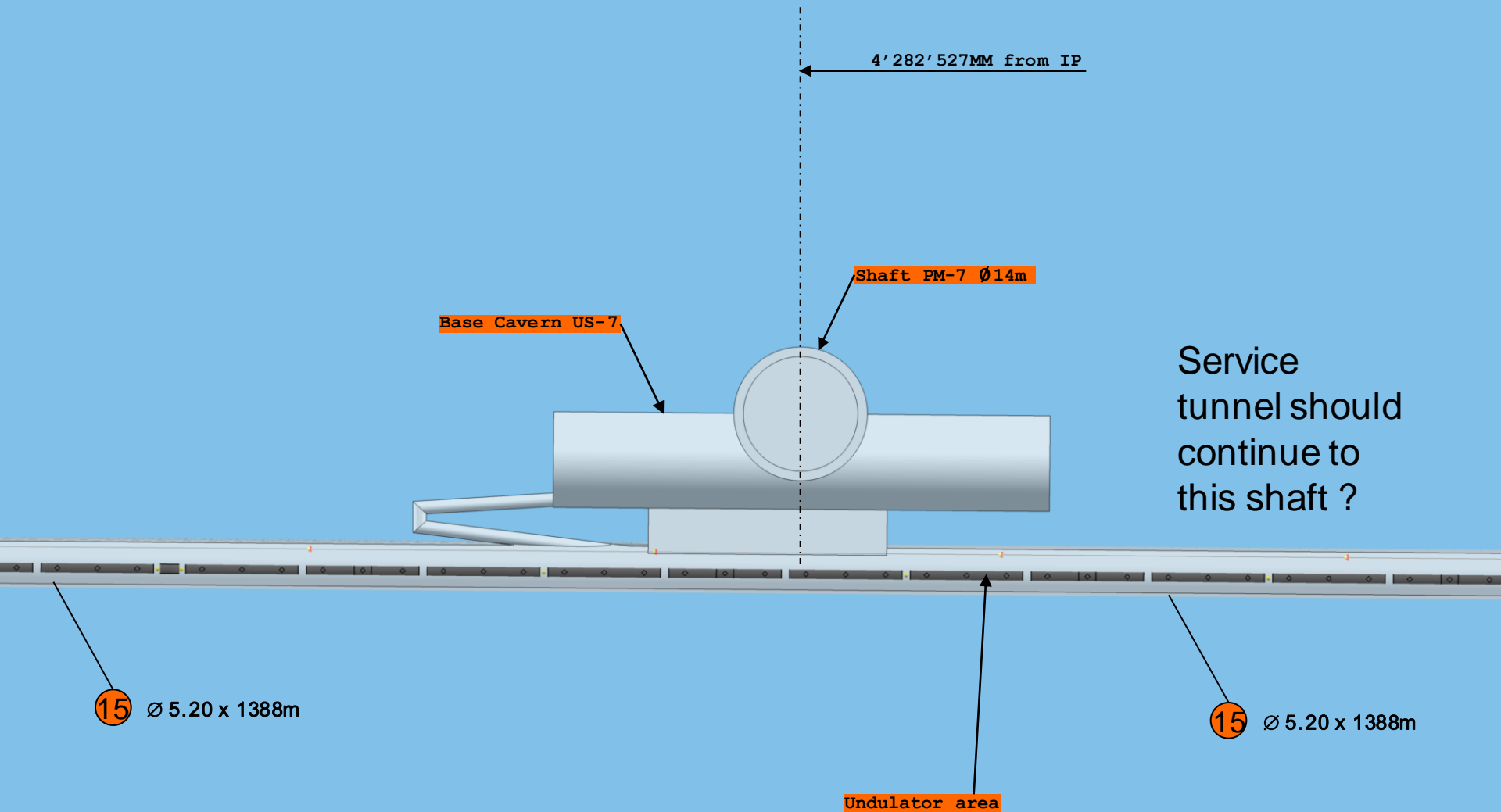
Undulator Area

Positron Capture Chicane

Positron source target with remote handling area: Needs shaft and hall!

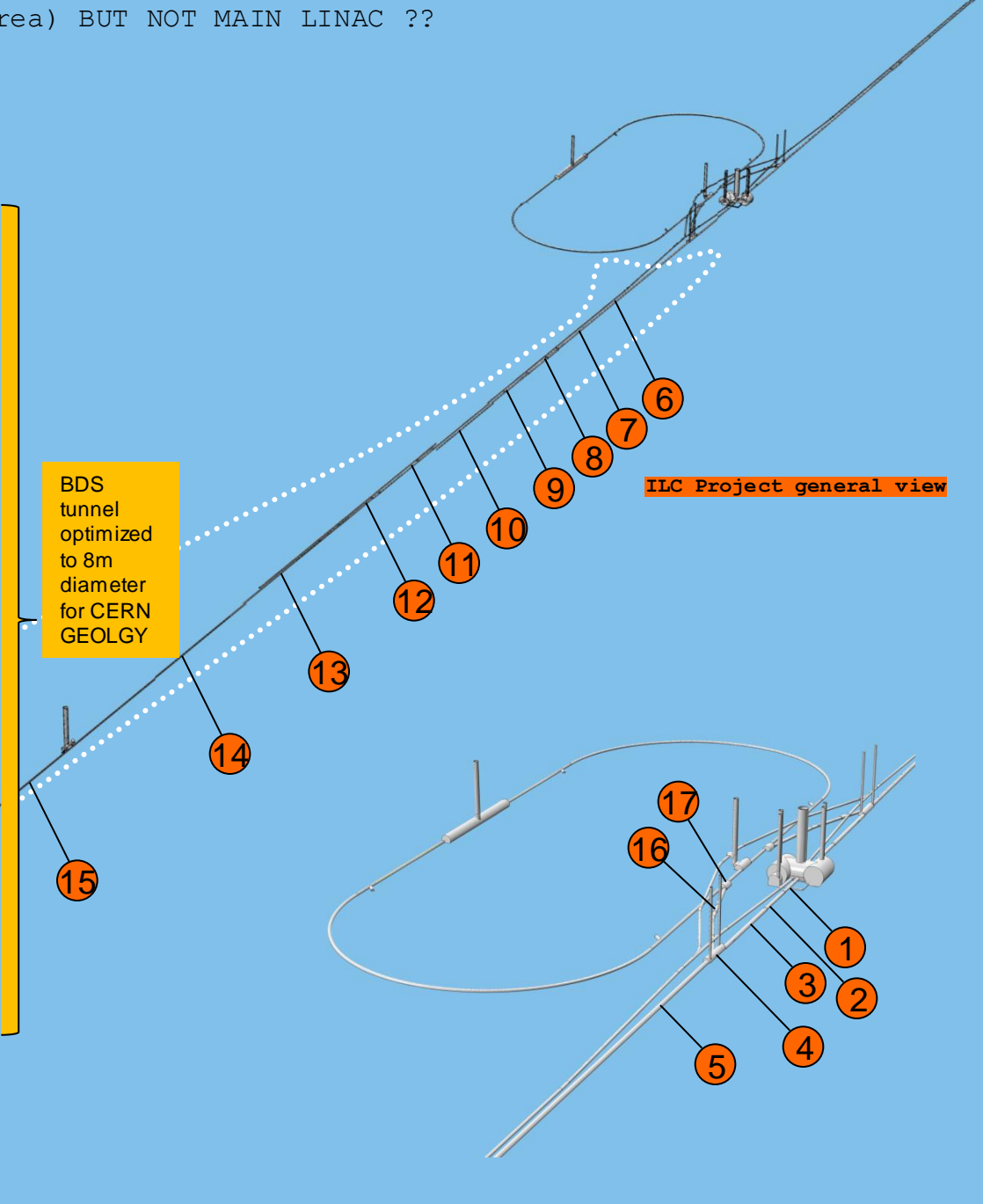
IP

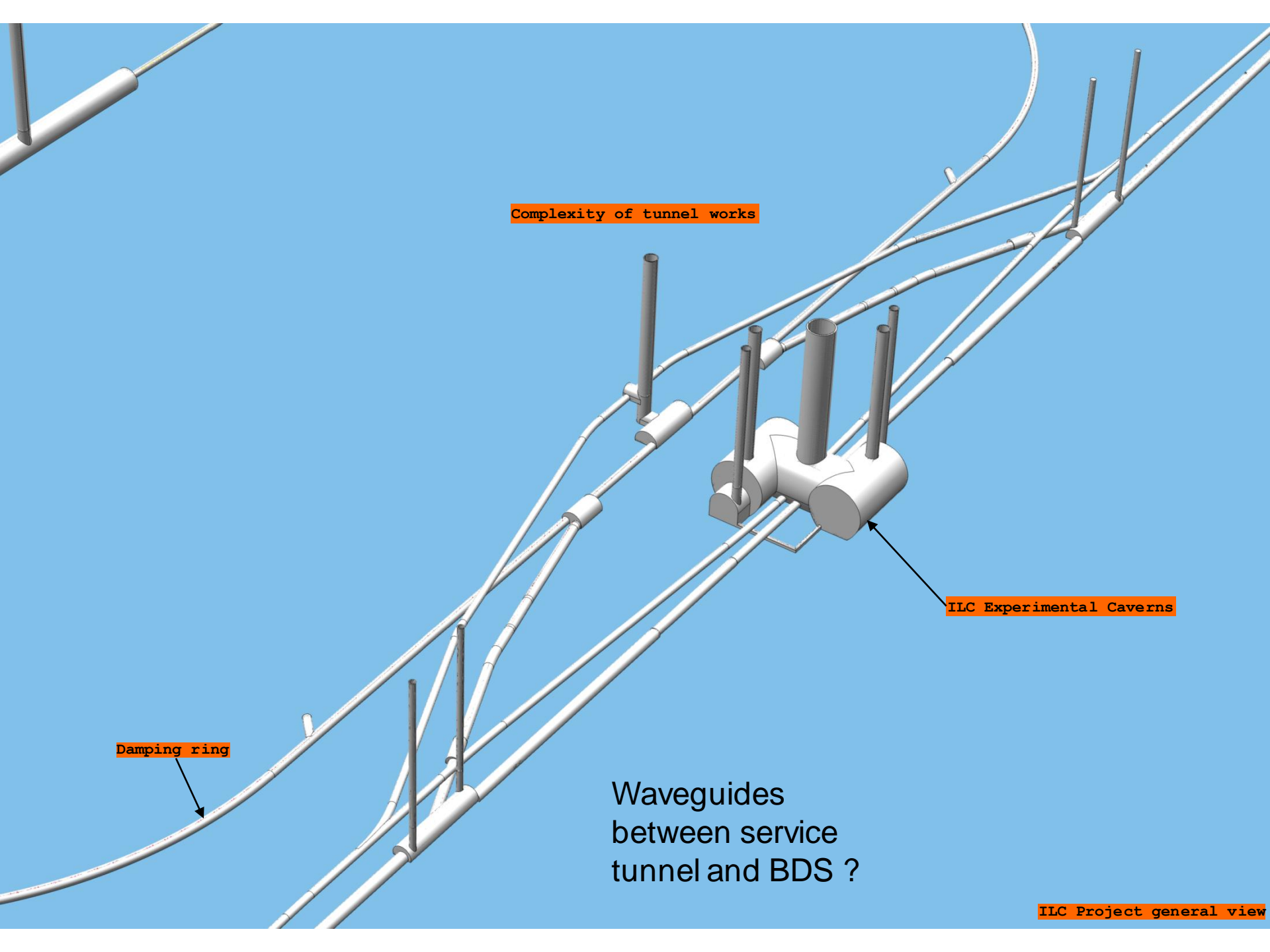




Concerns half of the project (circled area) BUT NOT MAIN LINAC ??

	Length (m)	Requ ired diam eter (m)	Opti mise d diam eter (m)
Experimental Cavern Interface Tunnel 1	68	5.20	8.00
Main Dump Branch Tunnel 2	82	6.00	8.00
Main Dump Branch Tunnel 3	173	7.00	8.00
Damping Ring Branch Tunnel 4	60	12.00	12.00
PTRAN & BDS Diag. Dump Tunnel 5	965	7.00	8.00
Tune-Up Dump Tunnel 6	75	10.00	10.00
400 MeV accelerator Tunnel 7	130	8.00	8.00
400 MeV accelerator Tunnel 8	155	7.00	8.00
Positron Production Tunnel & Remote Handling Cavern 9	467	5.20	8.00
Positron Production Tunnel & Remote Handling Cavern 10	96	8.00	8.00
e- BDS Dogleg Tunnel 11	242	5.20	8.00
e- BDS Dogleg Tunnel 12	45	6.00	8.00
e- BDS Dogleg Tunnel 13	200	6.00	8.00
Undulator & Fast Abort Dump Tunnel & Undulator Access Cavern 14	120	6.00	8.00
End ML – Start Positron Tunnel 15	1388 ??	5.20	5.20
Damping Ring Transfer Tunnel 16	270	6	6
Damping Ring Junction Cavern 17	22	14	14





Complexity of tunnel works

ILC Experimental Caverns

Damping ring

Waveguides
between service
tunnel and BDS ?

ILC Project general view

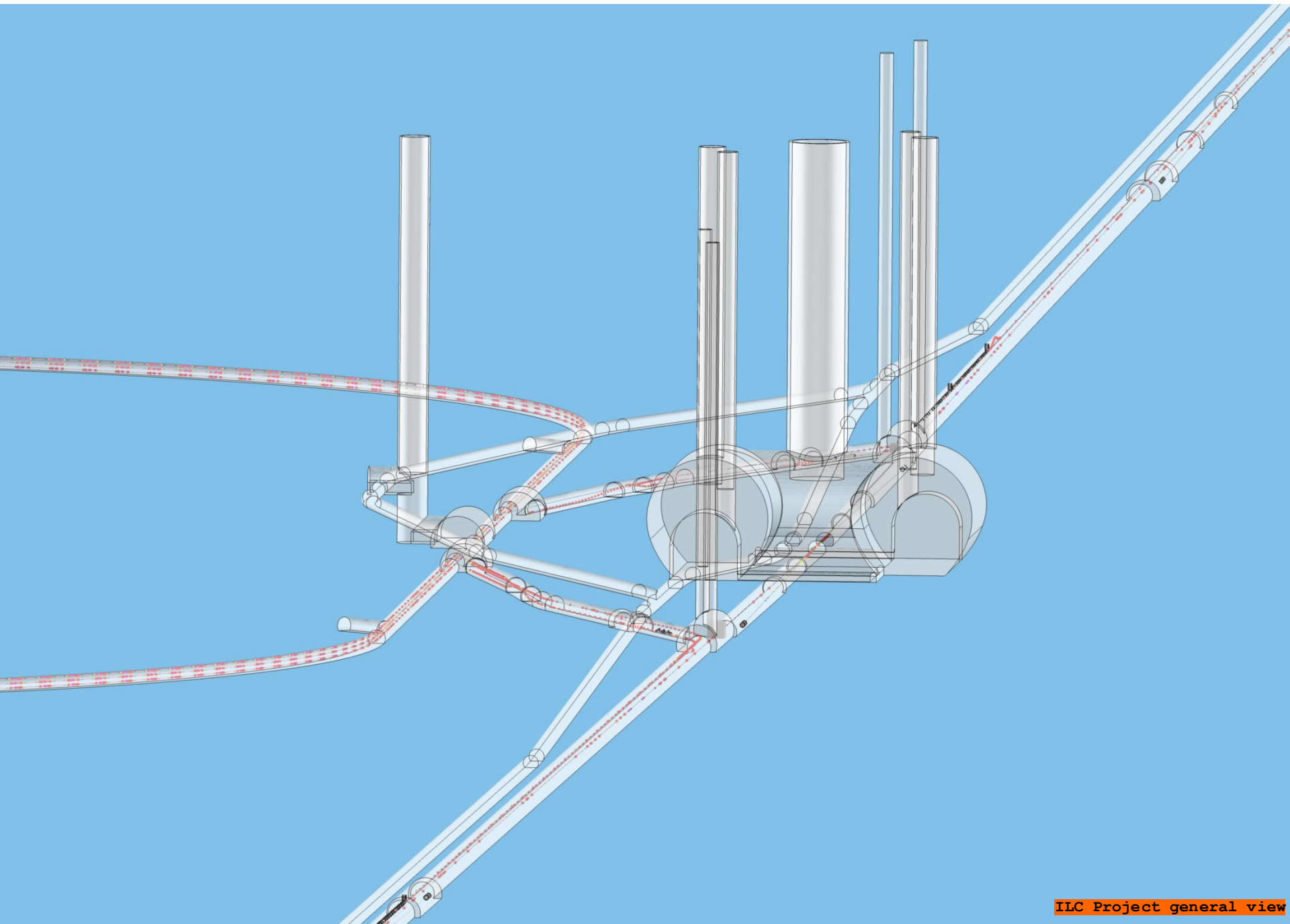


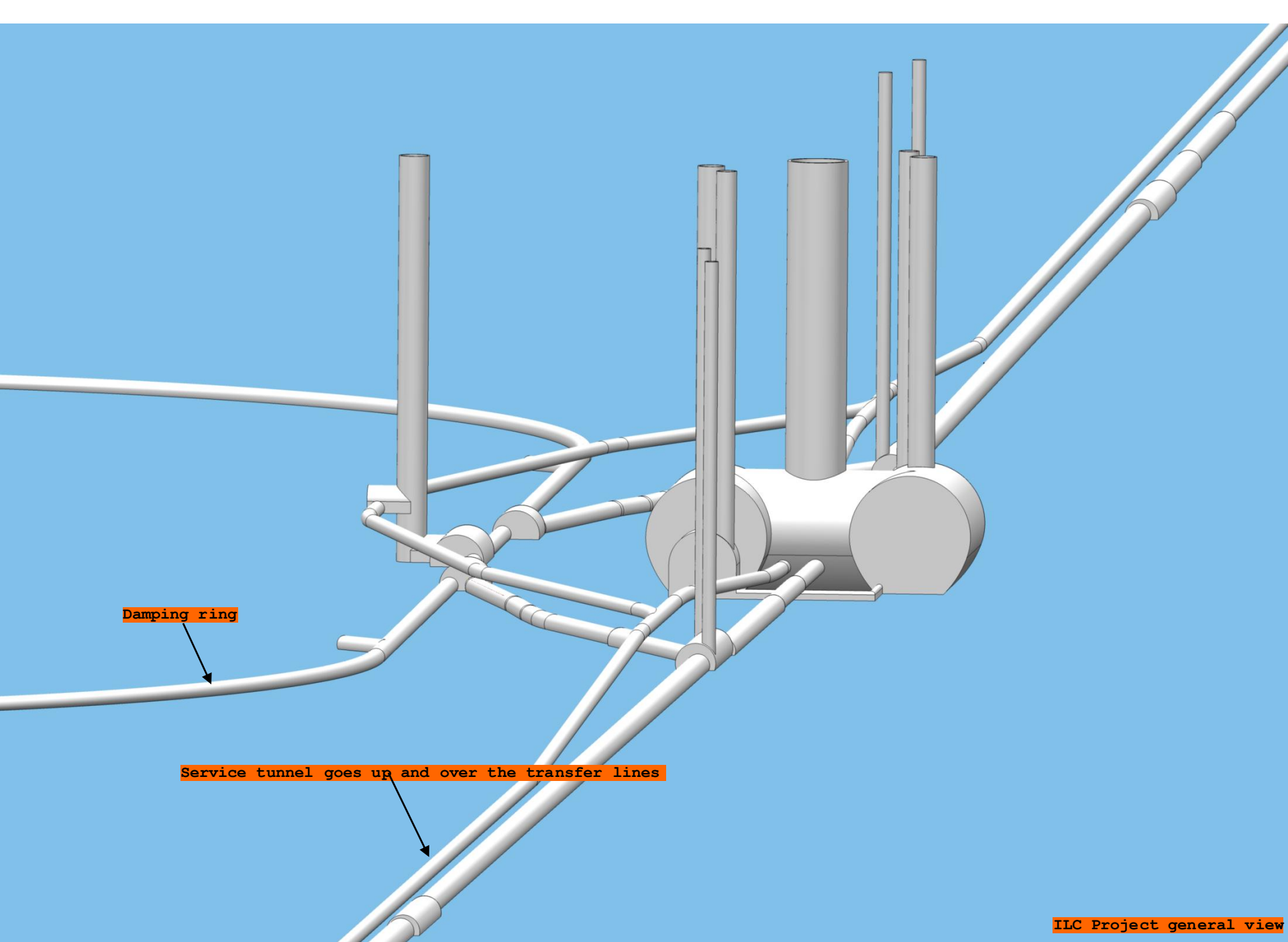
Complexity of tunnel works

A 3D perspective rendering of the ILC Experimental Caverns. The image shows a complex network of white, cylindrical tunnels and shafts against a solid blue background. In the foreground, a large, multi-chambered cavern structure is visible, with five vertical shafts rising from it. Several other tunnels branch out from this central structure, extending towards the top right of the frame. The perspective is from a low angle, looking up at the caverns.

Now five
shafts at the
IR

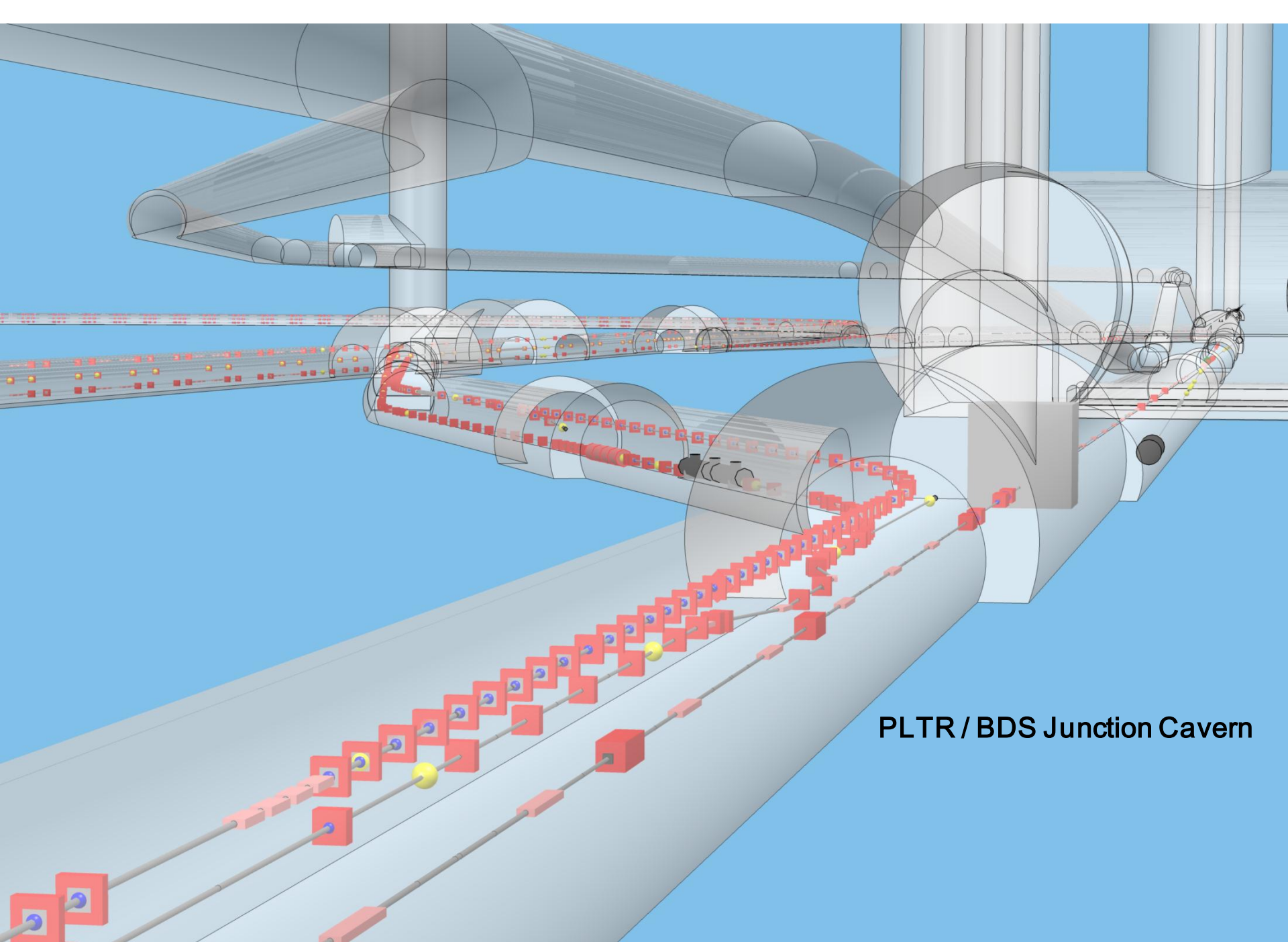
ILC Experimental Caverns



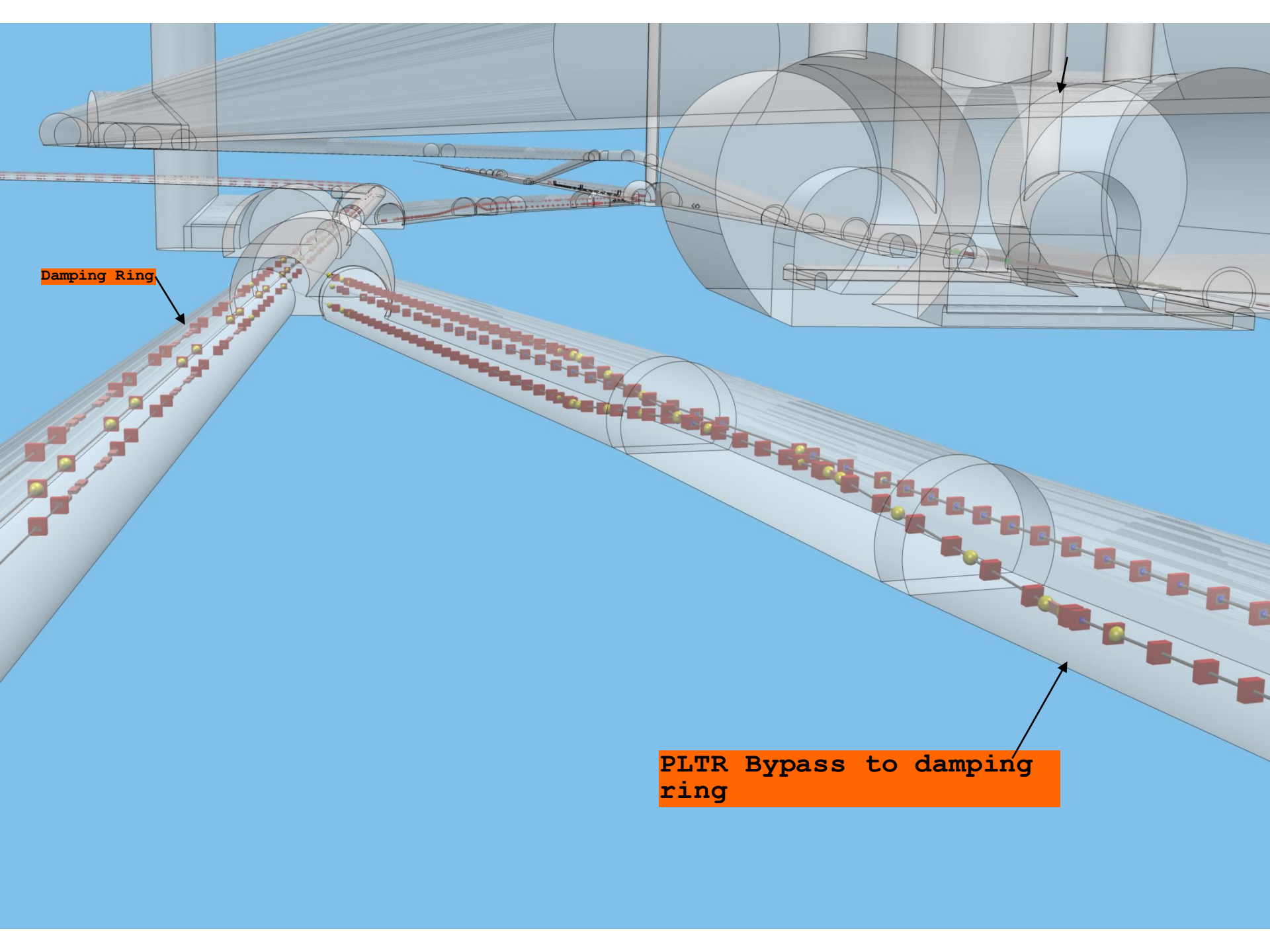


Damping ring

Service tunnel goes up and over the transfer lines



PLTR / BDS Junction Cavern



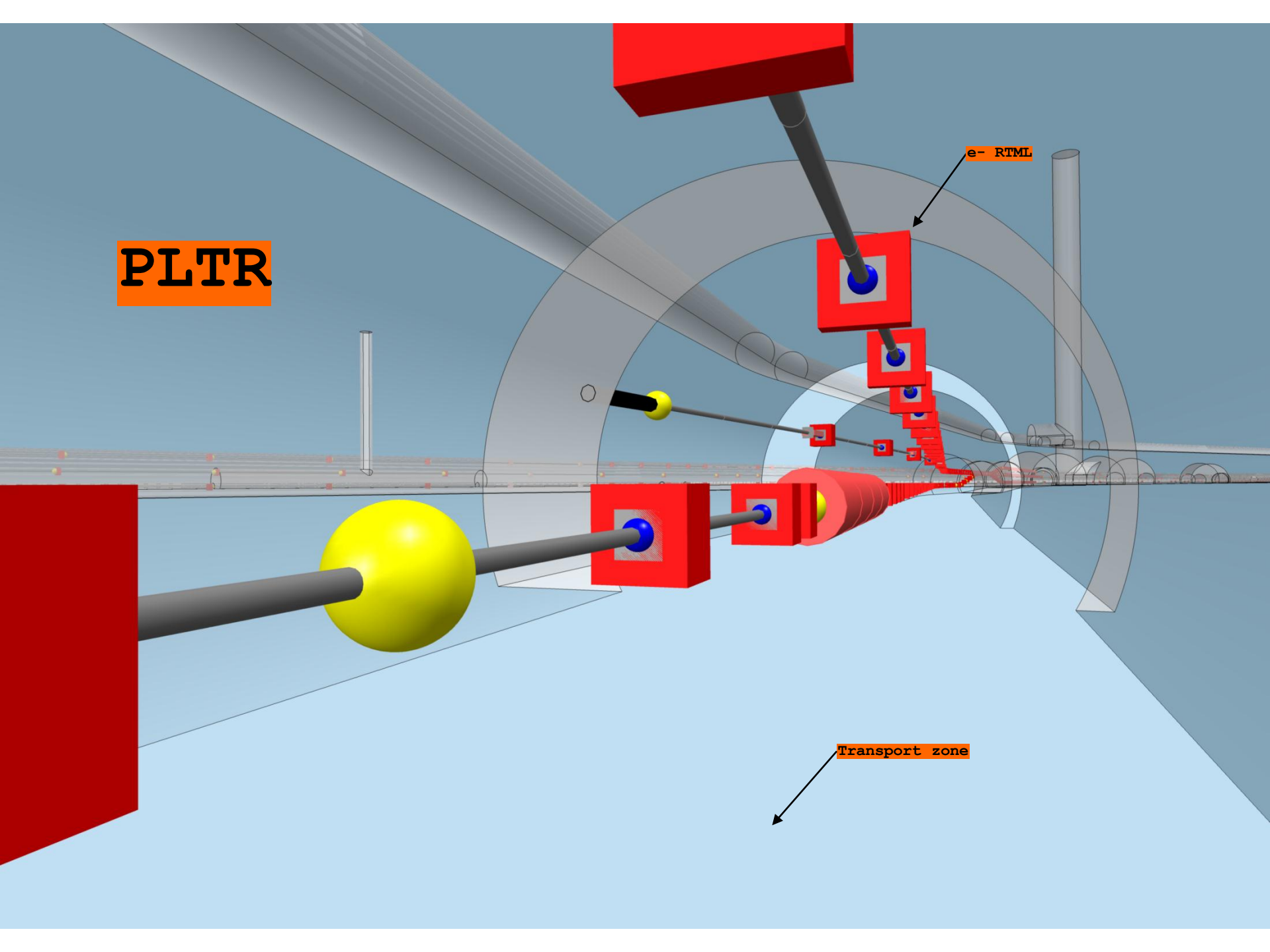
Damping Ring

PLTR Bypass to damping
ring

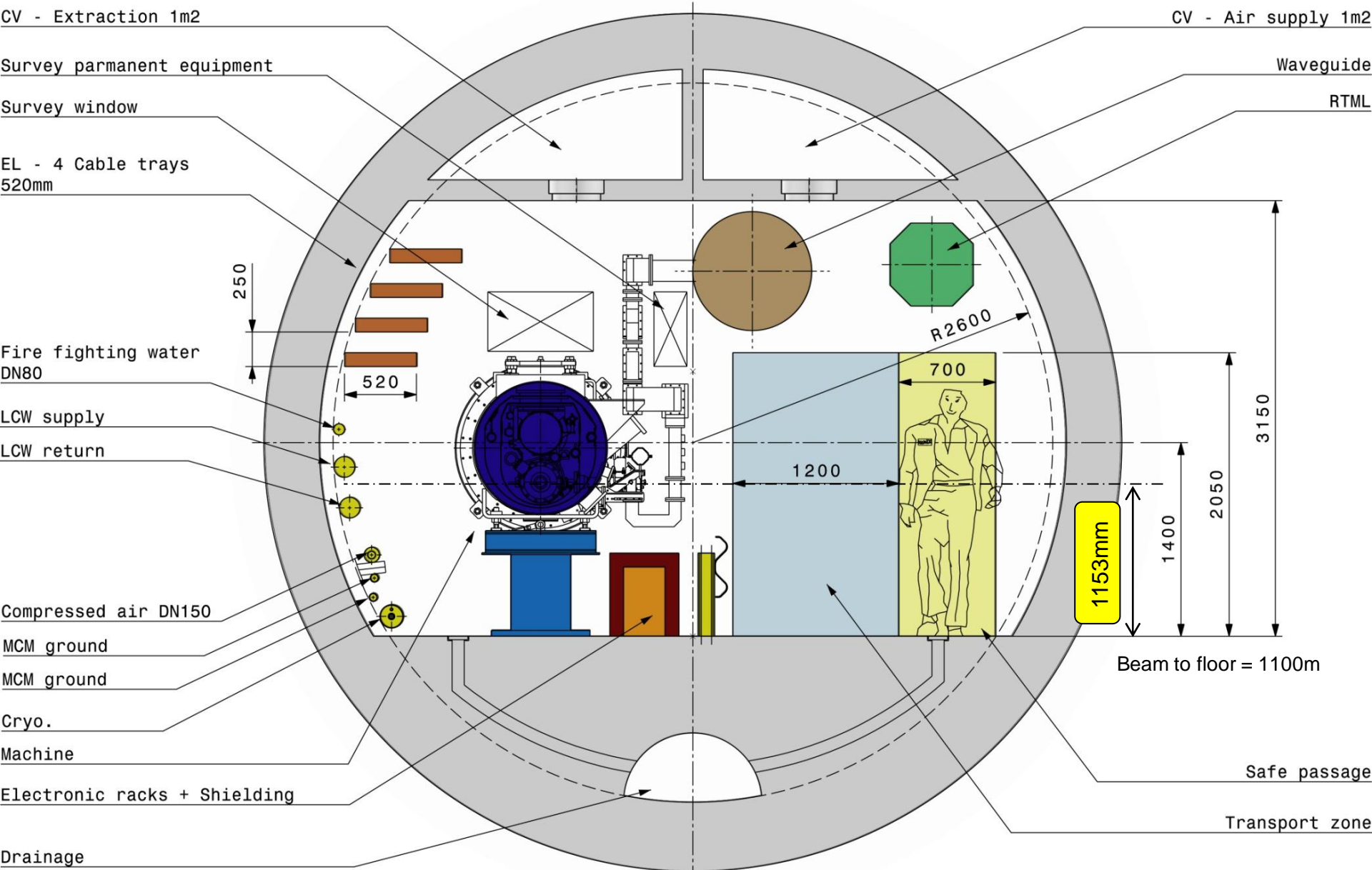
PLTR

e⁻ RTML

Transport zone



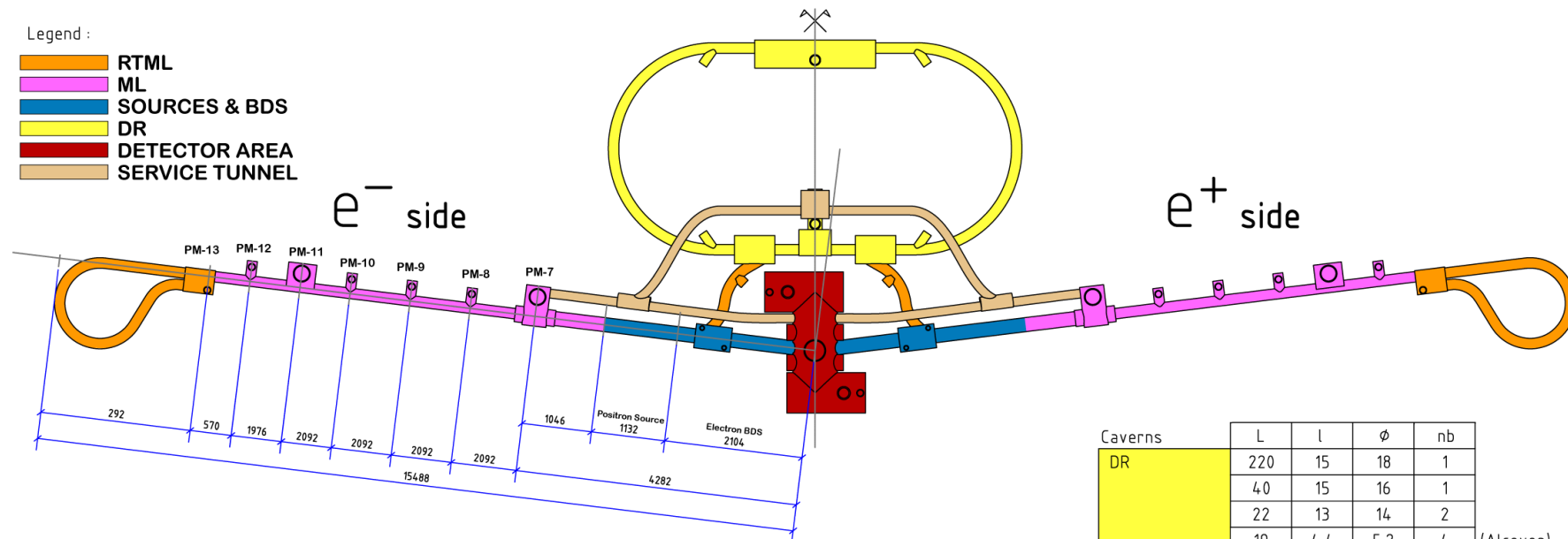
Typical Main Linac Cross Section for Klycluster Scheme on the CERN Site



ILC - Typical Cross Section - Diameter 5200mm - Scale 1:25 (A3)

Legend :

- RTML
- ML
- SOURCES & BDS
- DR
- DETECTOR AREA
- SERVICE TUNNEL



SITE / TUNNEL LENGTHS (m)

RTML	ML	DR	Sources & BDS	Service tunnel	TOTAL
1 100 / 1 700	23 920 / 23 920	1 316 / 3 240	6 474 / 6 474	8 560 / 9 336	30 978 / 44 670

TUNNELS ϕ

Area	RTML	ML	DR	Sources & BDS	Service tunnel
ϕ m	6.0 + 8.0 + 5.2	5.2 + 8.0	5.2	8.0	4.5

SHAFTS (x25)

Point	PX0	PMA 0	PMB 0	PXA0	PXA+1	PMA+2	PMB+2	PM+7	PM+8	PM+9	PM+10	PM+11	PM+12	PM+13
ϕ m	18	9	9	8	6	4	4	14	6	9	6	14	6	6
Point				PXB0	PXB-1	PMA-2	PMB-2	PM-7	PM-8	PM-9	PM-10	PM-11	PM-12	PM-13
ϕ m				8	6	4	4	14	6	9	6	14	6	6

Caverns

	L	l	ϕ	nb	
DR	220	15	18	1	(Alcoves)
	40	15	16	1	
	22	13	14	2	
	19	4.4	5.2	4	
Sources & BDS	60	11.4	12	2	
	75	9.8	10	2	
ML	52	10	10	4	(Alcoves)
	25	10	10	8	
	52	10	10	4	
	19	4.4	5.2	32	
RTML	10	10	10	2	
	18	8	8	2	
Service tunnel	13	9	9	1	
Detector area	55	20	36	3	(Service tunnel)
	20	13.5	20	2	
	68	2	2	2	

MUON WALL WIDENINGS

Point	-
(LxWxH) m	?

BORINGS

Point	-
ϕ m	-

ILC - 500 GeV KLYCLUSTER (Europe / CERN)



GROUP : GS-SE
CIVIL ENGINEERING
SUPERVISOR : J.OSBORNE
DESIGNER : A.KOSMICKI

SCALE : 1/50000(A3_FORMAT) DATE: 14/03/2012

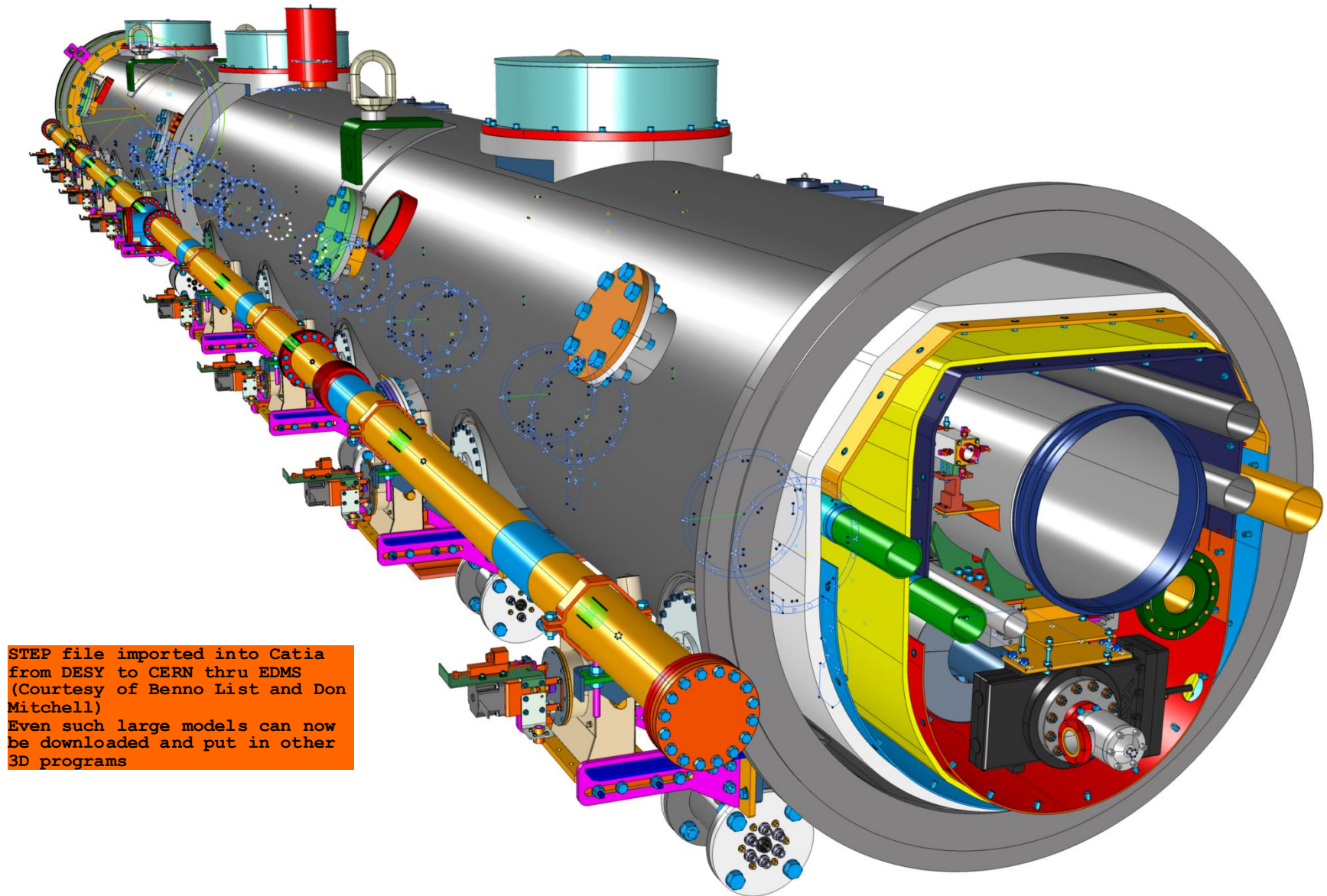
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Most important drawing for CFS costing : Needs checking !

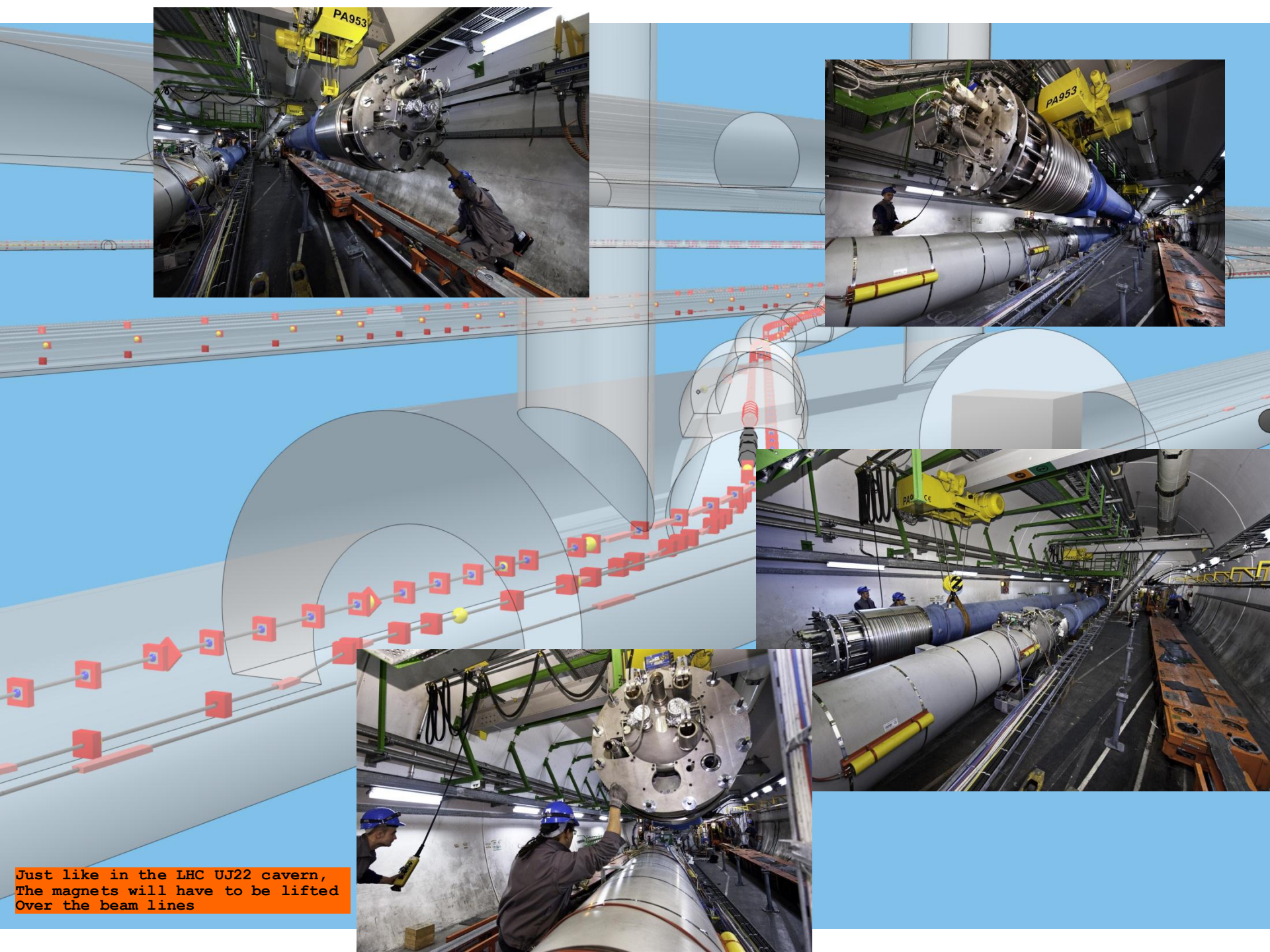
CERN TDR efforts for Klycluster Scheme... Next Steps

- These layouts will be used for ILC Europe civil engineering costing purposes and for :
 - Europe Scheduling exercise (Martin Gastal & Katy Foraz)
 - Handling & Installation studies (Keith Kershaw)
 - Survey & Alignment (Helene Mainaud Durand)
 - Safety requirements (Fabio Corsanego)
- Exact Scope of what is to included in these chapters needs to be defined.
- Environmental Impact Studies are ongoing for a LC at CERN (with the help of a technical student Caroline Waaijer).

BACK-UP SLIDES



STEP file imported into Catia
from DESY to CERN thru EDMS
(Courtesy of Benno List and Don
Mitchell)
Even such large models can now
be downloaded and put in other
3D programs



Just like in the LHC UJ22 cavern,
The magnets will have to be lifted
Over the beam lines

Environmental Impact Assessment (EIA)

- Required by French and Swiss law
 - [Feasibility issue](#)
- 3 phases
 - Screening: establish necessity for EIA ()
 - Scoping: conduct EIA
 - Review: before submission
- Required knowledge
 - Legal framework
 - Policies & decision-making
 - Engineering
 - Environmental impact criteria
 - Biophysical, socio-cultural, socio-economica



Environmental Impact Assessment

- Major issues for ILC:
 - Civil Engineering
 - Excavations, spoil dumps, soil swelling, hydrology, release pollutants geothermal drillings, hydrocarbons, visual impact...
 - Energy consumption
 - Focus on renewable & sustainable energy
 - Water consumption
 - Where discharged?
 - Focus on renewable & sustainable energy
 - Social acceptance
 - Impacts during and after constructions, fear
 - Waste
 - Radiation

Feasibility threats

Environmental Impact Assessment

- Next steps
 - Planning
 - Task division
 - cost estimates EIA
 - Land acquisition
 - Start
 - Work together with Swiss / French authorities
 - In-depth studies
 - Identify knowledge gaps
 - Address feasibility threats

