



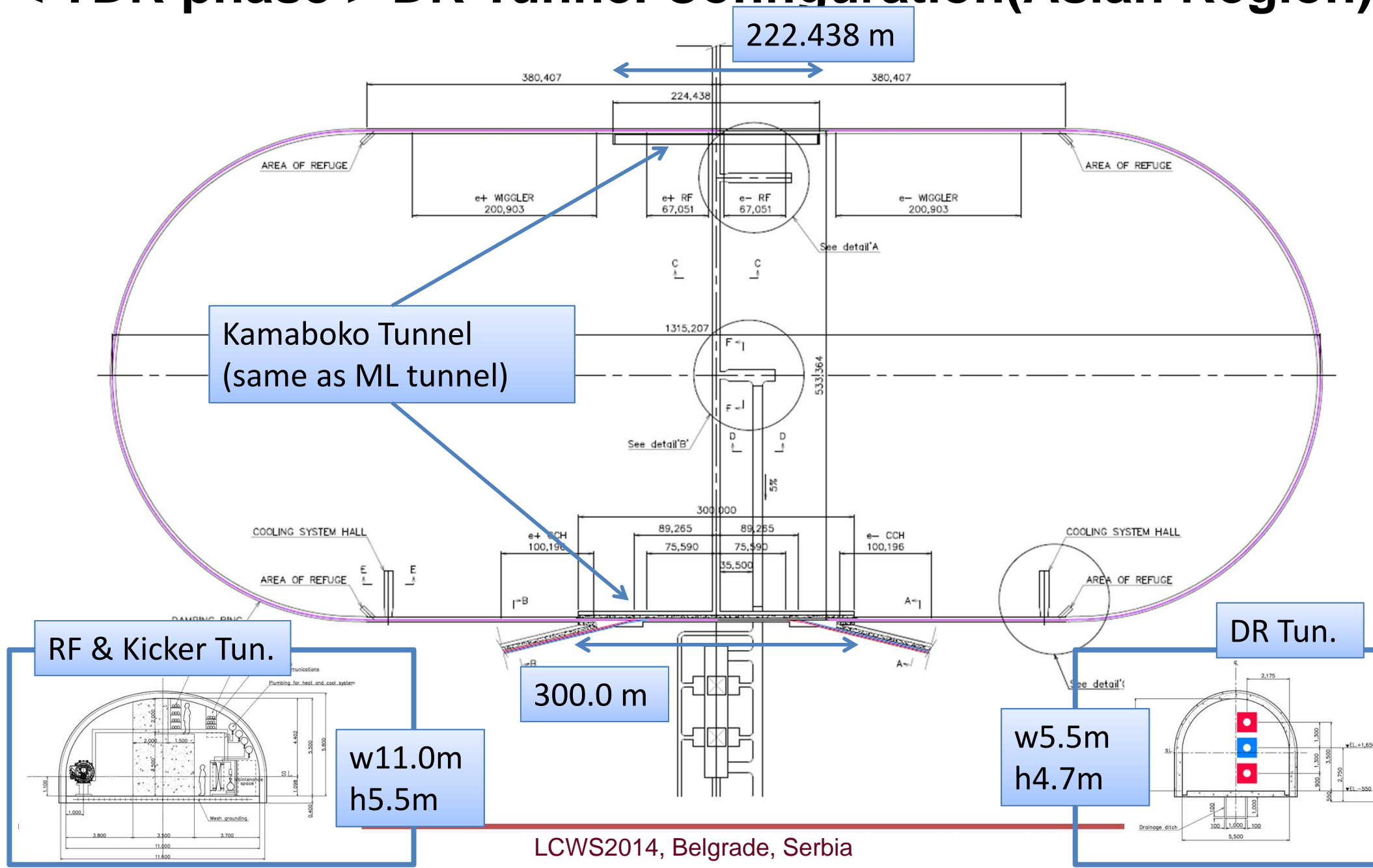
# Damping Ring Civil Design for Asian Region

9 October, 2014

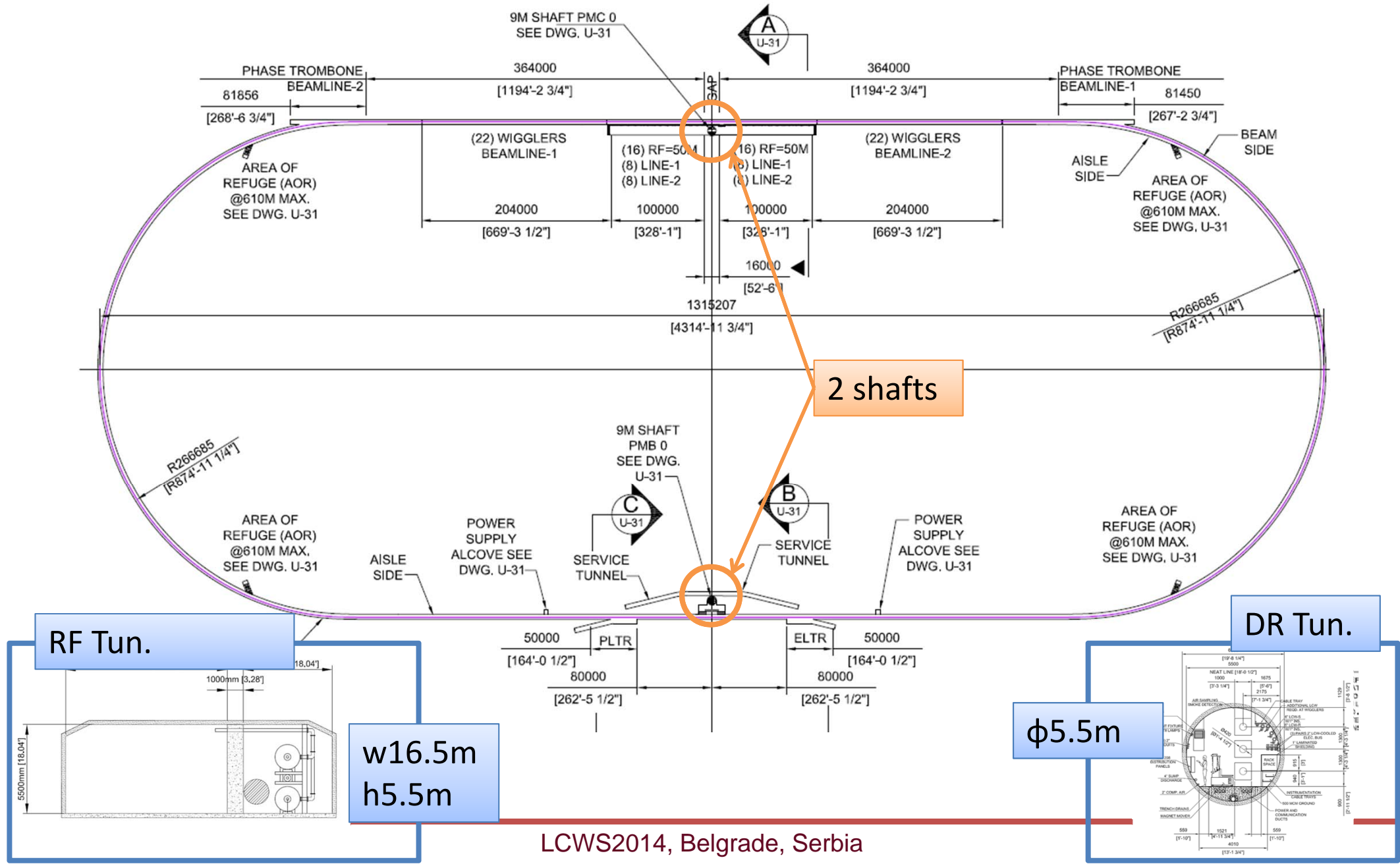
# Contents

- **Asian Damping Ring Configuration in TDR phase**
  - incl. the comparison of the configuration between America and Japan
- **Asian Damping Ring Configuration at present**
  - Several design was changed after publishing TDR
- **Issues on the present configuration**

## < TDR phase > DR Tunnel Configuration(Asian Region)



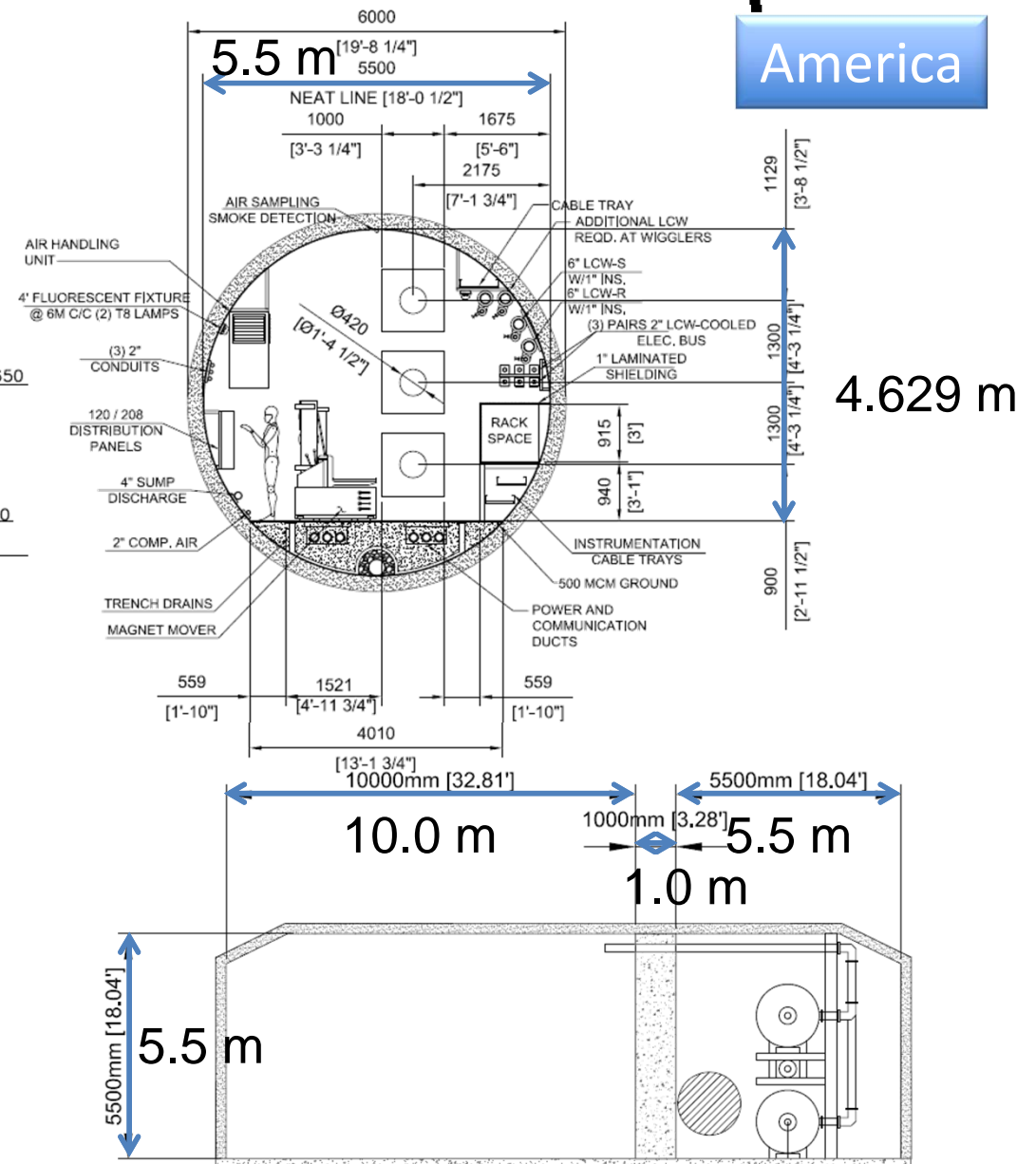
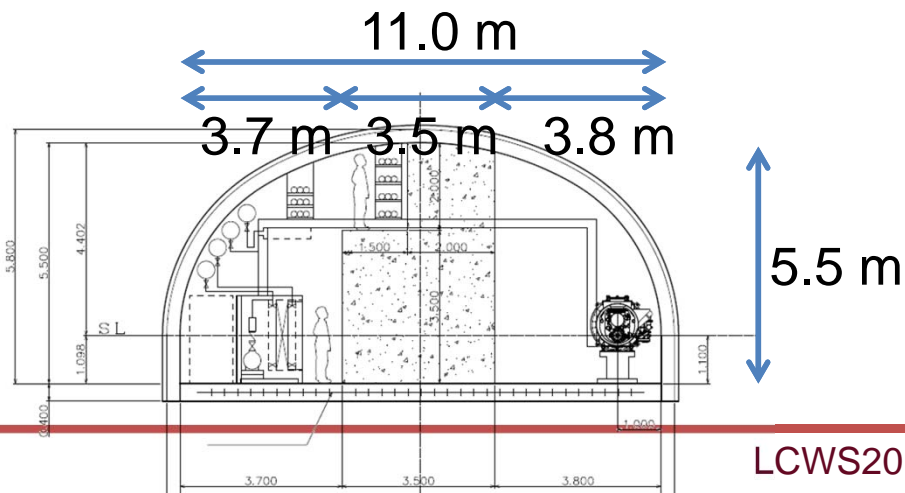
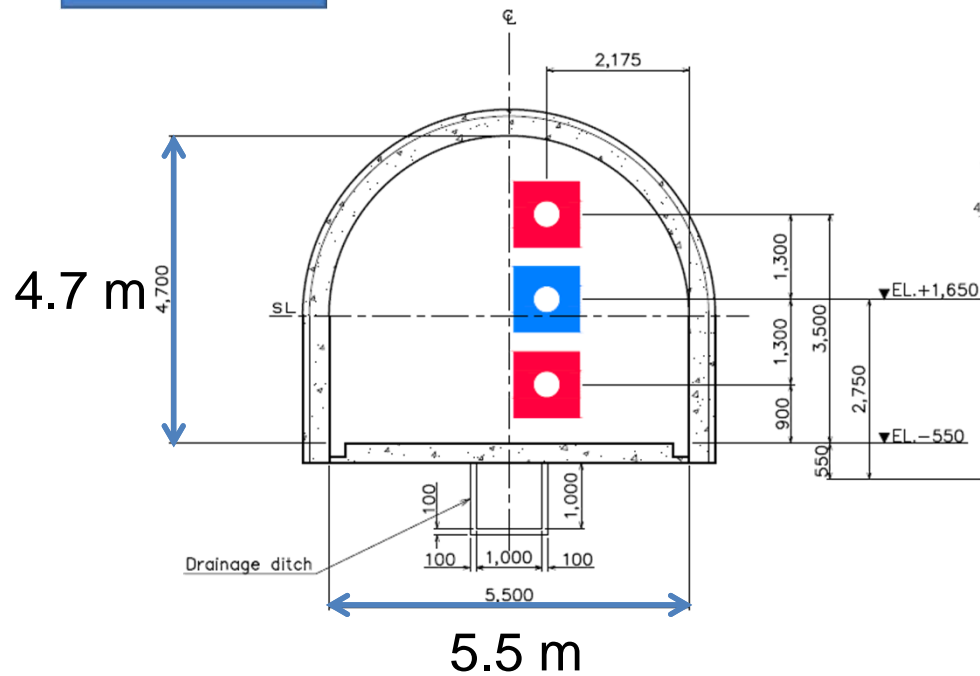
## < TDR phase >DR Tunnel Configuration(America Region)



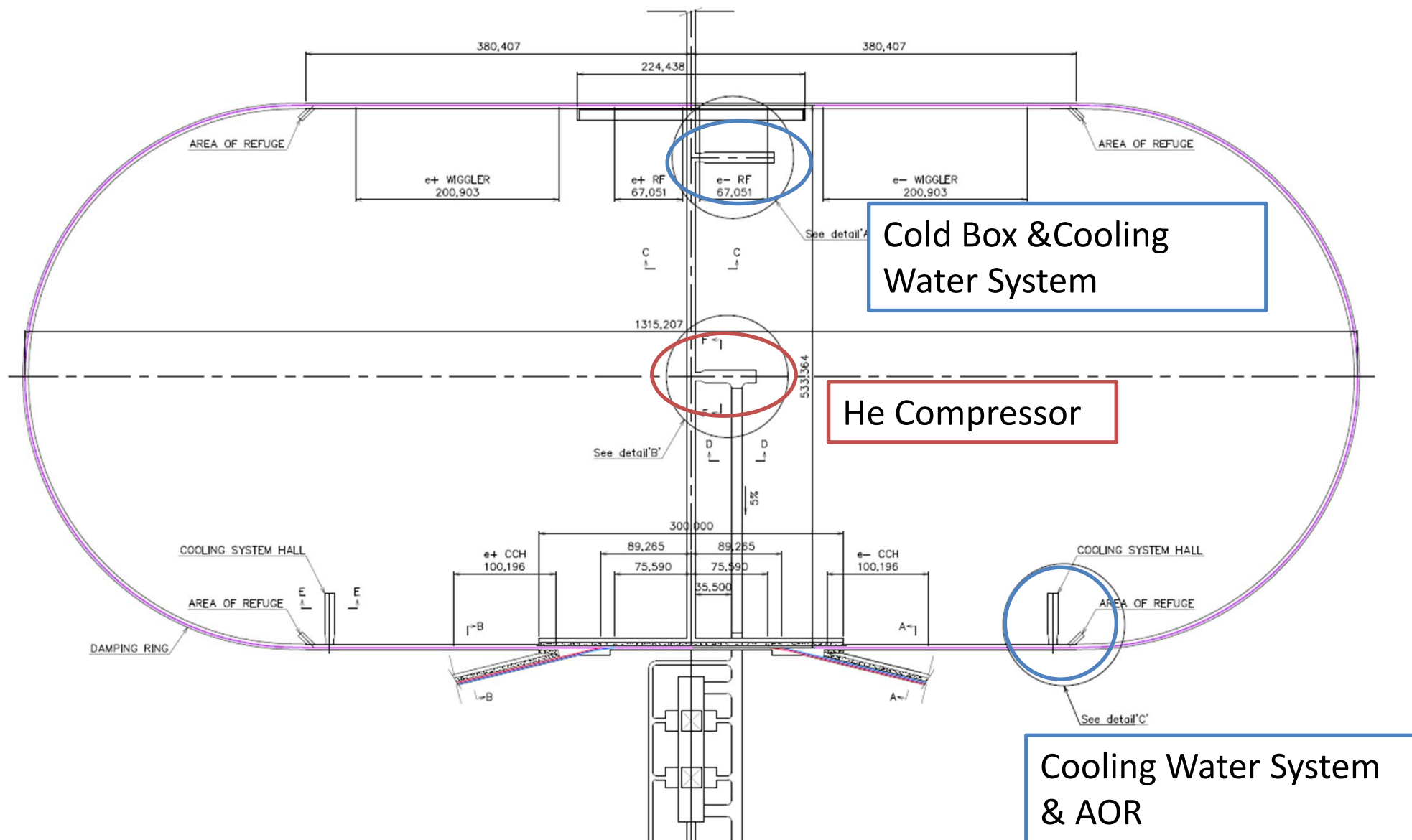
# Tunnel Comparison between America and Japan

# Japan

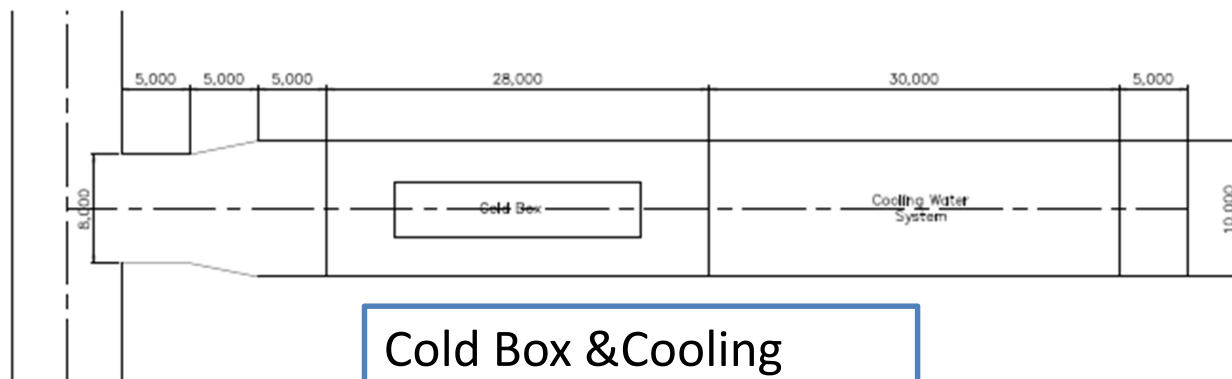
# America



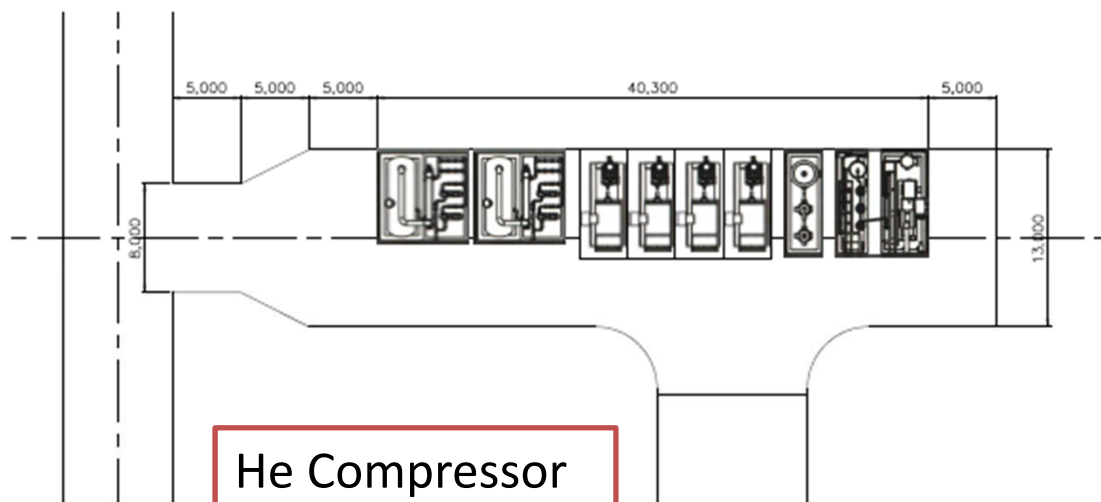
# < TDR phase > DR Tunnel Config (Asian Region)



# Hall (Cavern) Comparison between America and Japan

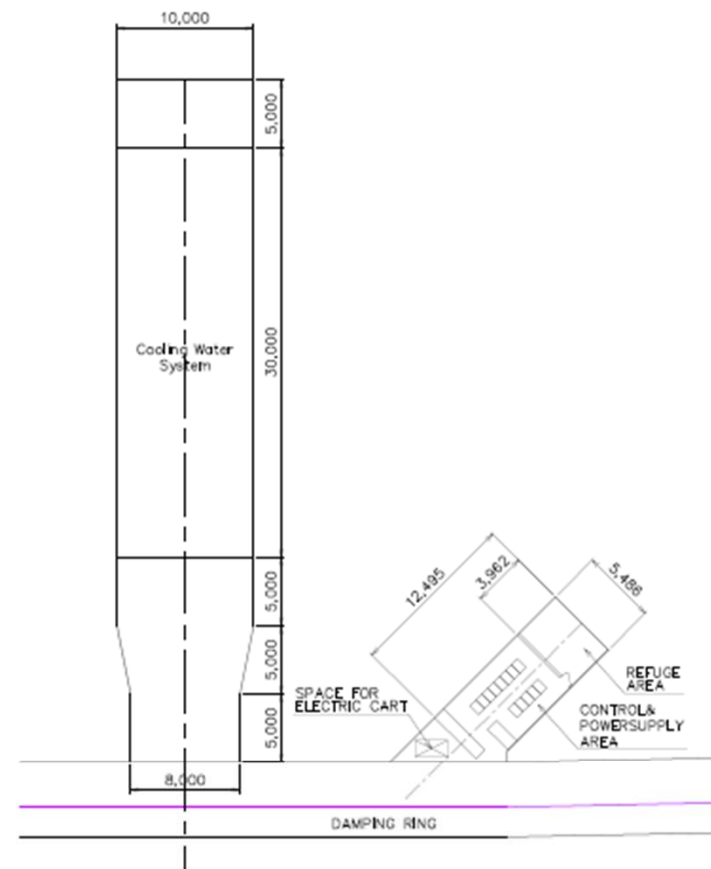


Cold Box & Cooling Water System



He Compressor

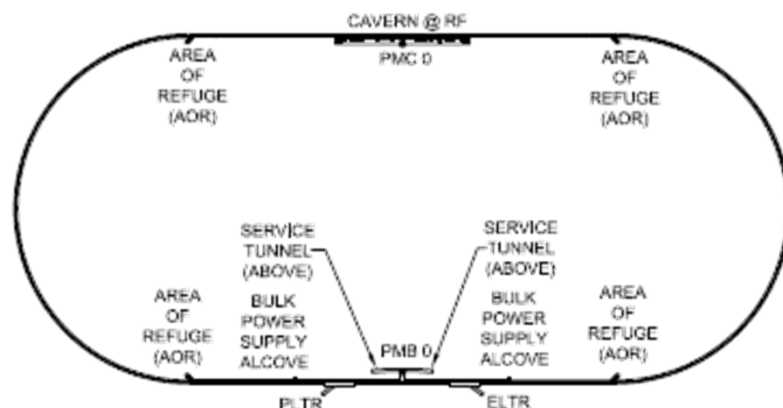
DETAIL 'B'



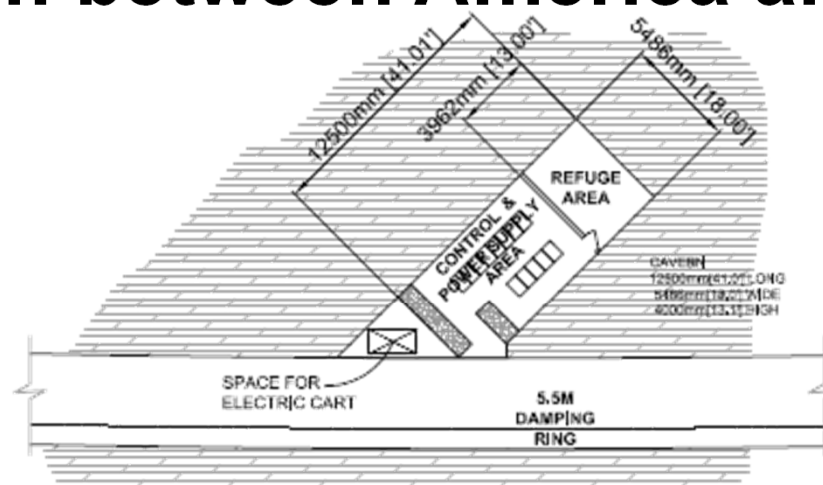
DETAIL 'C'

Cooling Water System & AOR

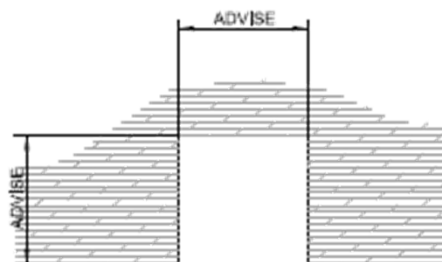
# Hall (Cavern) Comparison between America and Japan



### KEY PLAN - DAMPING RING



**PLAN - AREA OF REFUGE (AOR)**  
**4 - REQUIRED**



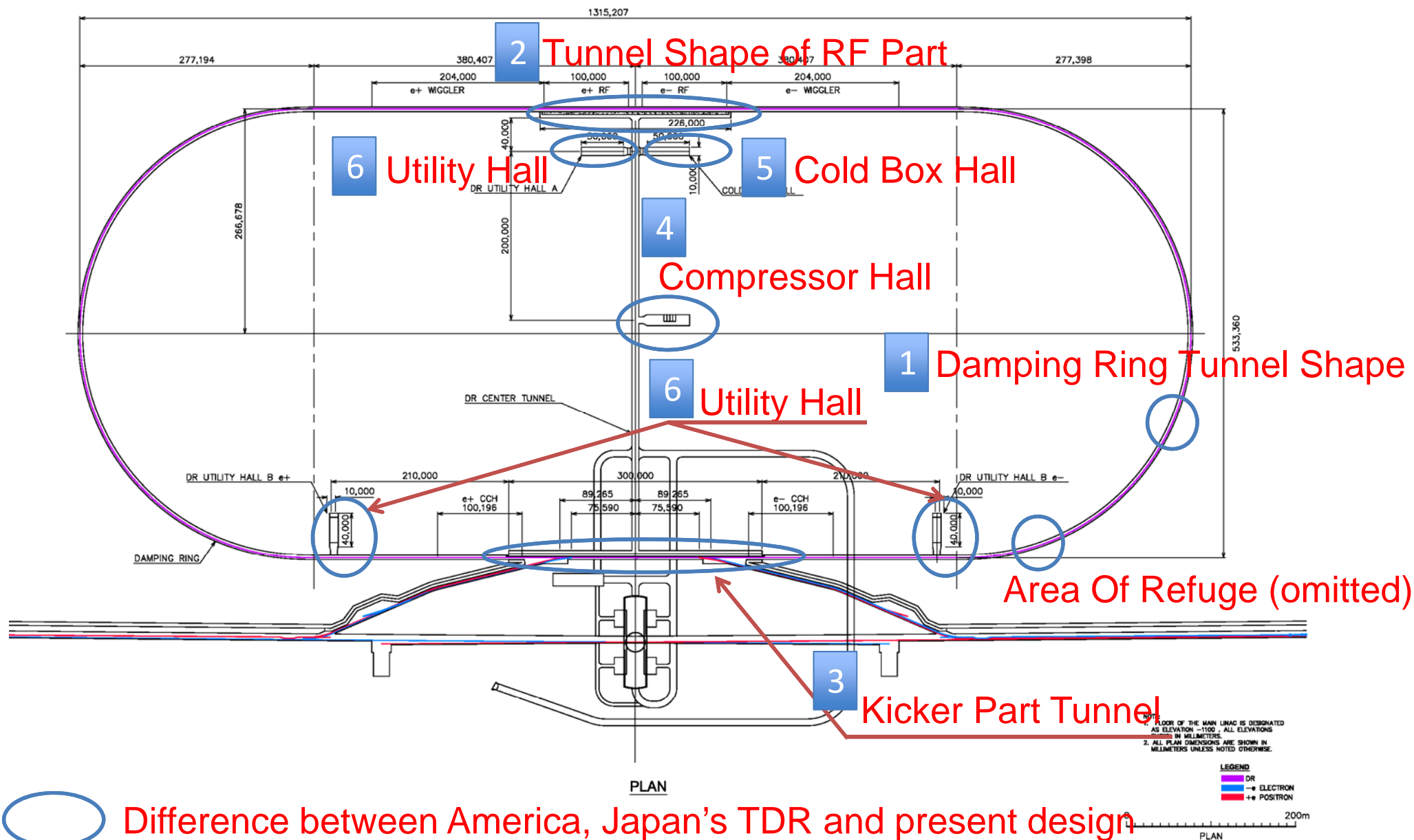
**PLAN - BULK POWER SUPPLY ALCOVES**  
**2 - REQUIRED**



**Then,**

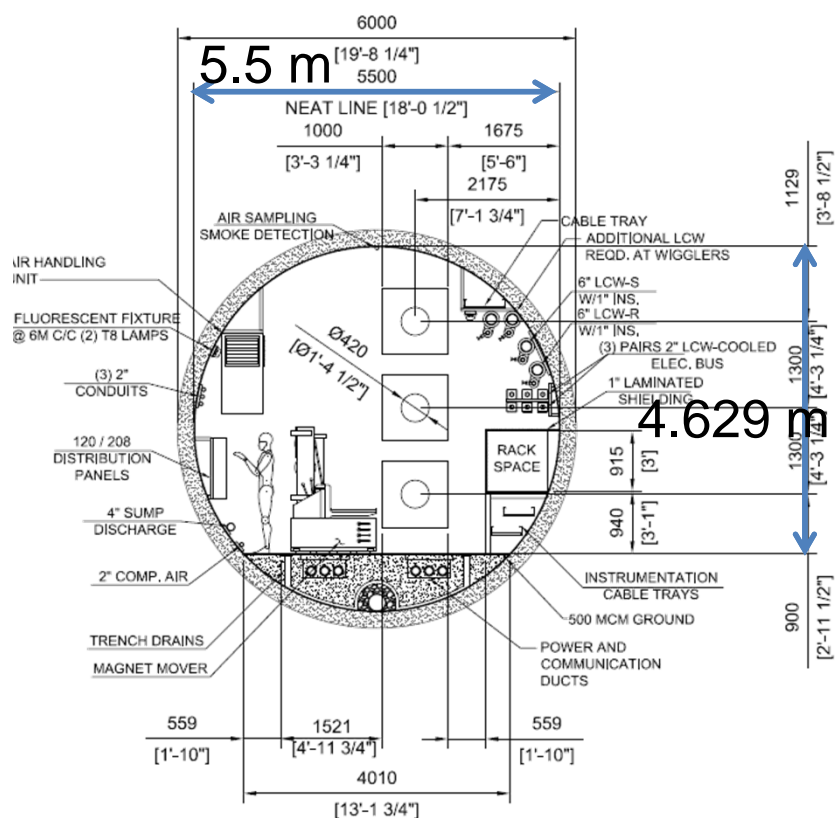
**Asian design was changed a little after publishing TDR as much as possible by studying the detail even though the detail was not clear.**

# Revised Damping Ring Configuration for Asian Region

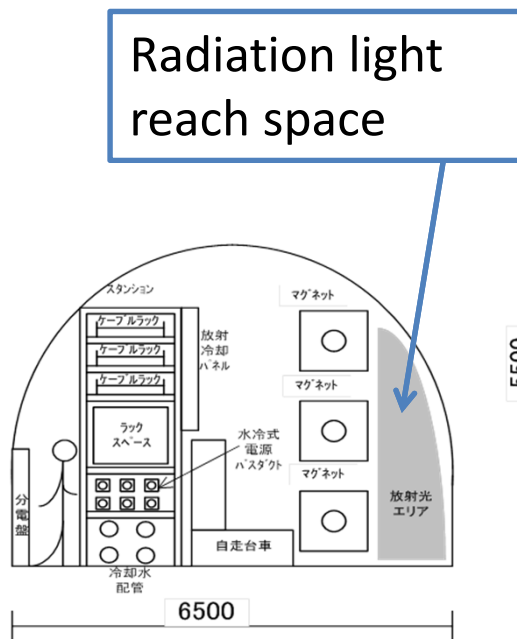


# 1 Damping Ring Tunnel Shape (Typical tunnel Part)

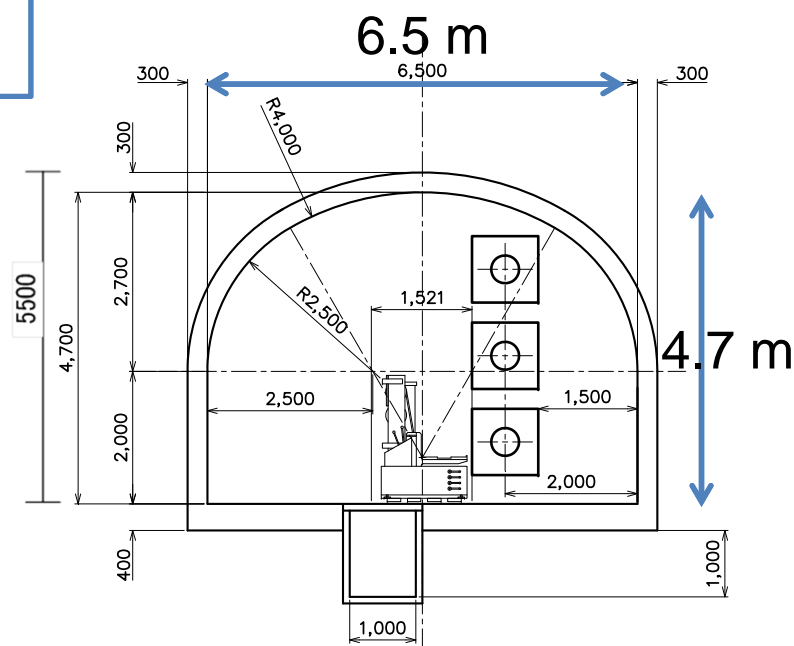
- Considering facilities layout and radiation light which arise at the outside of the tunnel, then 6.5m wide and 4.7m high was required.



America's tunnel shape



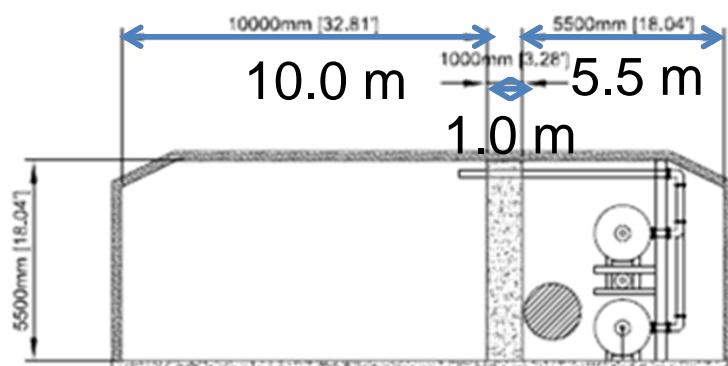
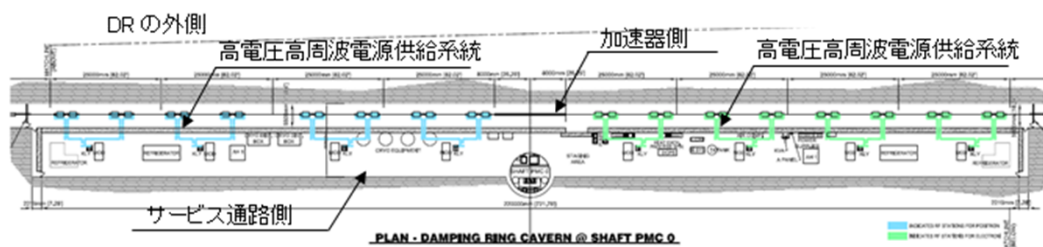
Facilities layout study



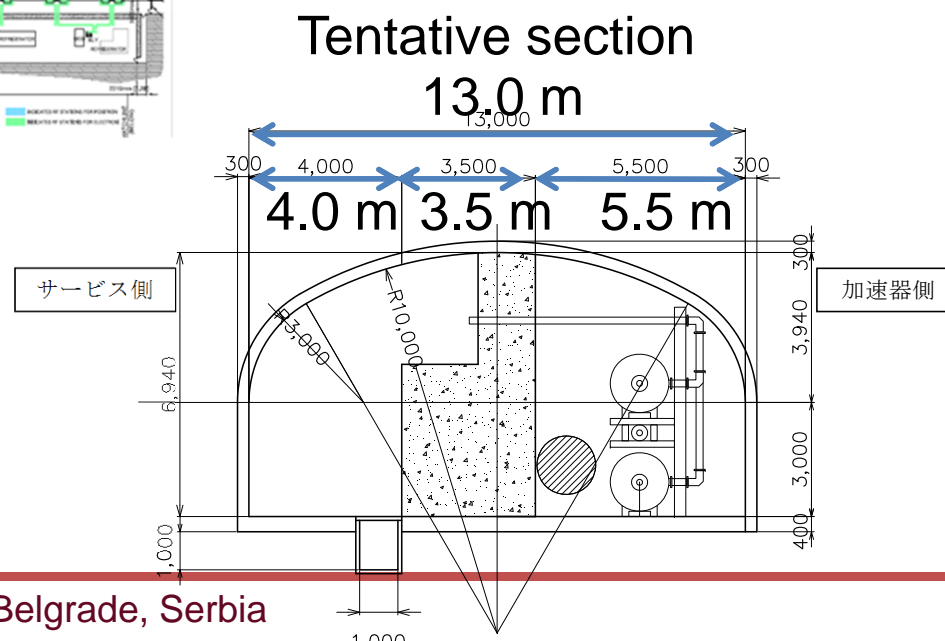
Optimized shape according to the facilities layout study

## 2 Tunnel Shape of RF Part

- Similar to “Kamaboko Tunnel (ML Tunnel)” shape
- Inner width of accelerator side is 5.5 m in consideration of the America’s design and double bunked accelerator
- Shielding wall thickness is to be 3.5m in the same way as ML tunnel even though 1.0m wide on the America’s design
- As for RF side of the tunnel, inner width is to be 4.0m which is a little wider than ML tunnel because two accelerators’ facilities will be placed (but the details are not sure...).

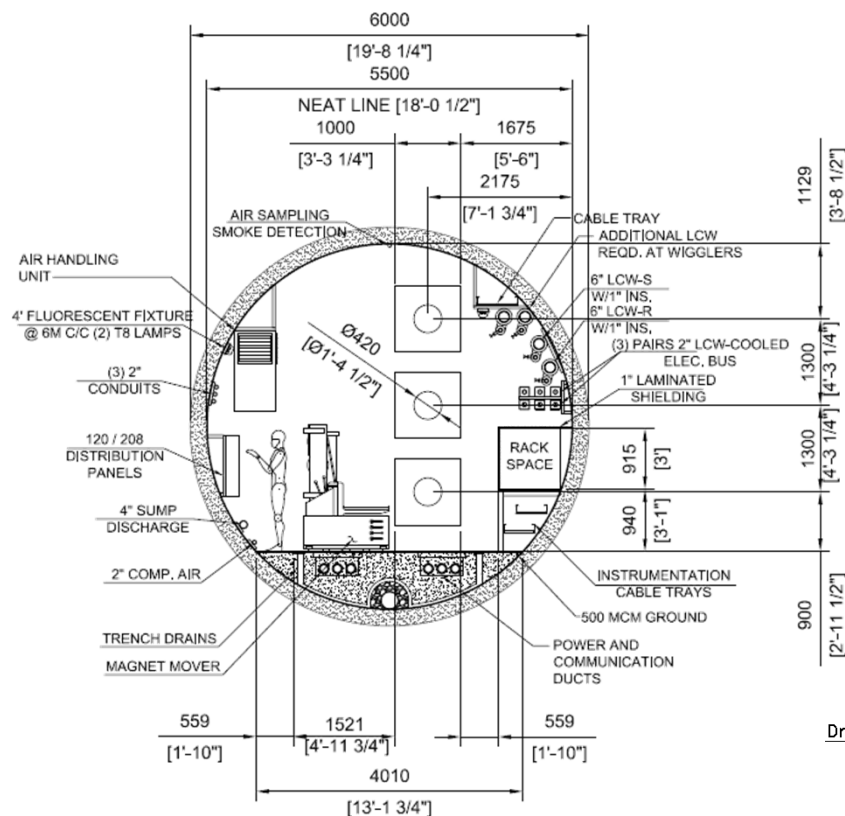


America's tunnel shape



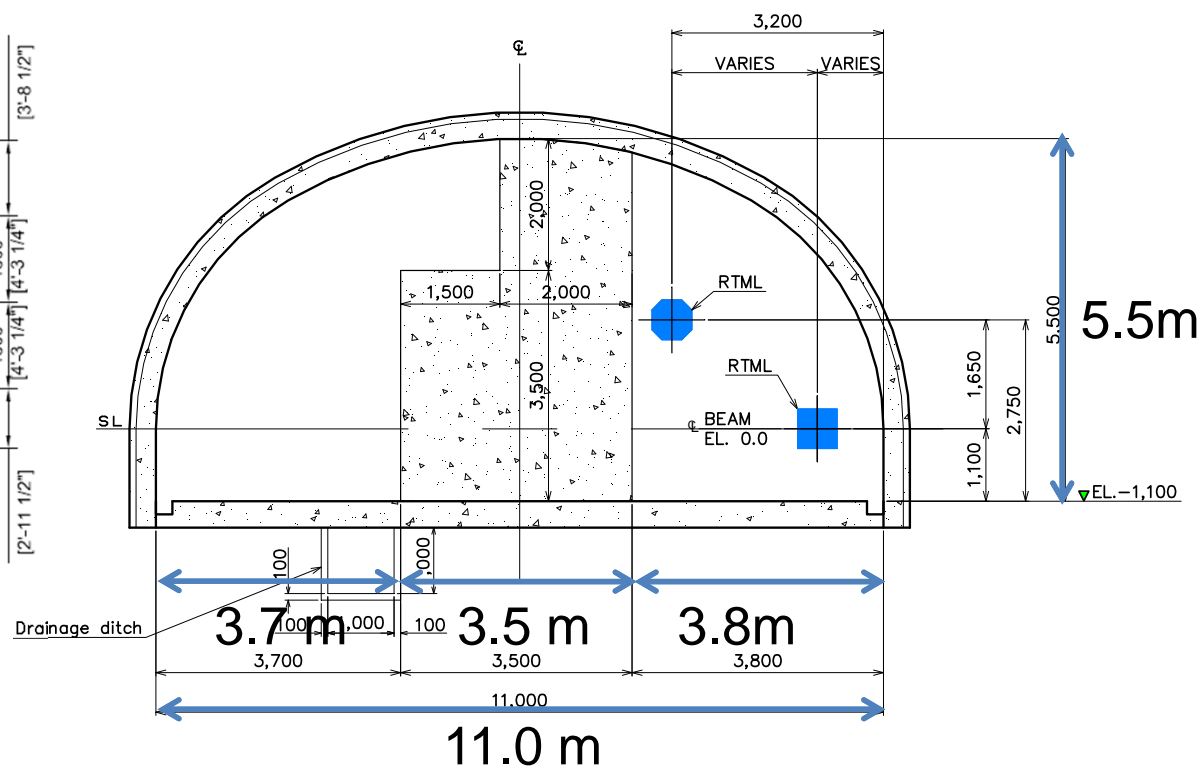
### 3 Kicker Part Tunnel

- Same as ML tunnel shape because the details are not clear at this moment



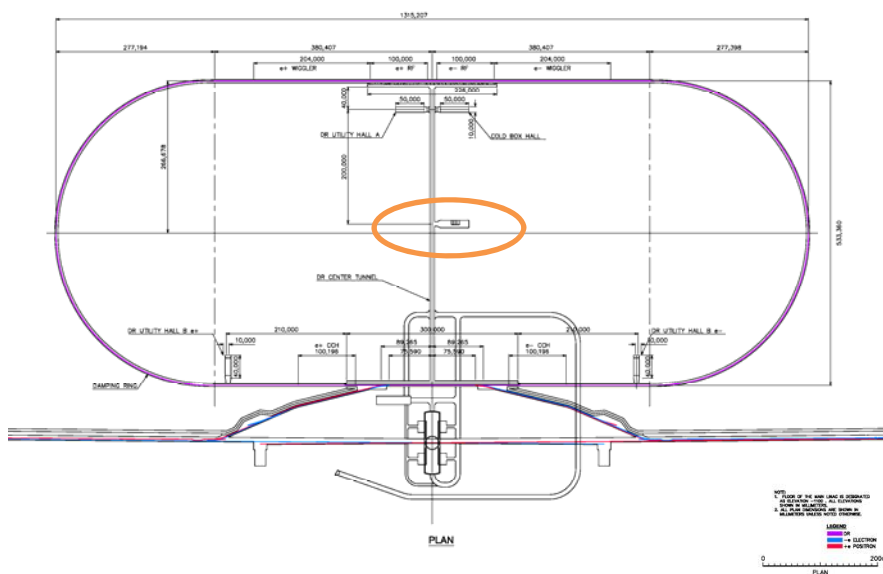
America's tunnel shape

Same as the TDR design

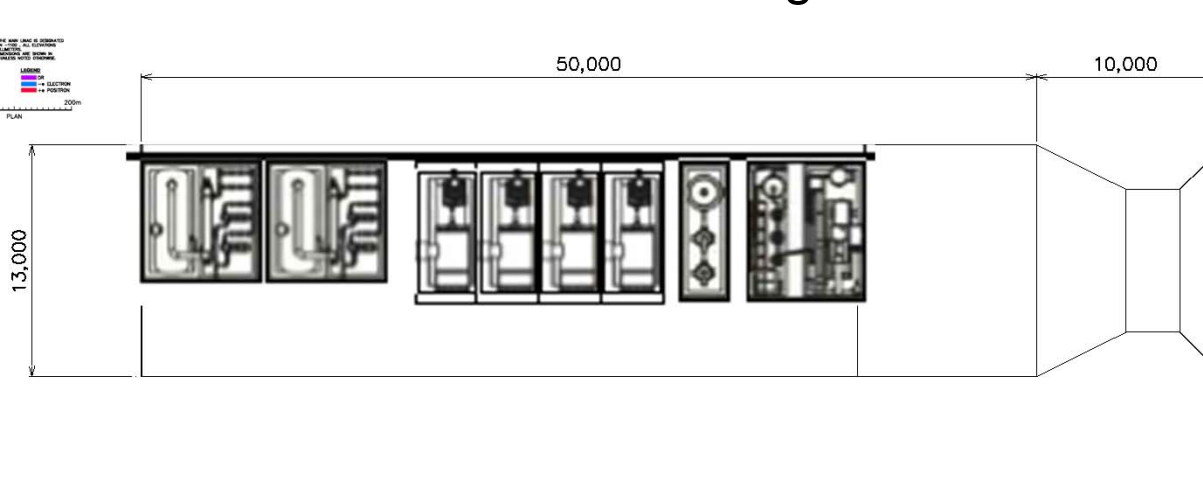


## 4 Compressor Hall

- The hall size is determined in consideration of the installation clearance and maintenance

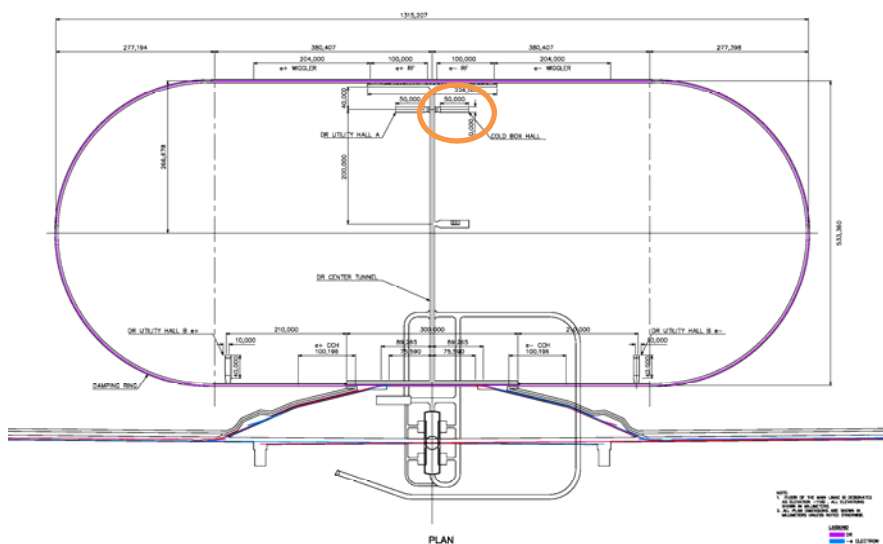


Same as the TDR design

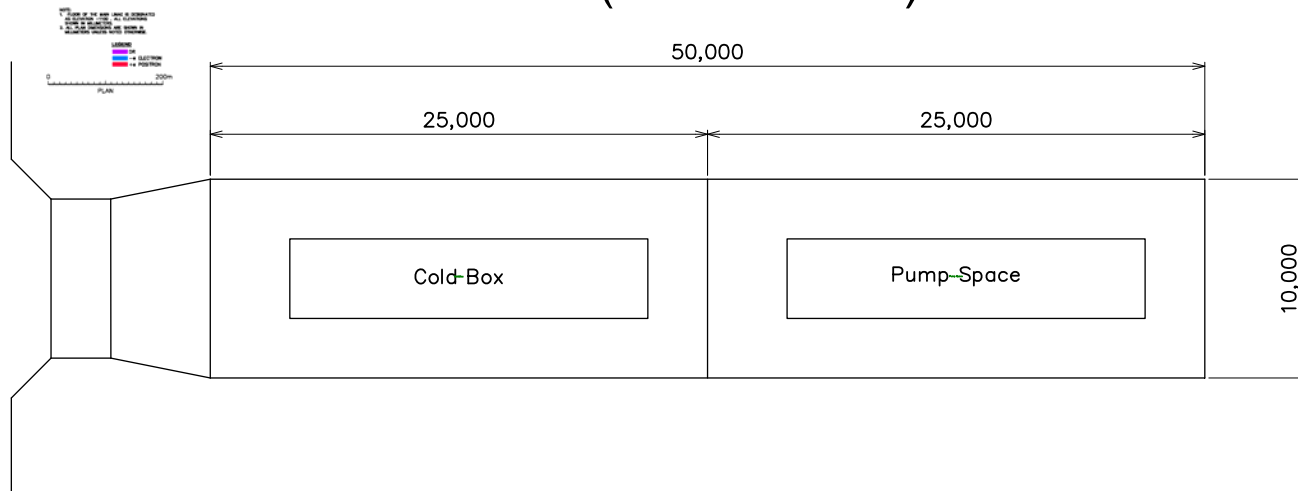


## 5 Cold Box Hall

- The hall is to be planed at the nearby Cryo-module



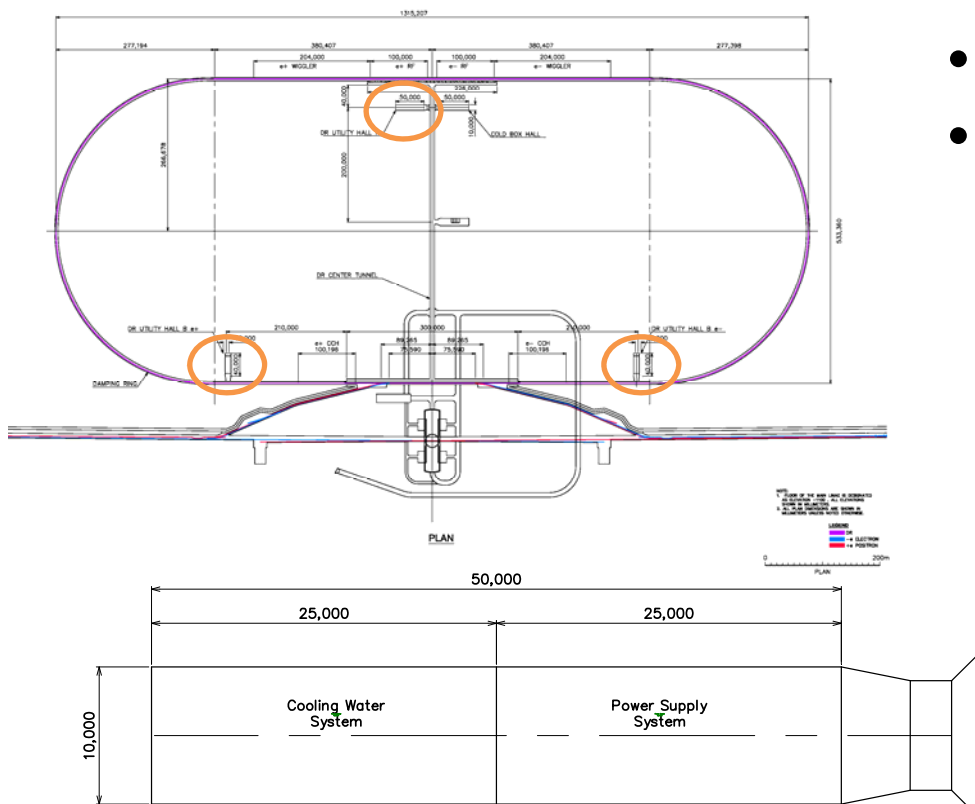
The length was shortened from TDR design  
(68m → 50m)



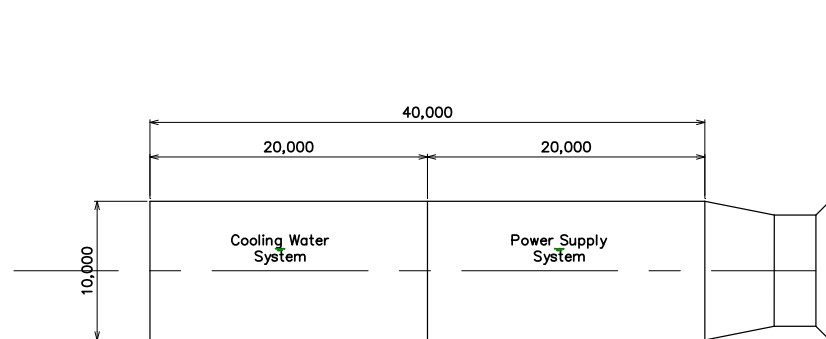
## 6 Utility Hall

- The hall is to be utilized for facilities as electricity, cooling water system and ventilation system

- These hall spaces are tentative.
- Necessary spaces of each hall are unknown because the facilities size for DR are not defined.



The hall was added

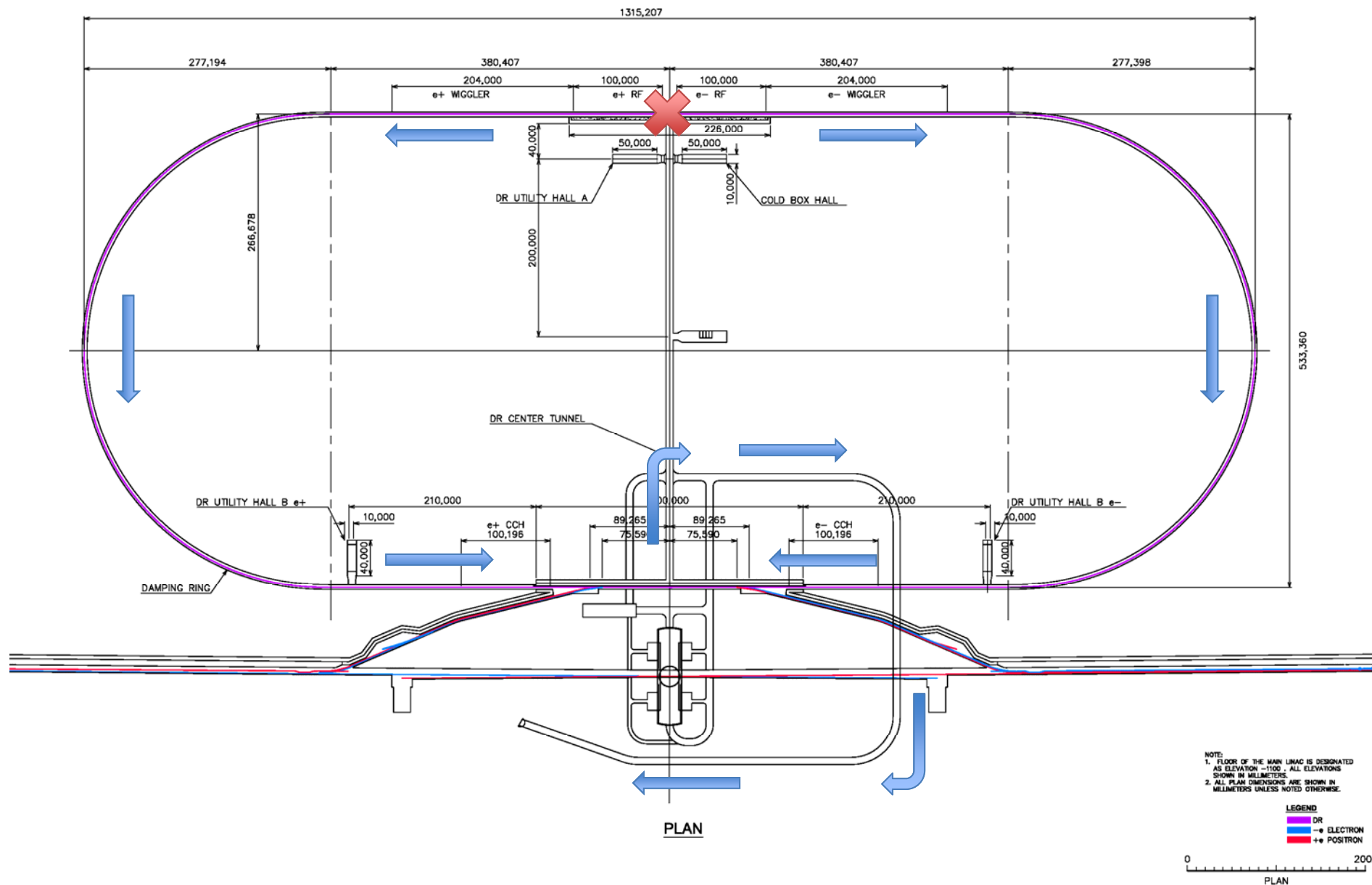


Same as the TDR design



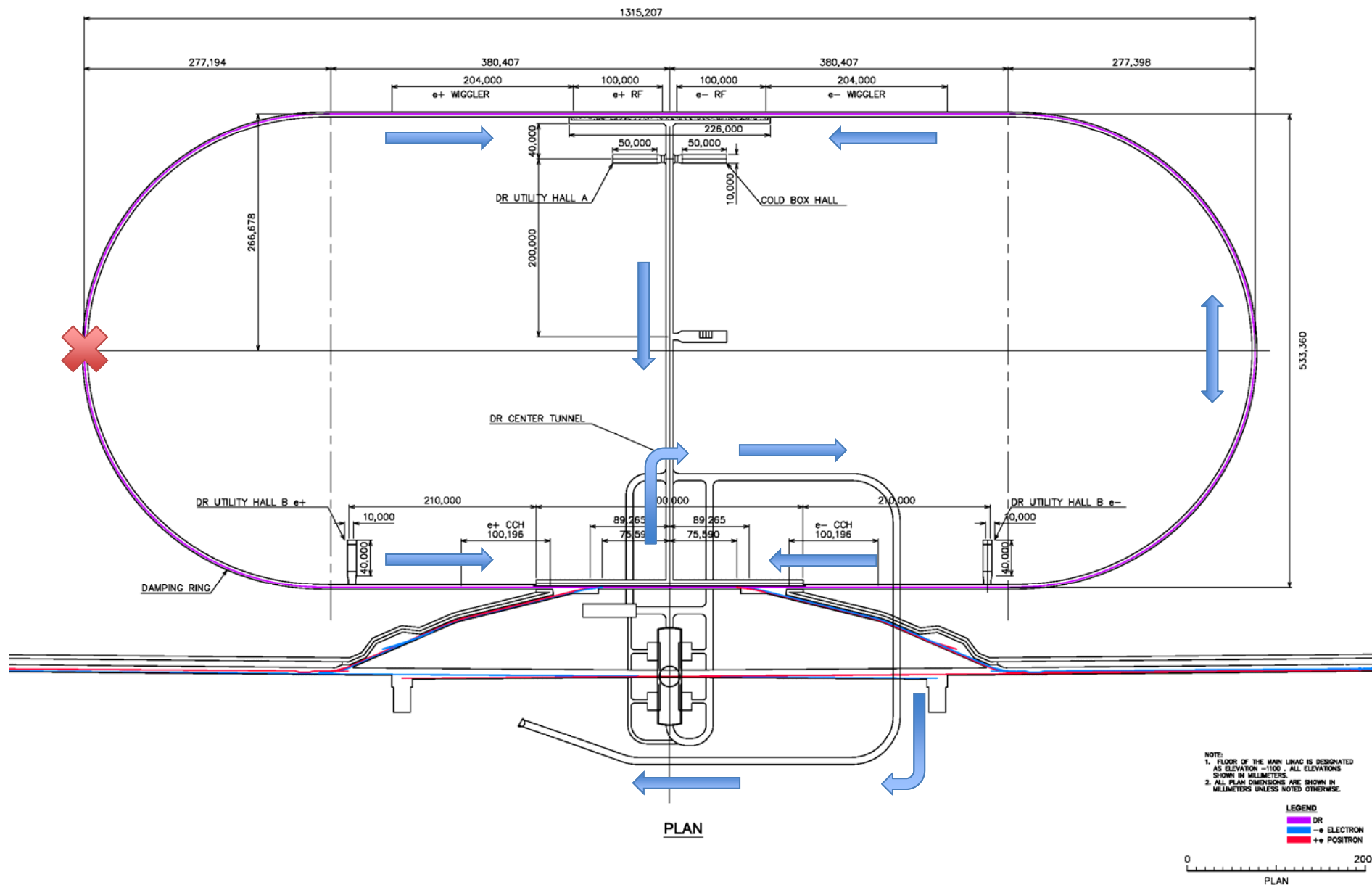
# Evacuation Simulation No.1

✖ Disaster Source



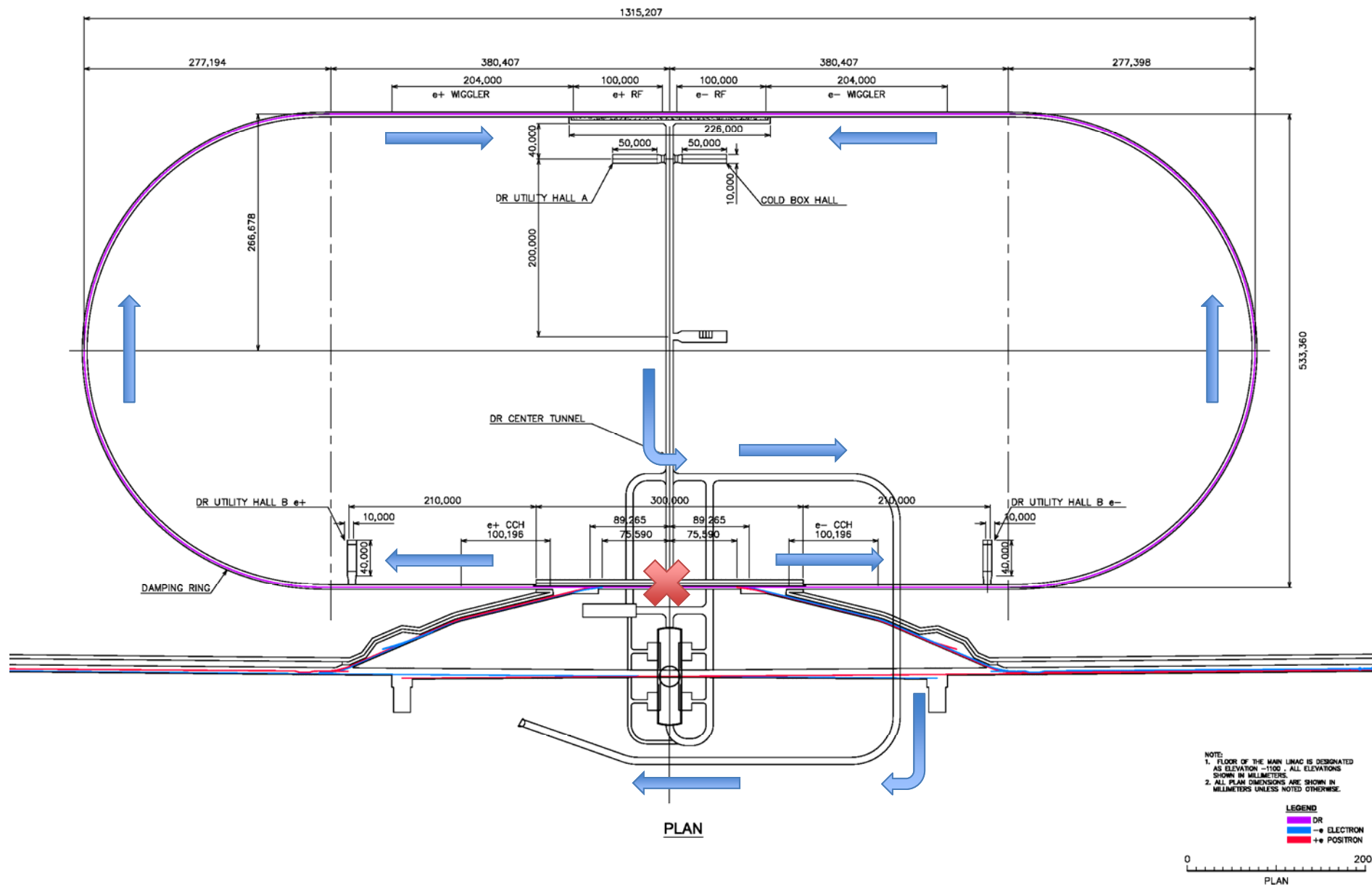
# Evacuation Simulation No.2

✖ Disaster Source



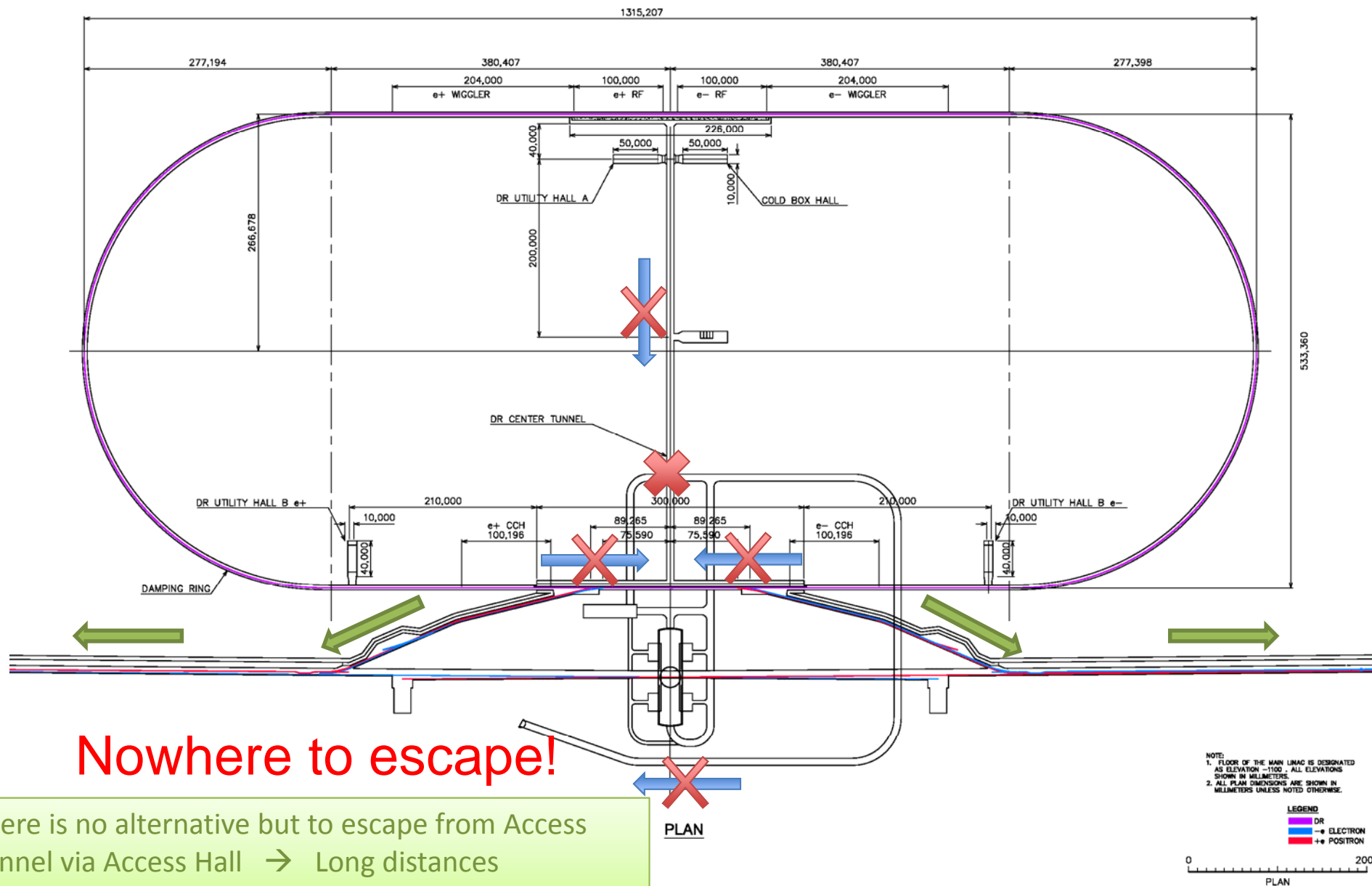
# Evacuation Simulation No.3

✖ Disaster Source



# Evacuation Simulation No.4

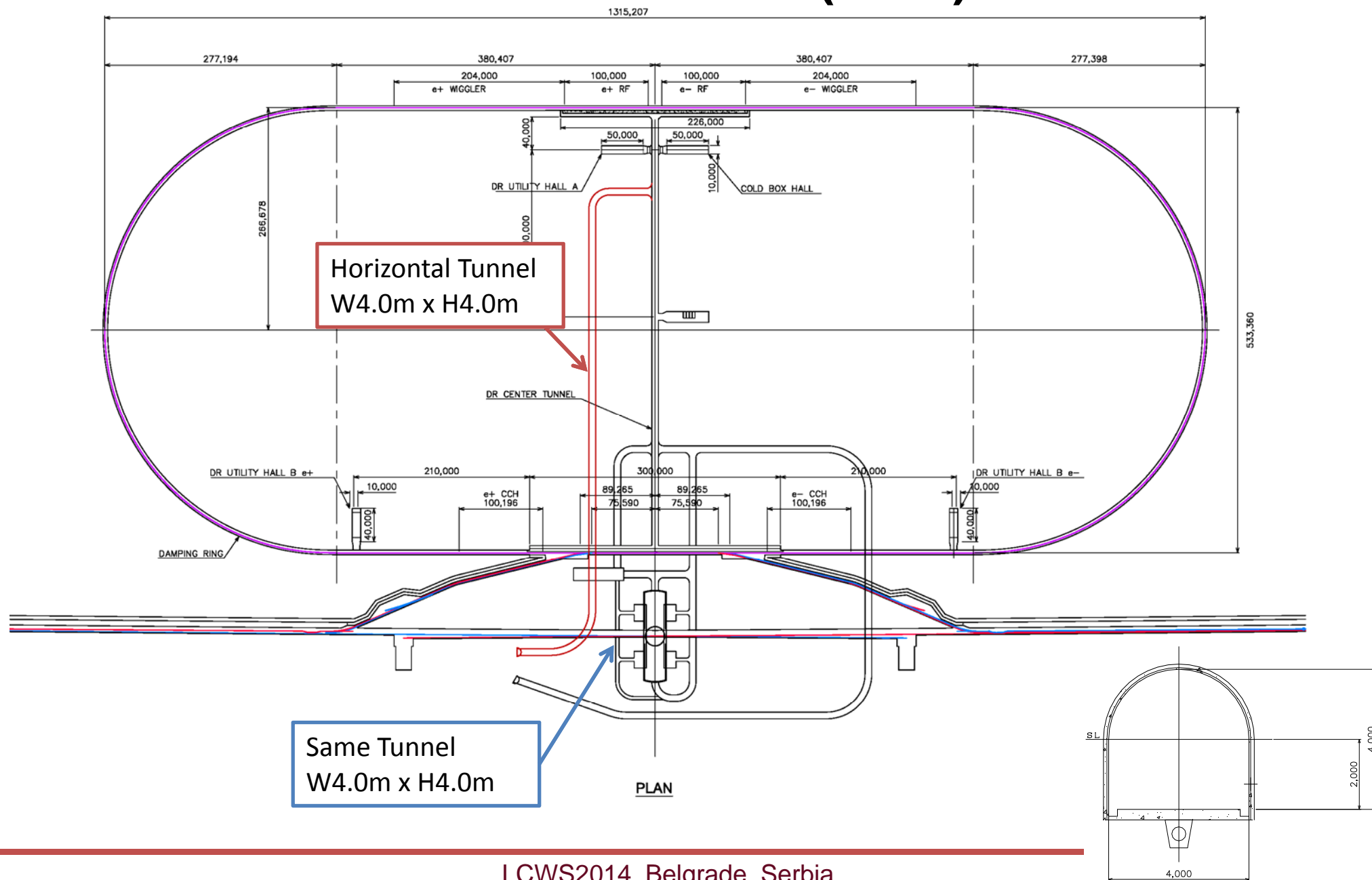
✖ Disaster Source



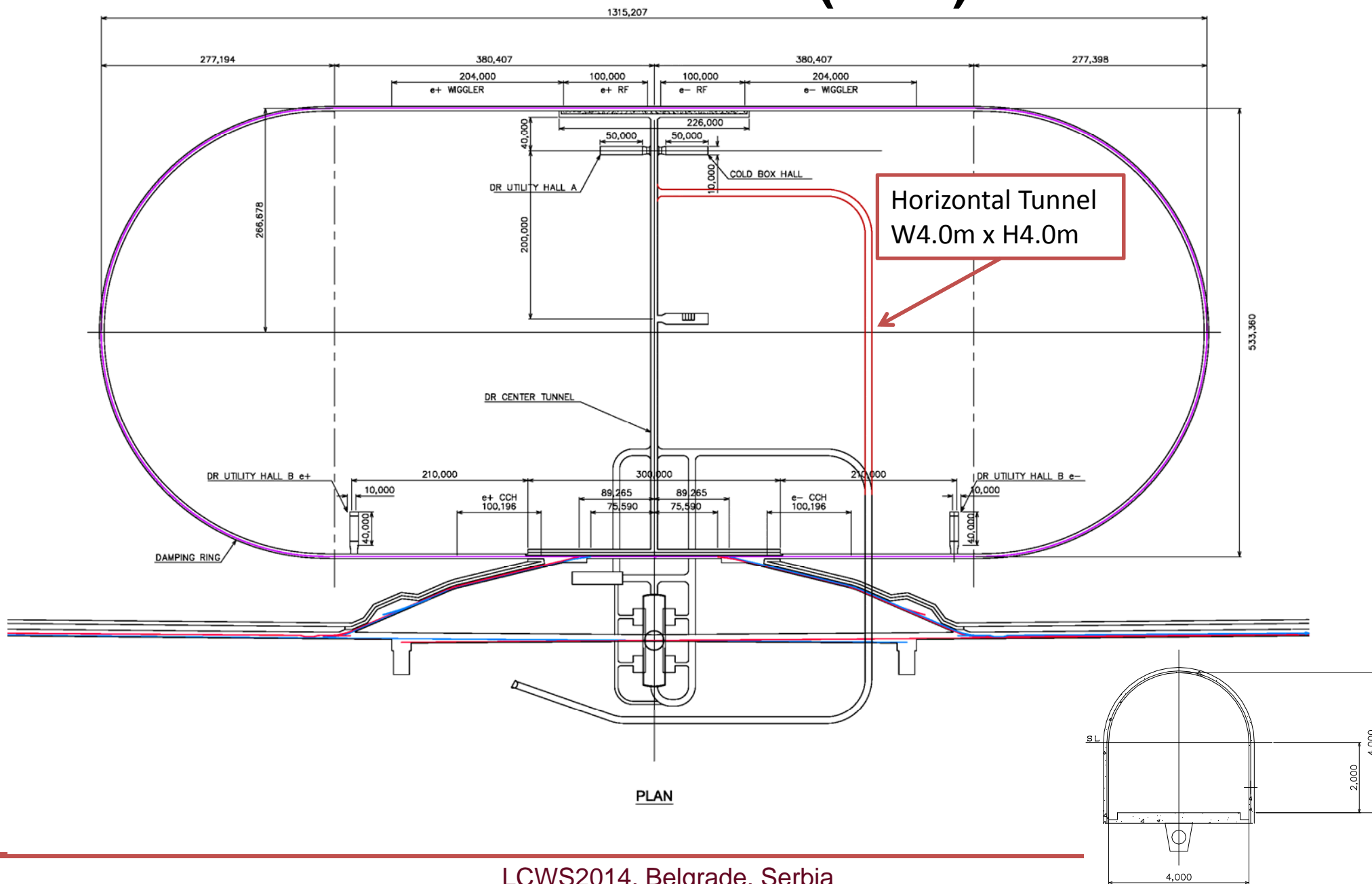
Nowhere to escape!

There is no alternative but to escape from Access Tunnel via Access Hall → Long distances

# A Case of the Evacuation Route (No.1)

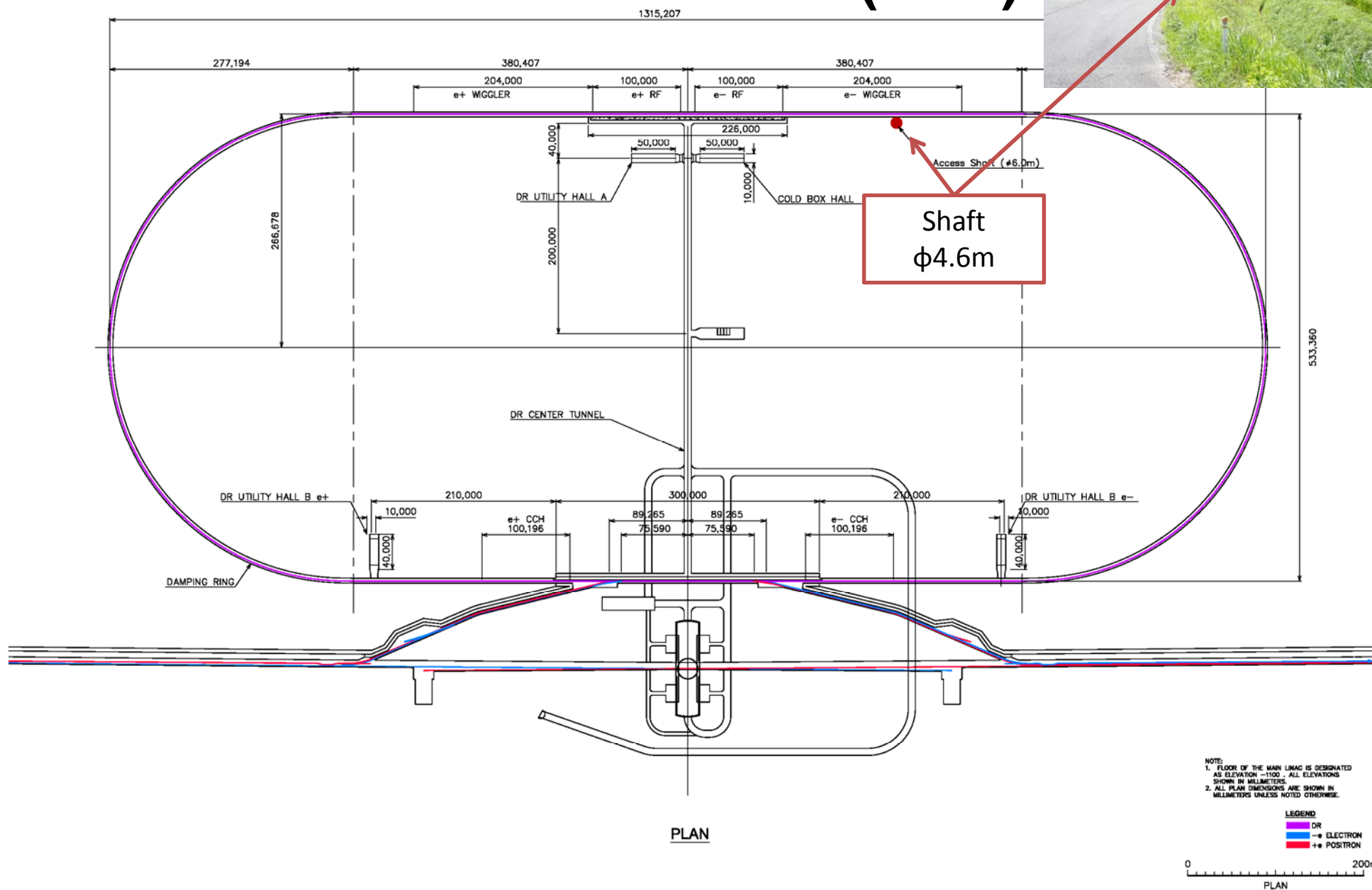


# A Case of the Evacuation Route (No.2)





# A Case of the Evacuation Route (No.3)



## Items to be discussed

- **Required size for each tunnel and cavern (hall)**
- What kind and size of facilities and/ or machineries will be placed in DR area?
- **Evacuation route for Damping Ring area**