Status of Radiation Protection studies in support of ELENA

HSE
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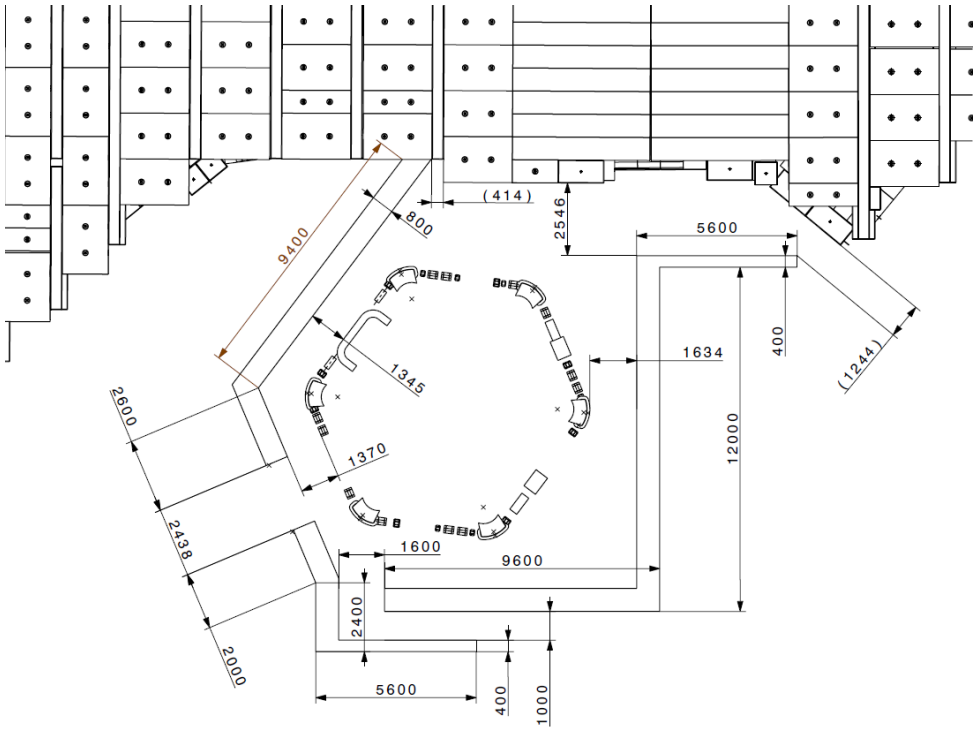
List of RP studies for ELENA / AD

- Shielding of the ELENA ring
- Construction of Building 193 extension (on top of TT2)
- Shielding reinforcement in the ATP area
- New chicane for AD ring access point (Installation of new access system on the PS complex in LS1)

Shielding for ELENA ring (R. Froeschl)

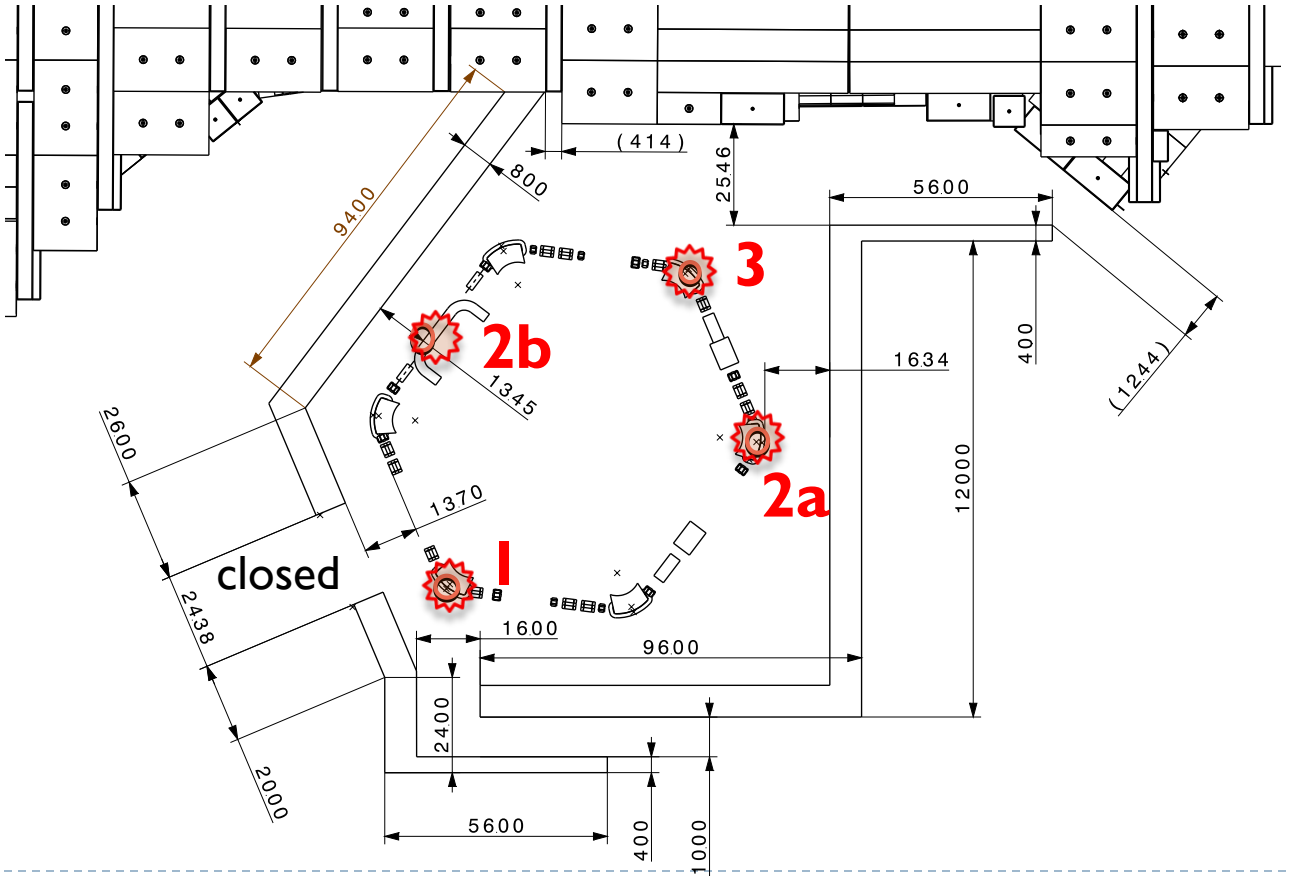
- Detailed layout of the ELENA shielding wall implemented in FLUKA



Thx to O. Choisnet for layout

Beam losses I

- Considering beam losses at worst locations (close to walls or chicane openings)

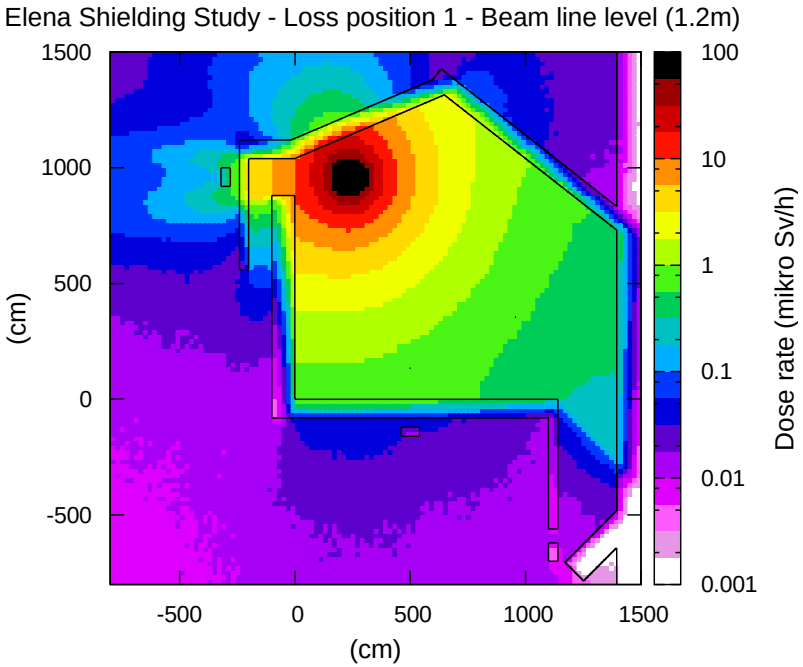


Beam losses II

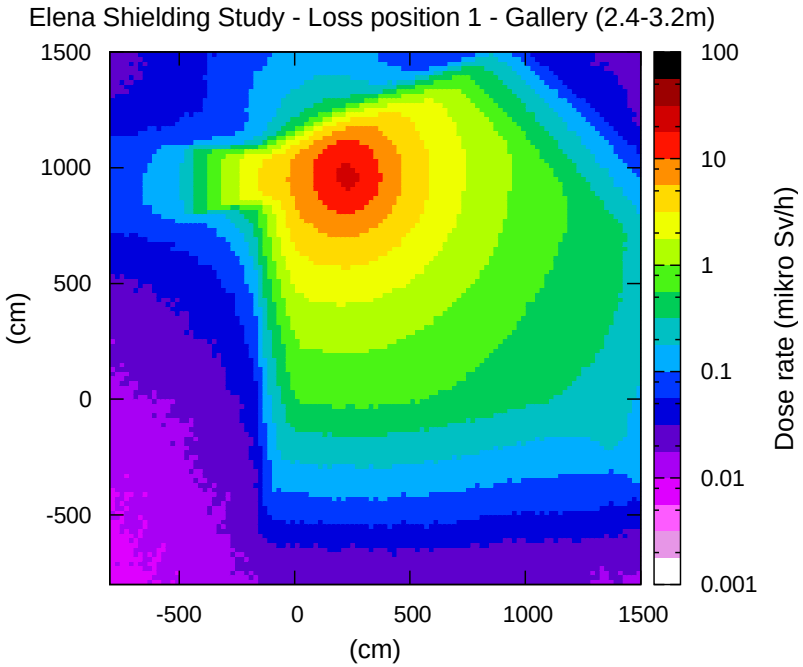
- Energy 5.3 MeV (injection)
- Beam intensity
  - Injected: 3E7 antiprotons/cycle
  - Ejected: 1.6E7 antiprotons/cycle
- Normal Loss
  - 1.4E7 protons/cycle
  - 1 cycle every 60s (now 100s)
- Loss rate
  - 2.33E5 antiprotons/s (1.4E7/60s)
  - 47% of full loss rate

Loss point 1

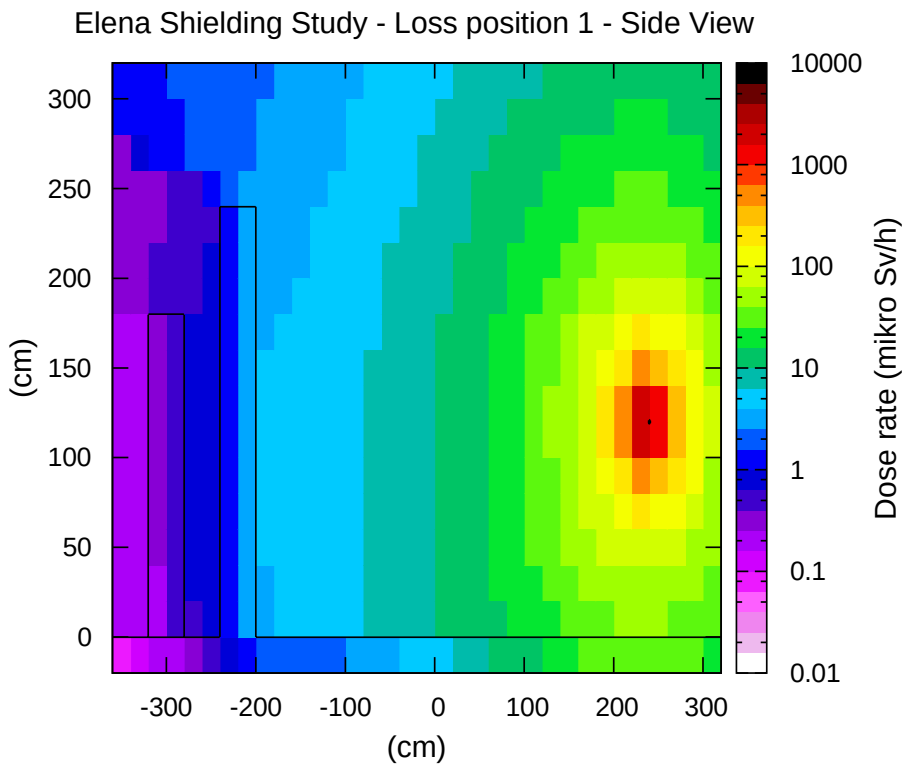
- Beam line level

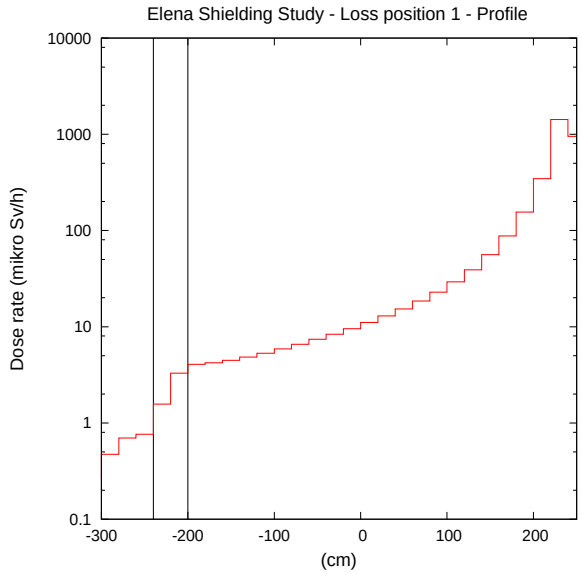


- Platform level



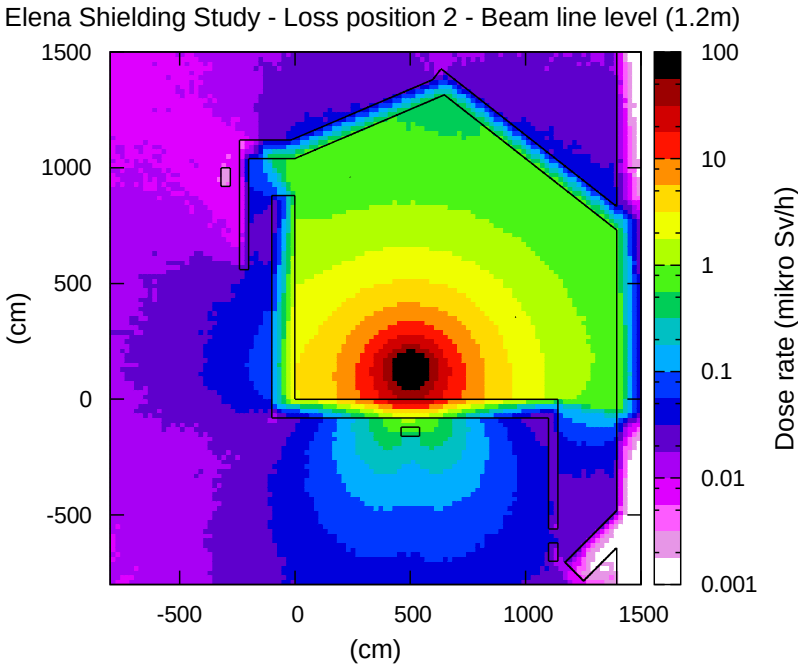
Loss point 1 – Side view



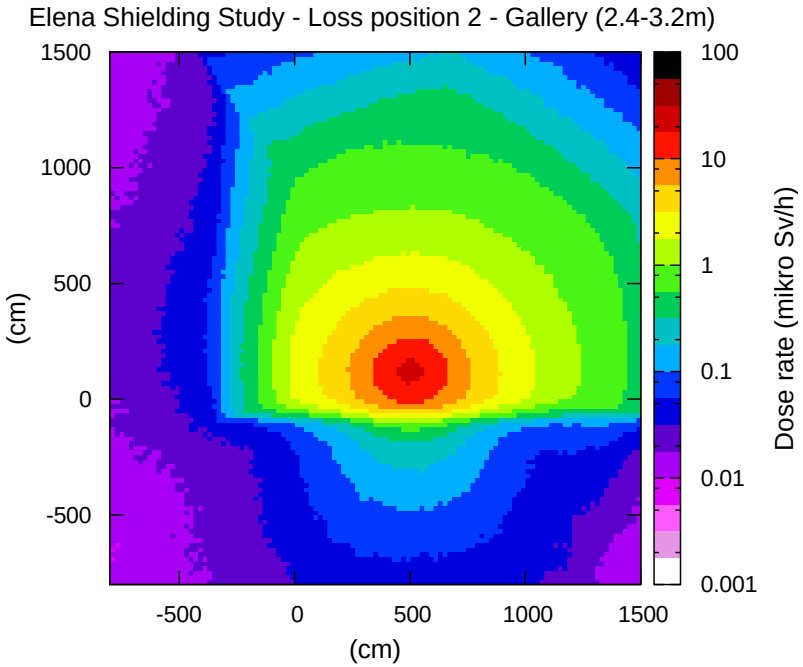


Loss point 2a (smallest distance 2b)

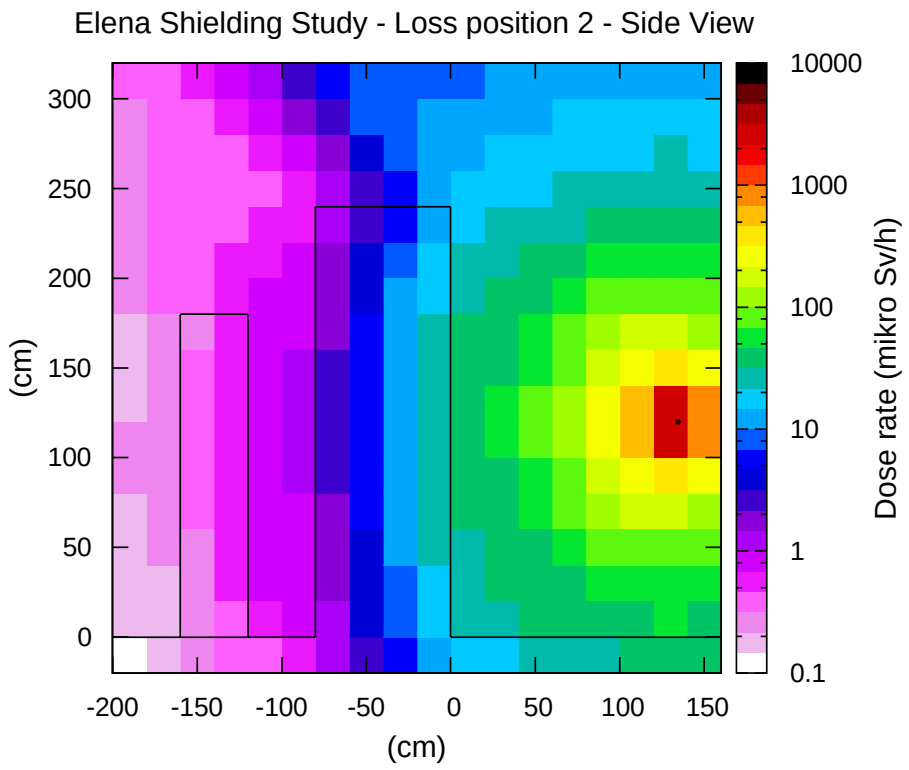
- Beam line level

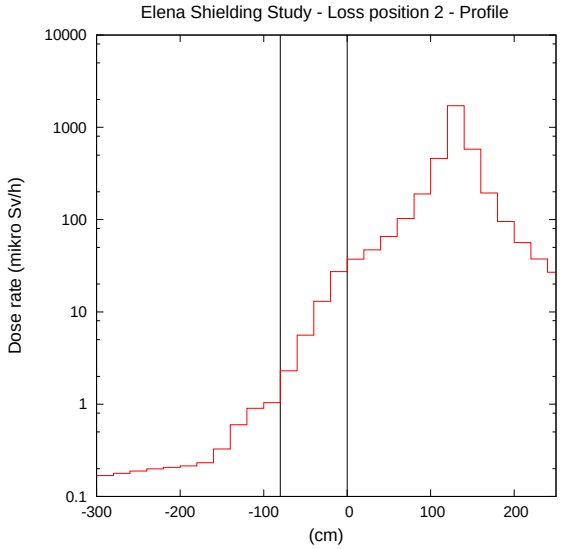


- Platform level



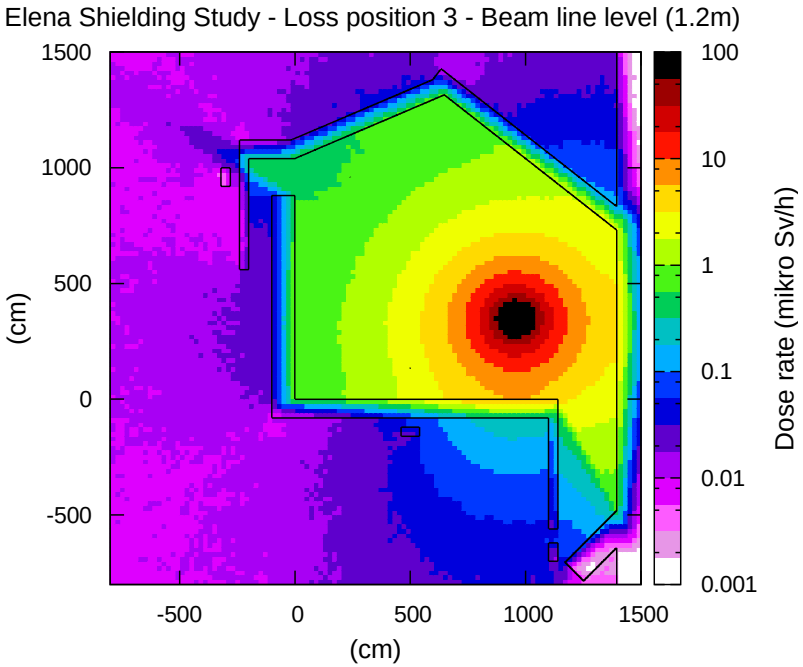
Loss point 2a (smallest distance 2b) Side view



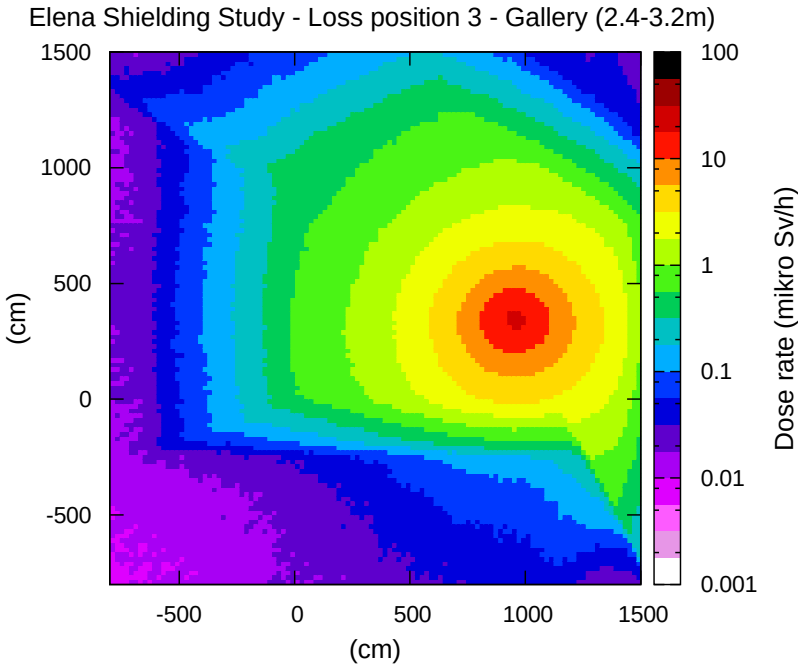


Loss point 3

- Beam line level



- Platform level



Preliminary conclusions ELENA shielding

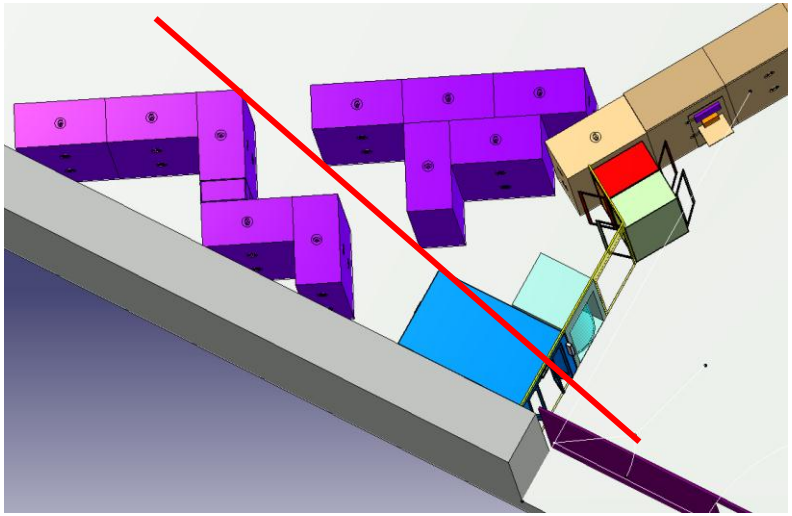
- Shielding thickness compatible with AD hall classification
- Location of the platform (visitors) to be properly chosen to ensure minimum exposure (it has to be moved away from the shielding enclosure)
- Concrete blocks implementation must ensure 80 cm of shielding (connection of slanted walls….)

Building Extension on top of TT2

- Similar strategy than for the new barracks (Build. 93)
- 6 m of earth vertically from TT2
- Trench along Build. 193 to be covered with 80 cm of concrete (included in Building design)
- Radiation monitor will be installed inside the building extension (included in monitoring budget)
- Excavation and work in trench to be conducted in LS1 (no beam in TT2)
- Possible PSNF would be 23 m away
- Official RP approval to be communicated by memo very shortly

Chicane for the AD access point

- Part of the integration studies for the PS Access System Renovation project (installation of PAD/MAD)
- Current access point allows direct line of sight with the beam line, opportunity to improve the situation….
- Latest proposal does not provide a sufficient shielding overlap….



Shielding improvement the ATP area

- Door D321 bis to be relocated and shielded to be added
- Existing FLUKA geometry of TT2/ATP does not include details of the area
- Layout of the area needed to update the FLUKA model and identify additional shielding requirements (scan performed lately)