



**High
Luminosity
LHC**

HL-LHC: CIVIL ENGINEERING WHY

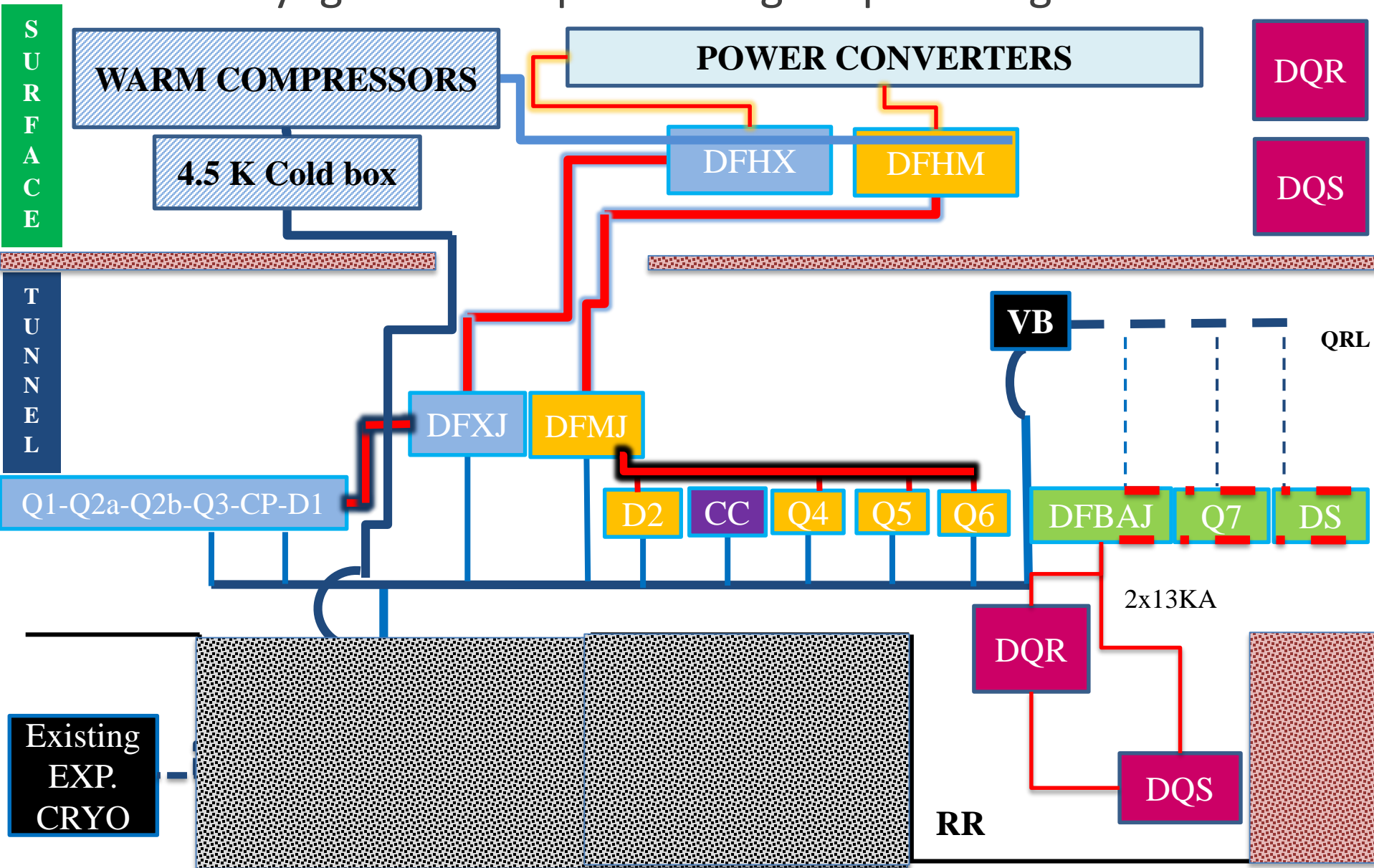
Presented by P. Fessia



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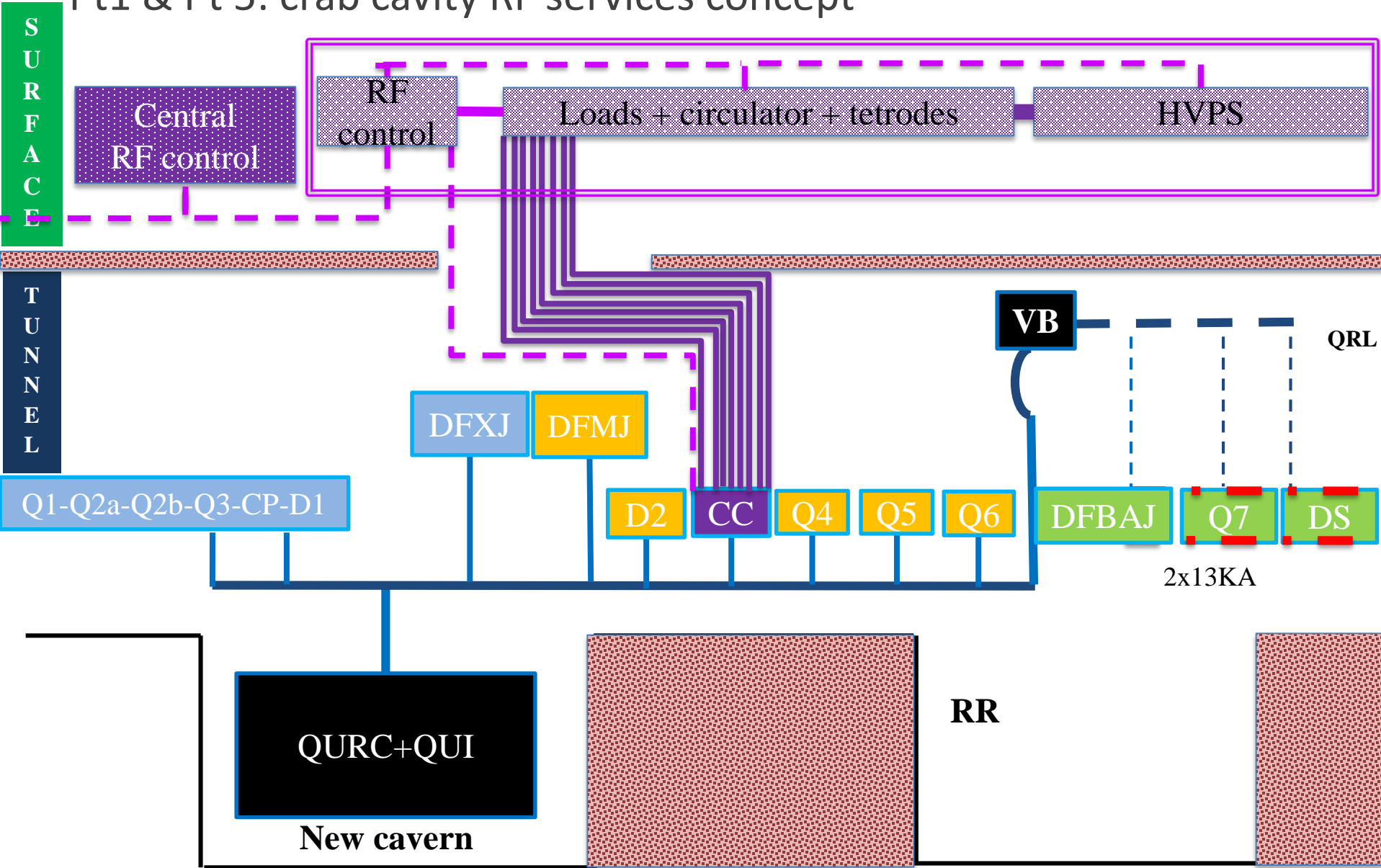


Pt1 & Pt 5: cryogenic concept and magnet powering

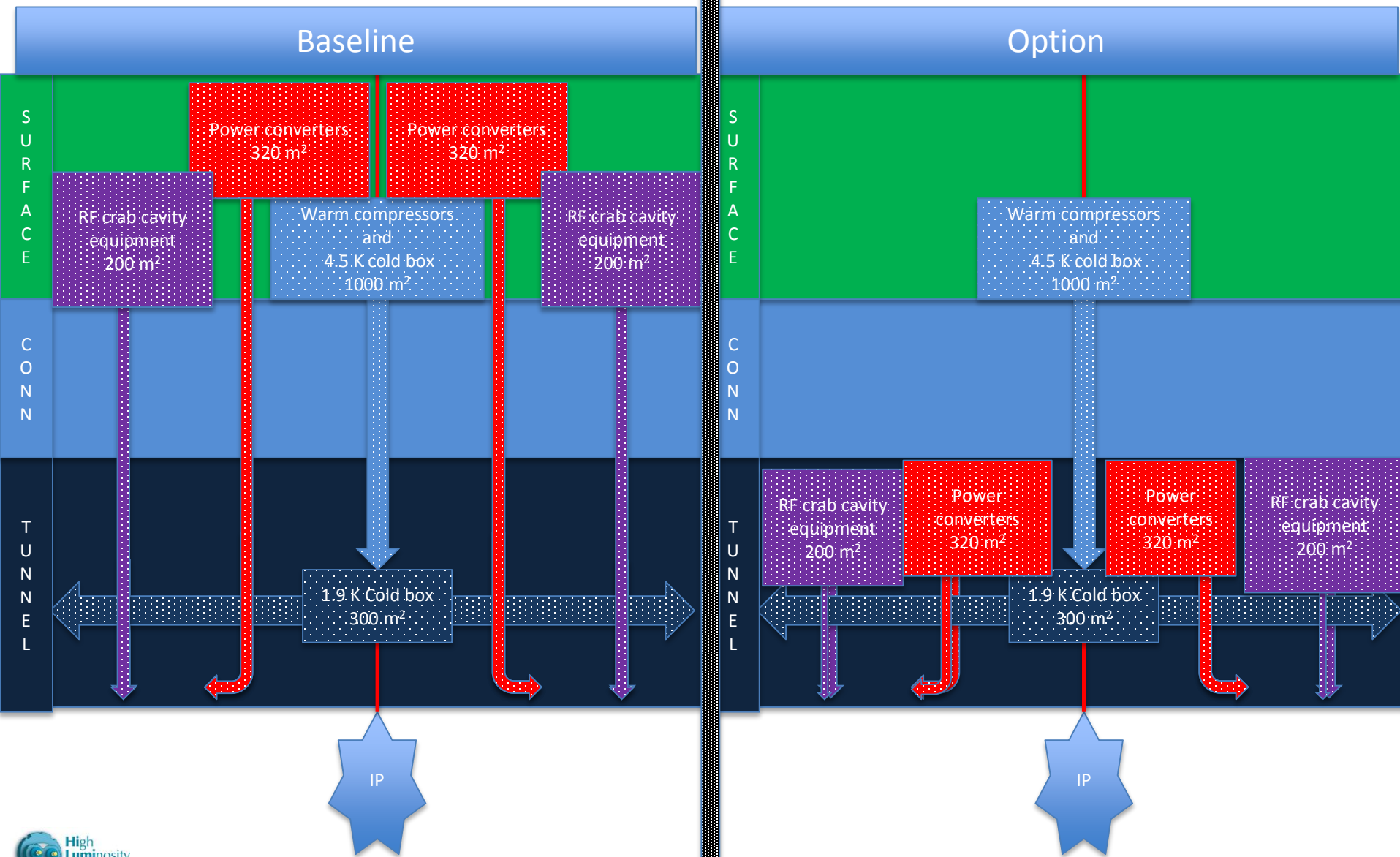


Existing EXP. CRYO

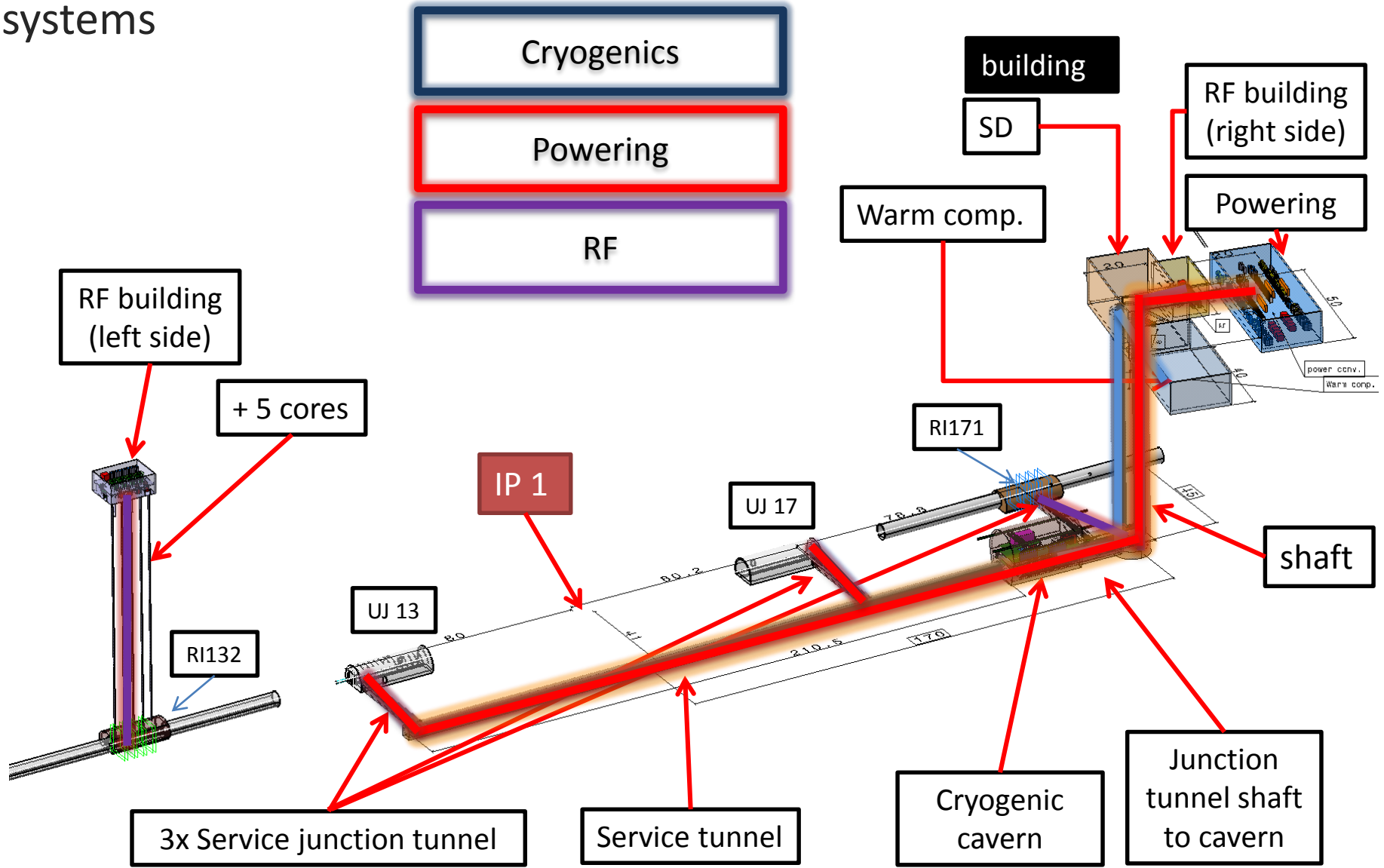
Pt1 & Pt 5: crab cavity RF services concept



Inventory of space requirement



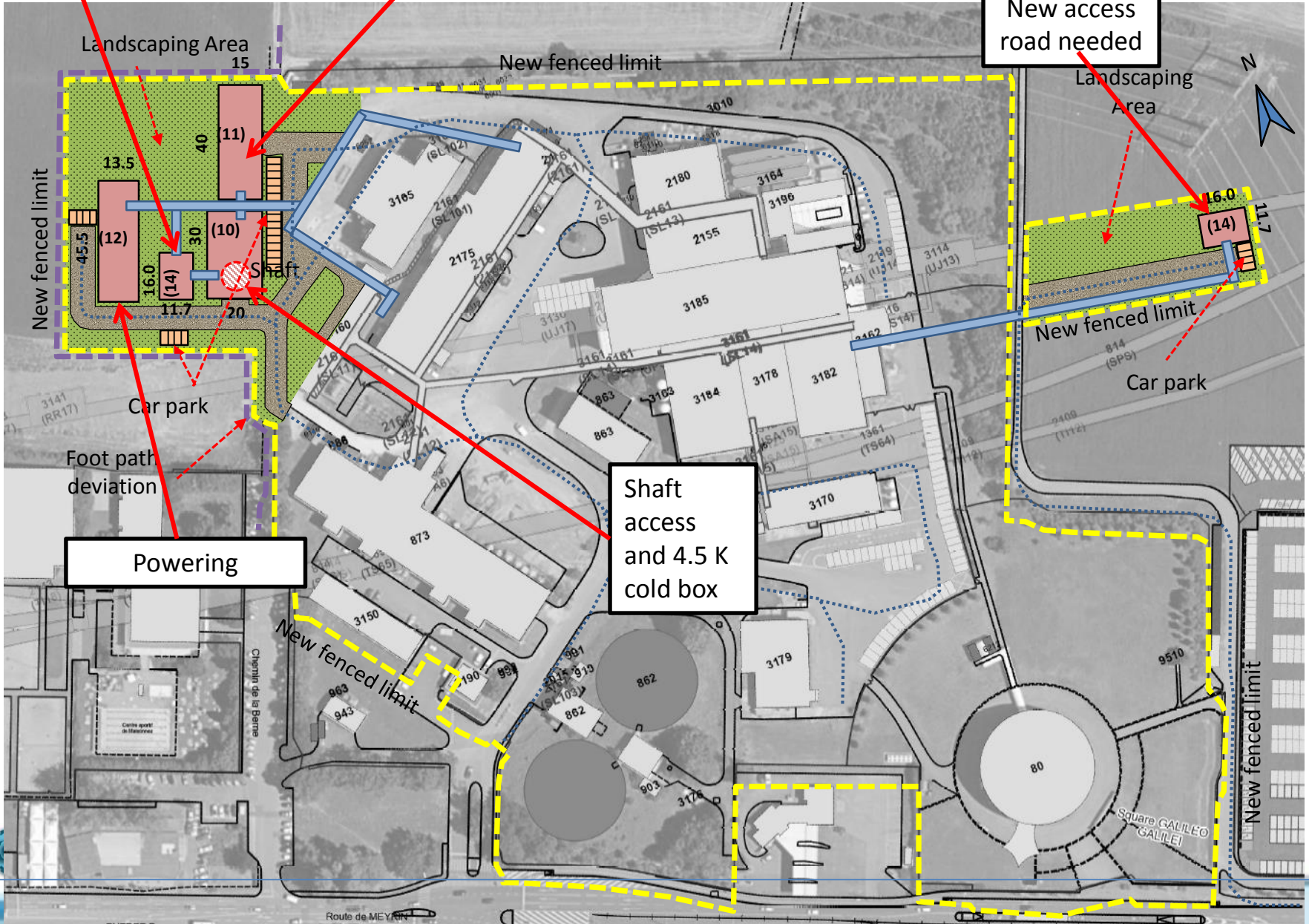
Point 1 - BASELINE : allocation of volumes to technical equipment and systems



RF building
(right side)

Warm
compressors

RF building
(left side)
New access
road needed



Powering

Shaft
access
and 4.5 K
cold box

Car park

Foot path
deviation

New fenced limit

Landscaping Area

New fenced limit

Landscaping Area

New fenced limit

Car park

New fenced limit

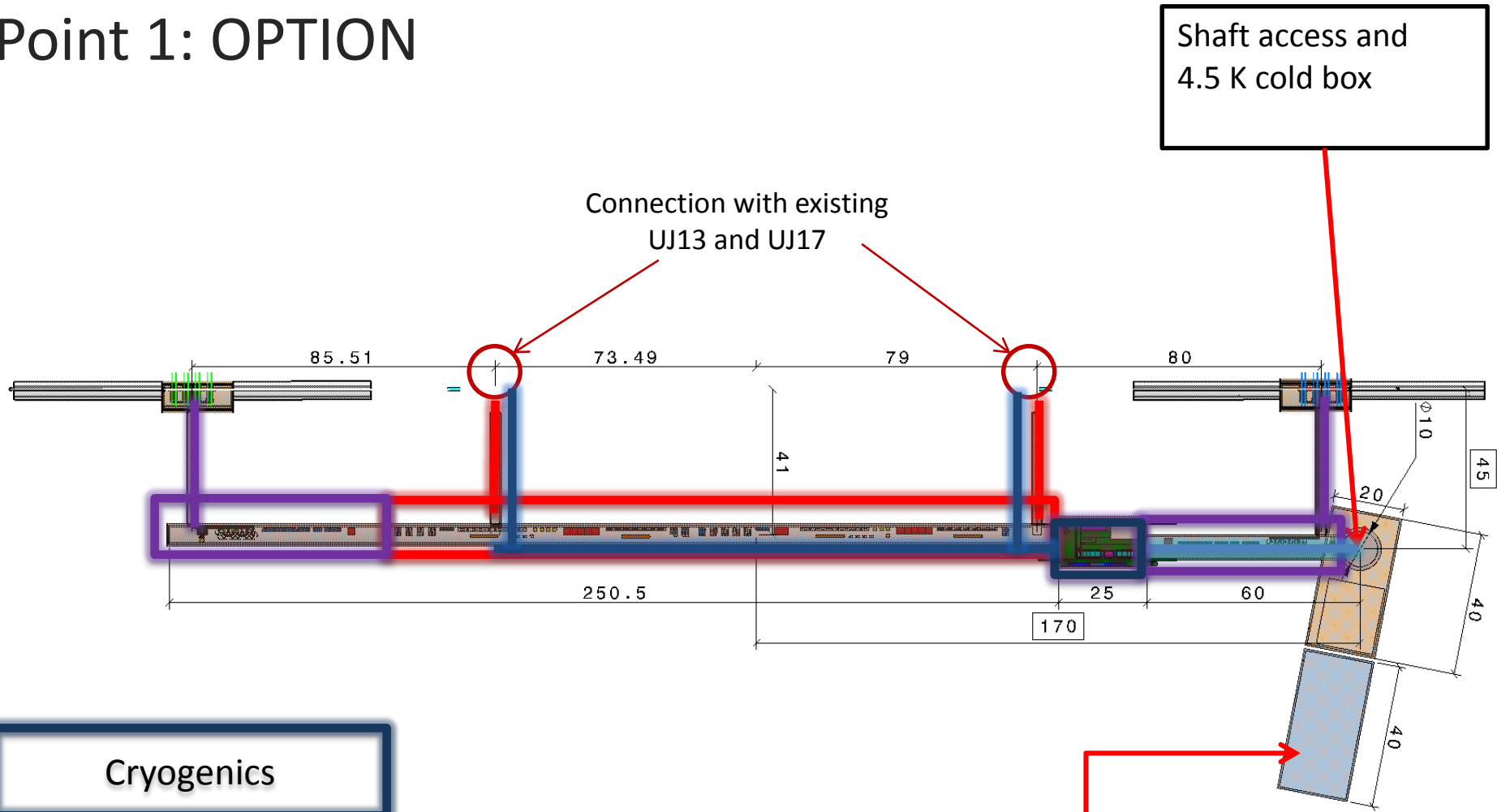
N

Route de MEY

Square GALILEO GALILEI

Chemin de la Berme

Point 1: OPTION



- Cryogenics
- Powering
- RF

Warm comp.

Warm compressors

Landscaping Area

New fenced limit

New fenced limit

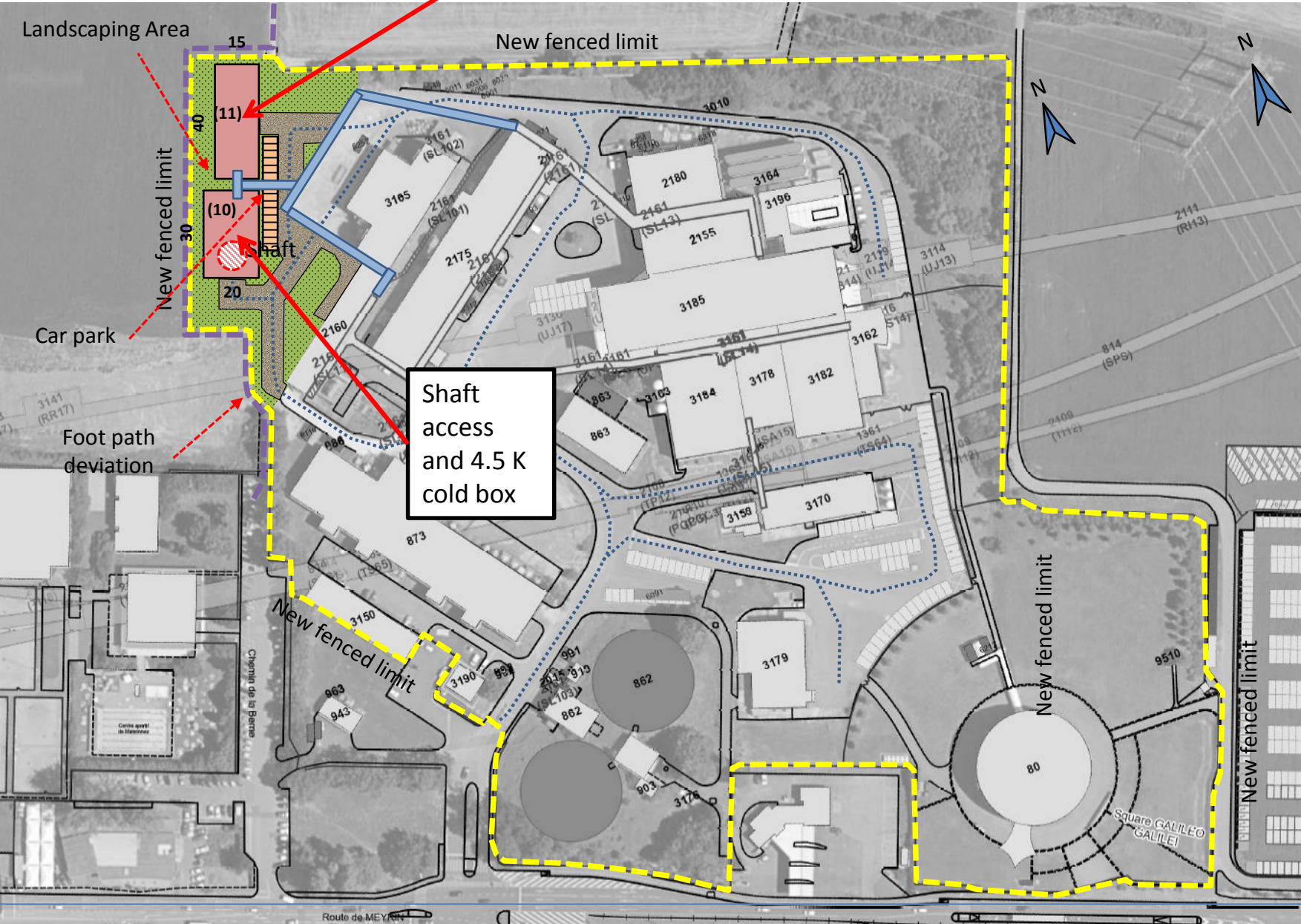
Car park

Foot path deviation

Shaft access and 4.5 K cold box

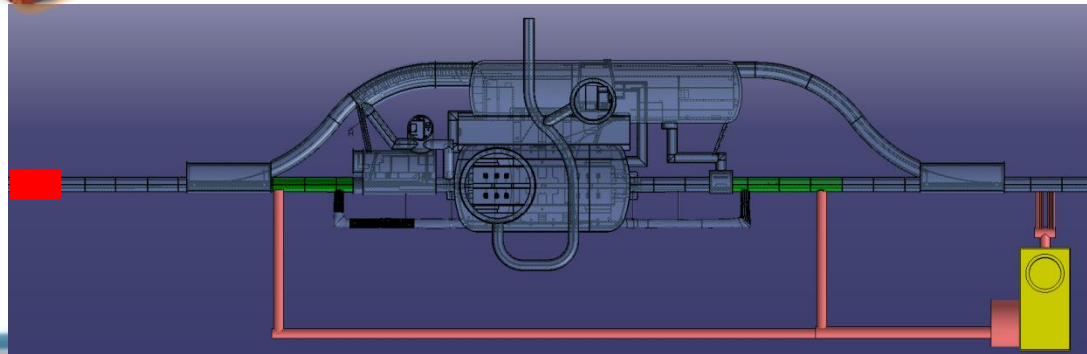
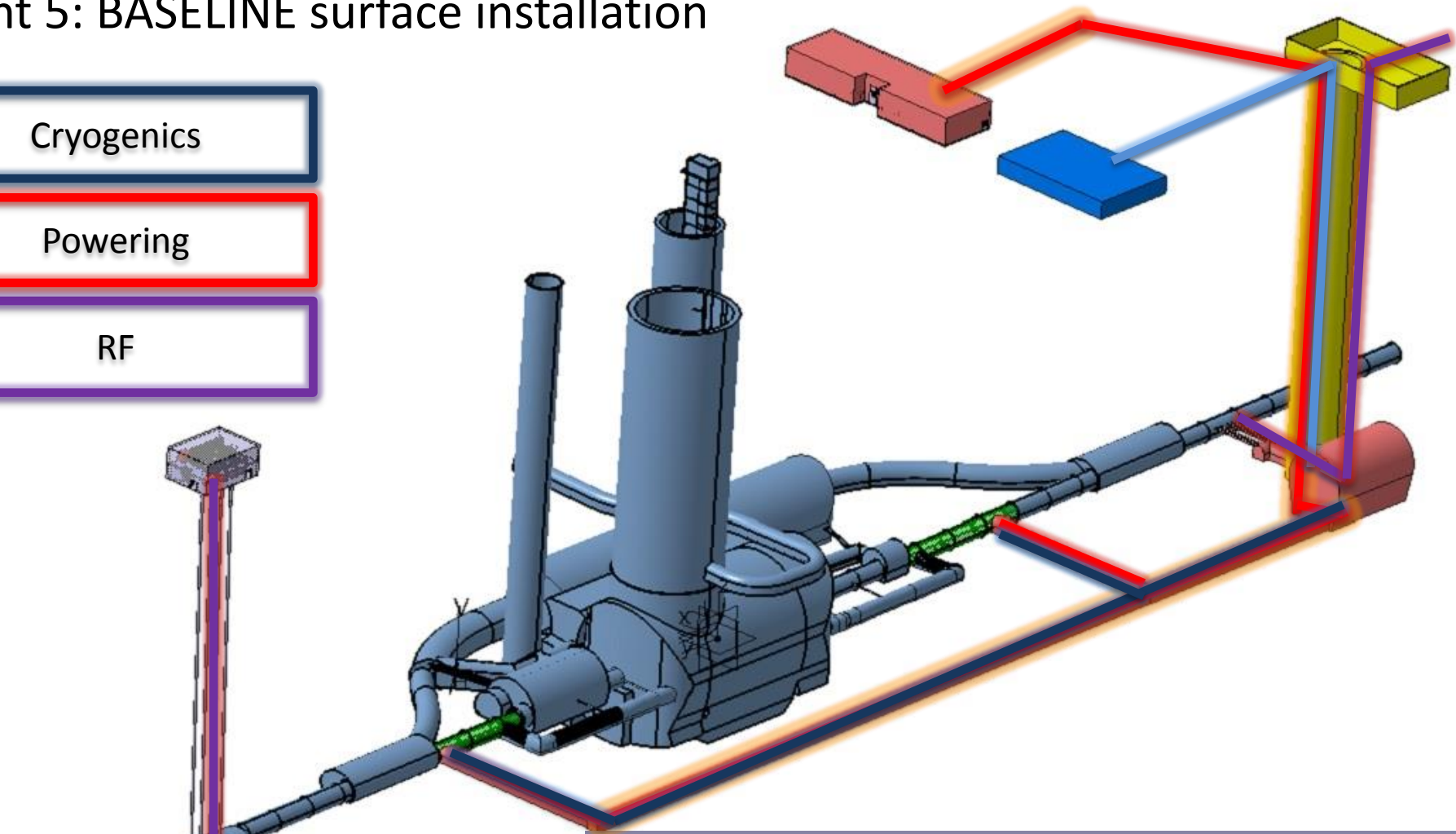
New fenced limit

New fenced limit



Point 5: BASELINE surface installation

- Cryogenics
- Powering
- RF



Point 5 Baseline surface building

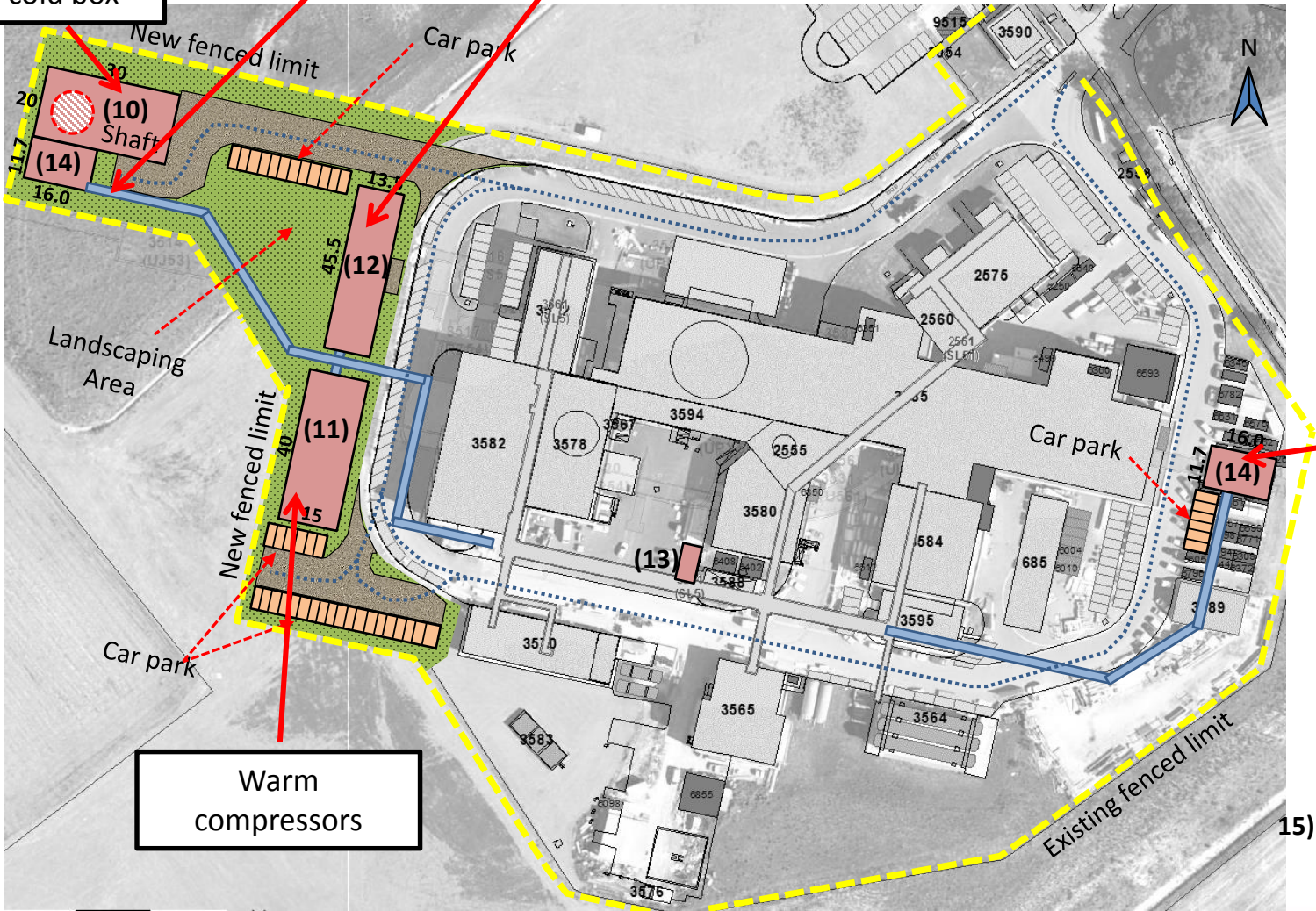
Shaft access and 4.5 K cold box

RF building (left side)

Powering

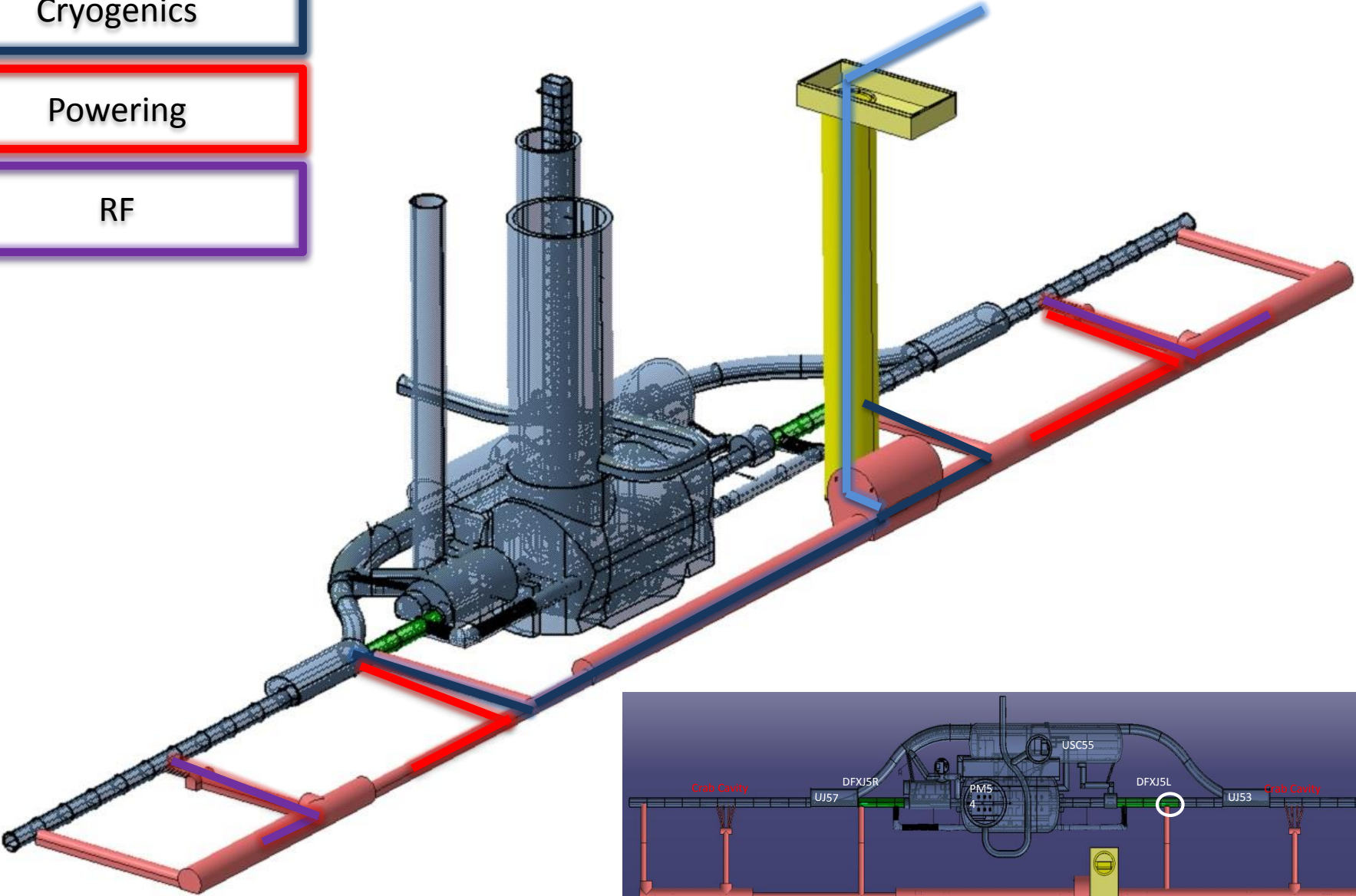
RF building (right side)

Warm compressors



Point 5: OPTION underground installation

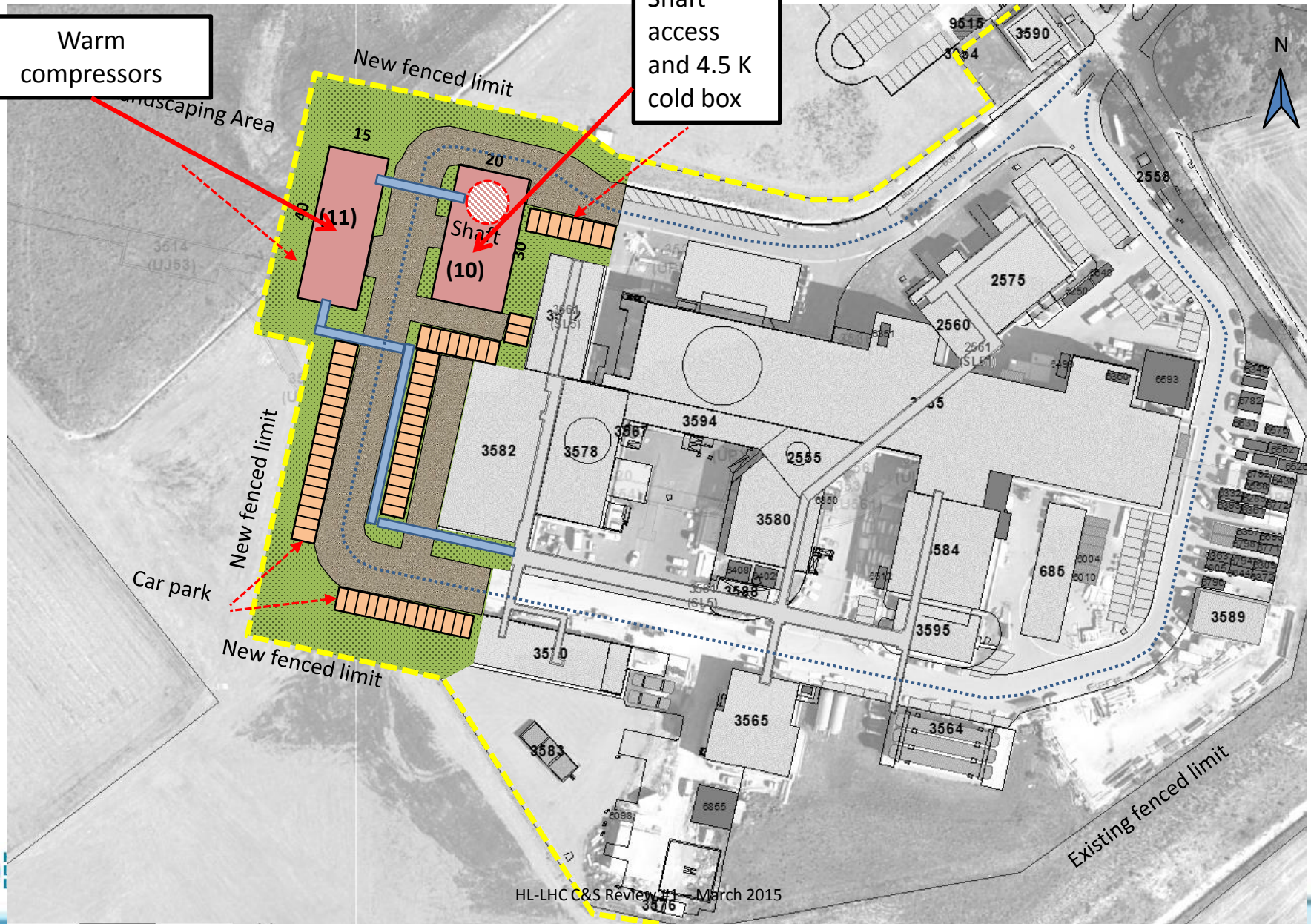
- Cryogenics
- Powering
- RF



Point 5 Option surface building

Warm compressors

Shaft access and 4.5 K cold box



Conclusions

- HL-LHC civil engineering underground works are needed for technical reasons. Need to install 1.9 K cold box underground. No volume available. This goes with a shaft and a tunnel/distribution tunnel. This “basic requirement ” fit HL-LHC baseline
- The underground options do not increase the length of the tunnels to be excavated but mainly their section. Therefore the time needed for the work underground will be longer. Difference to be evaluated by CE. From the point of view of costs the difference between the two is in the noise of budget error, but it allows simplification of installation, reduction of CE work during LS3, reduction of LHC tunnel disruption and cost reduction of equipment mainly SC link. It also reduces the surface footprint