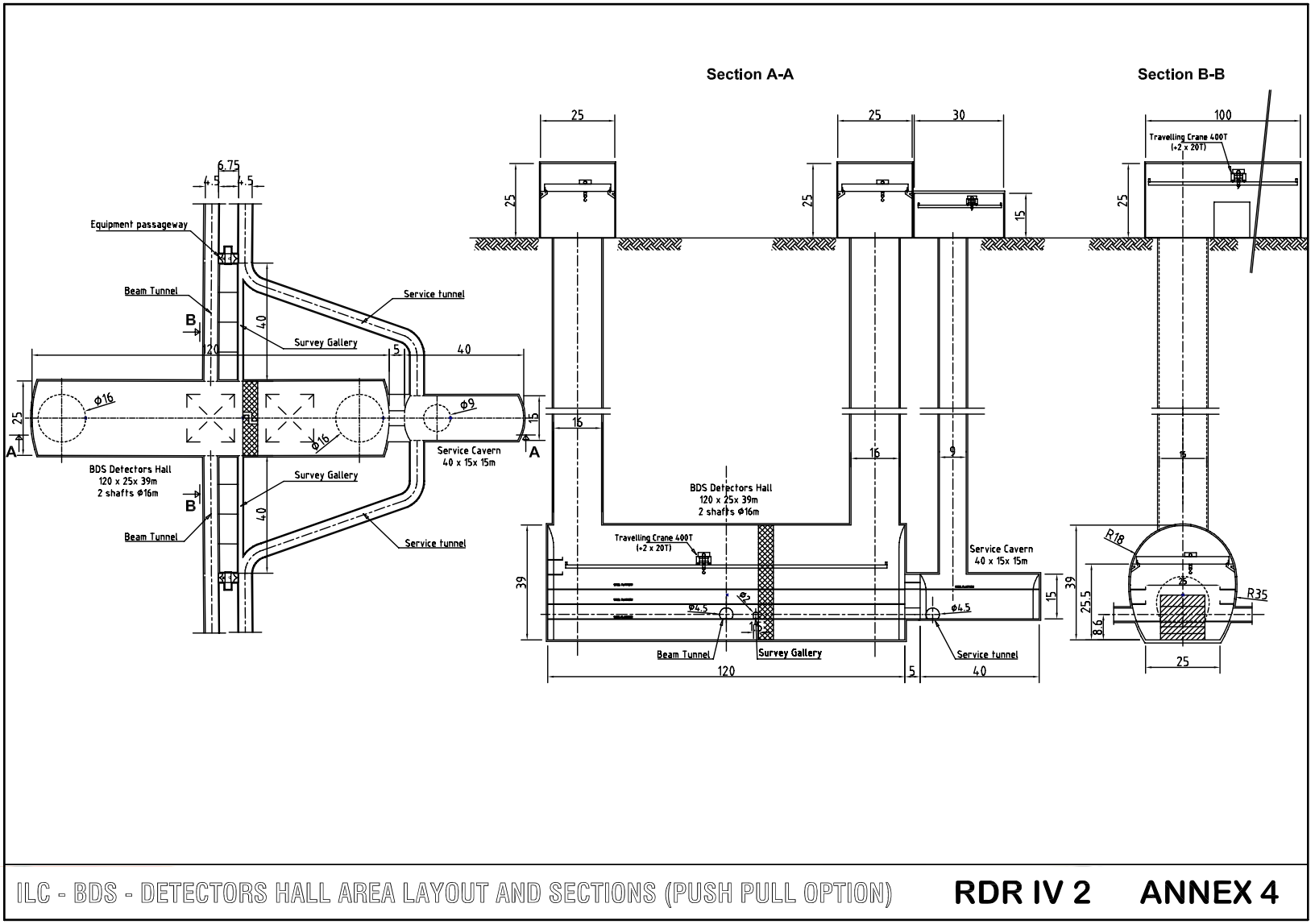
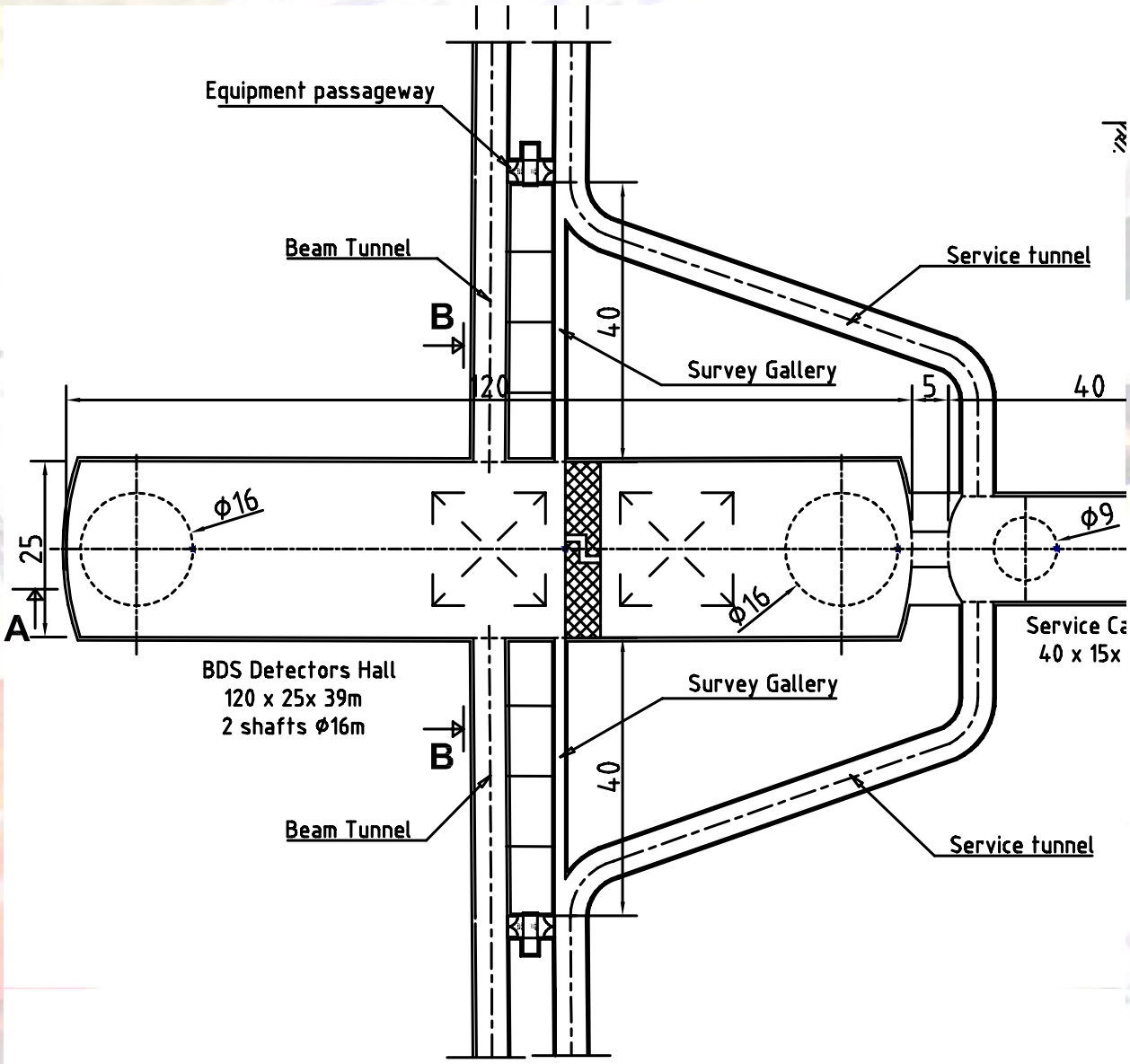
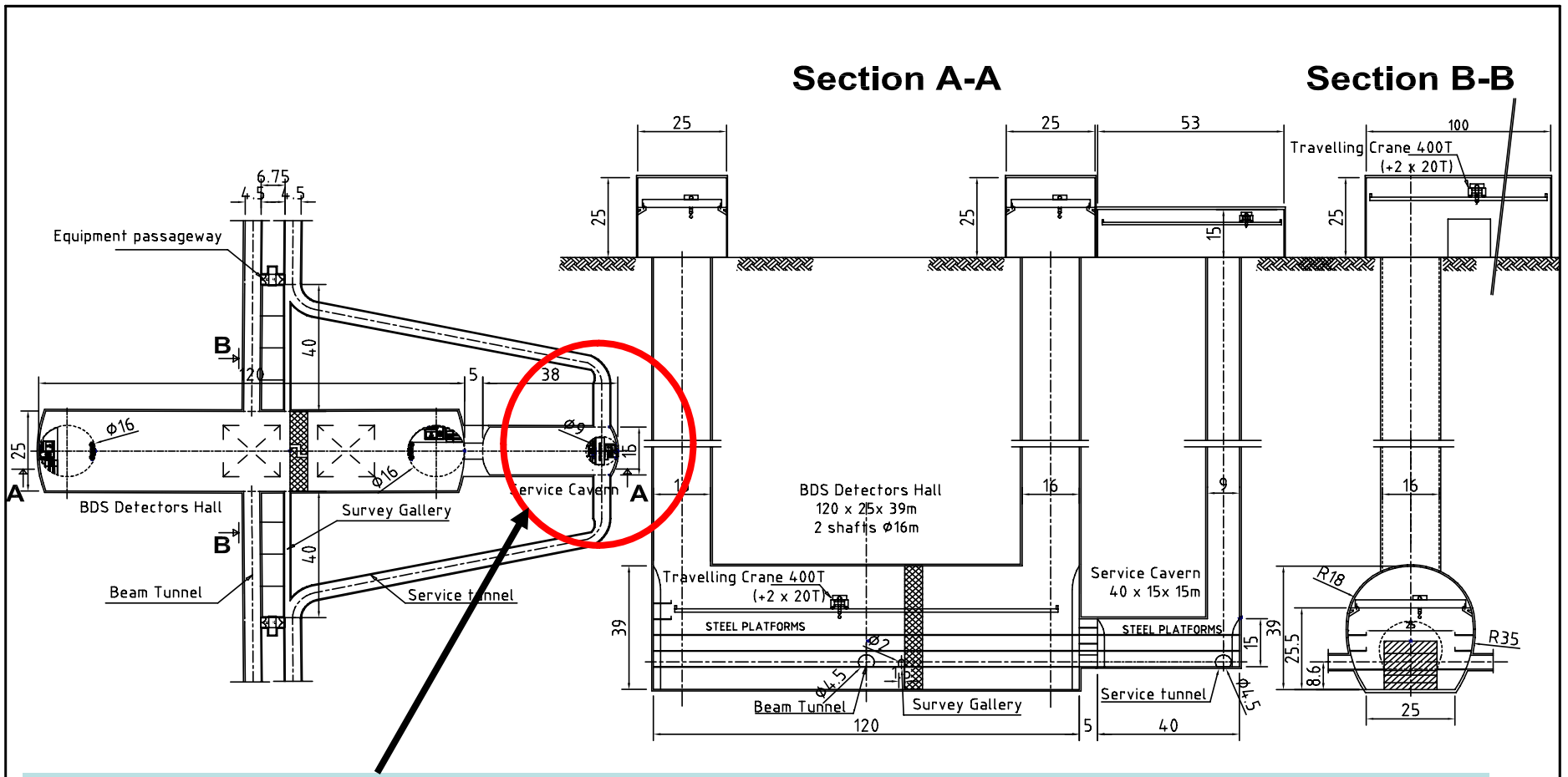
- ***Alternative Layouts for the Interaction Region***
- ***Preparation for Interaction Region Engineering Design Workshop: Working Group C - September 17-21, 2007***



RDR Baseline Layouts for Interaction Region



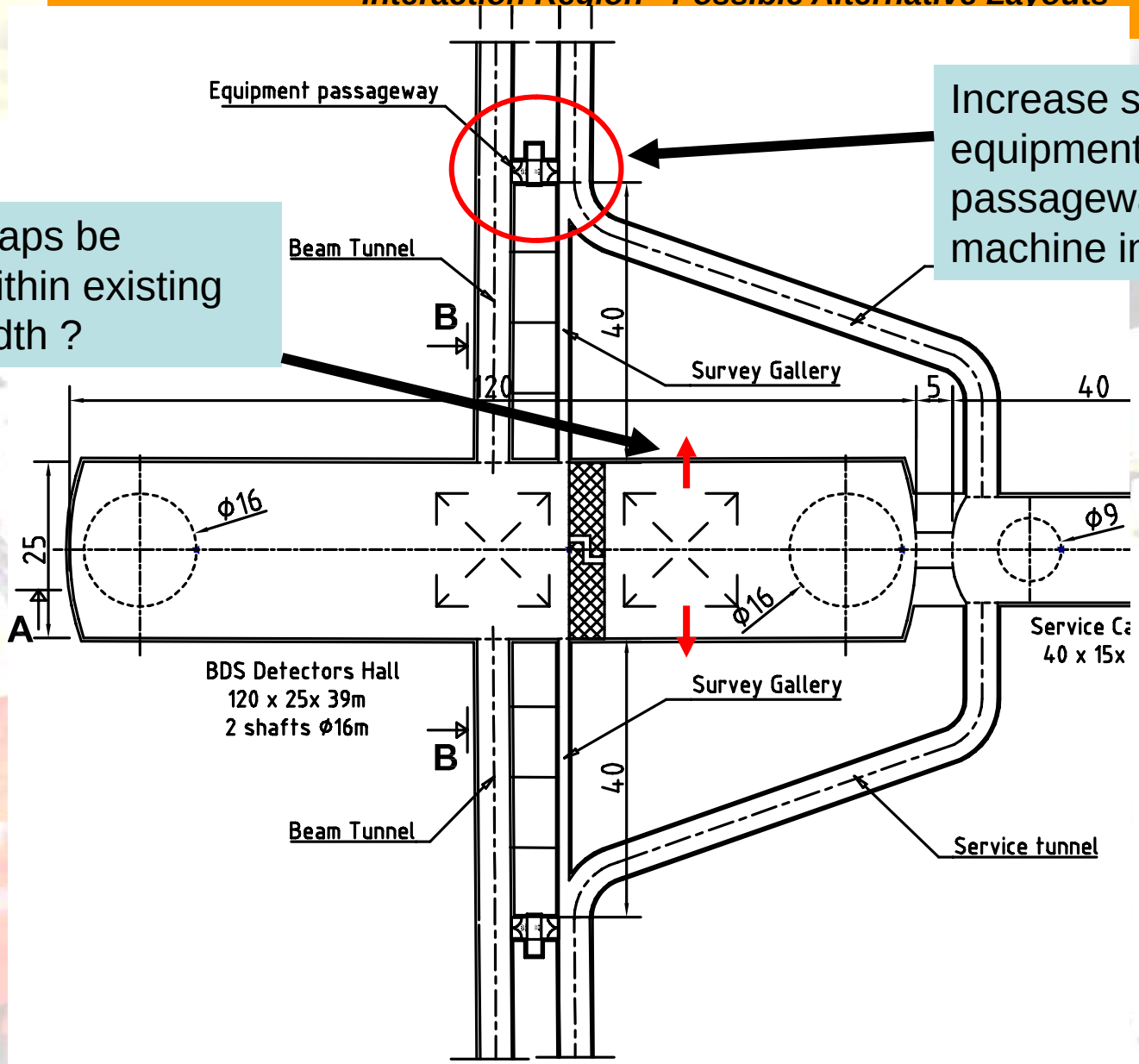
RDR Baseline Layouts for Interaction Region



Service Cavern Shaft moved to the end of the cavern ?

Advantages :

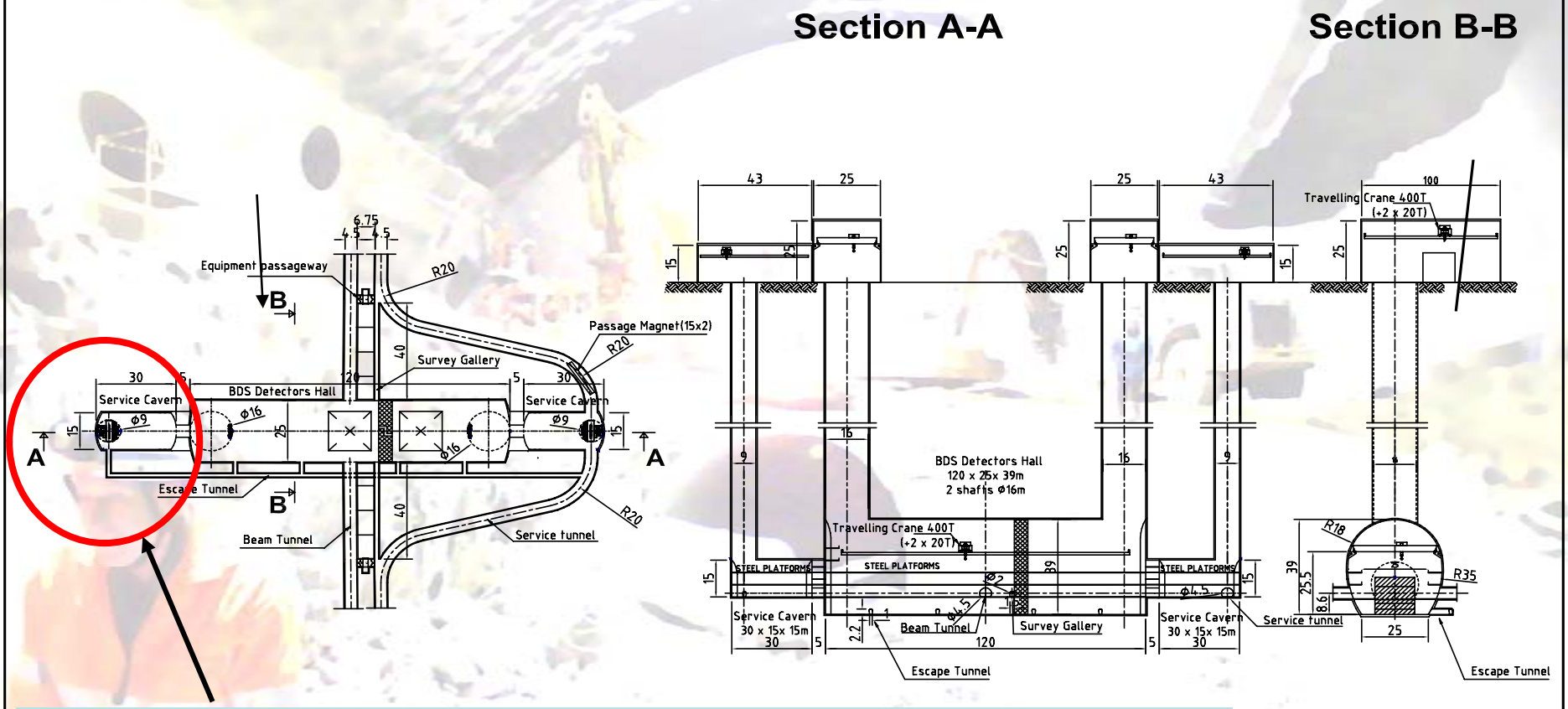
- Easier passage from detector hall into service cavern.
- Shaft is over the bypass tunnel to ease service tunnel + machine installation



Increase size of equipment passageway for machine installation ?

Can Endcaps be opened within existing cavern width ?

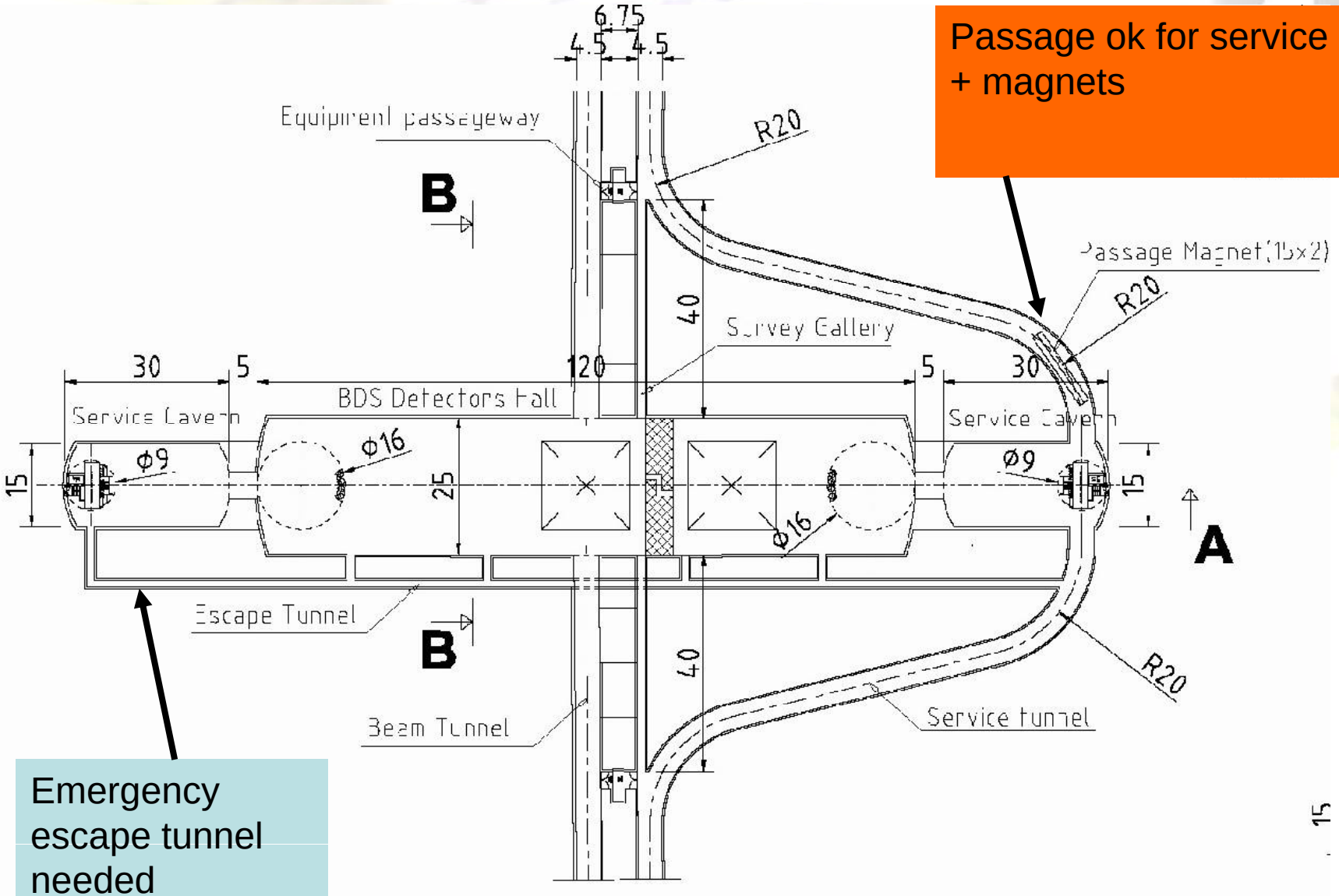
RDR Baseline Layouts for Interaction Region



Ideal World = Additional Service Caverns 30metres long ?

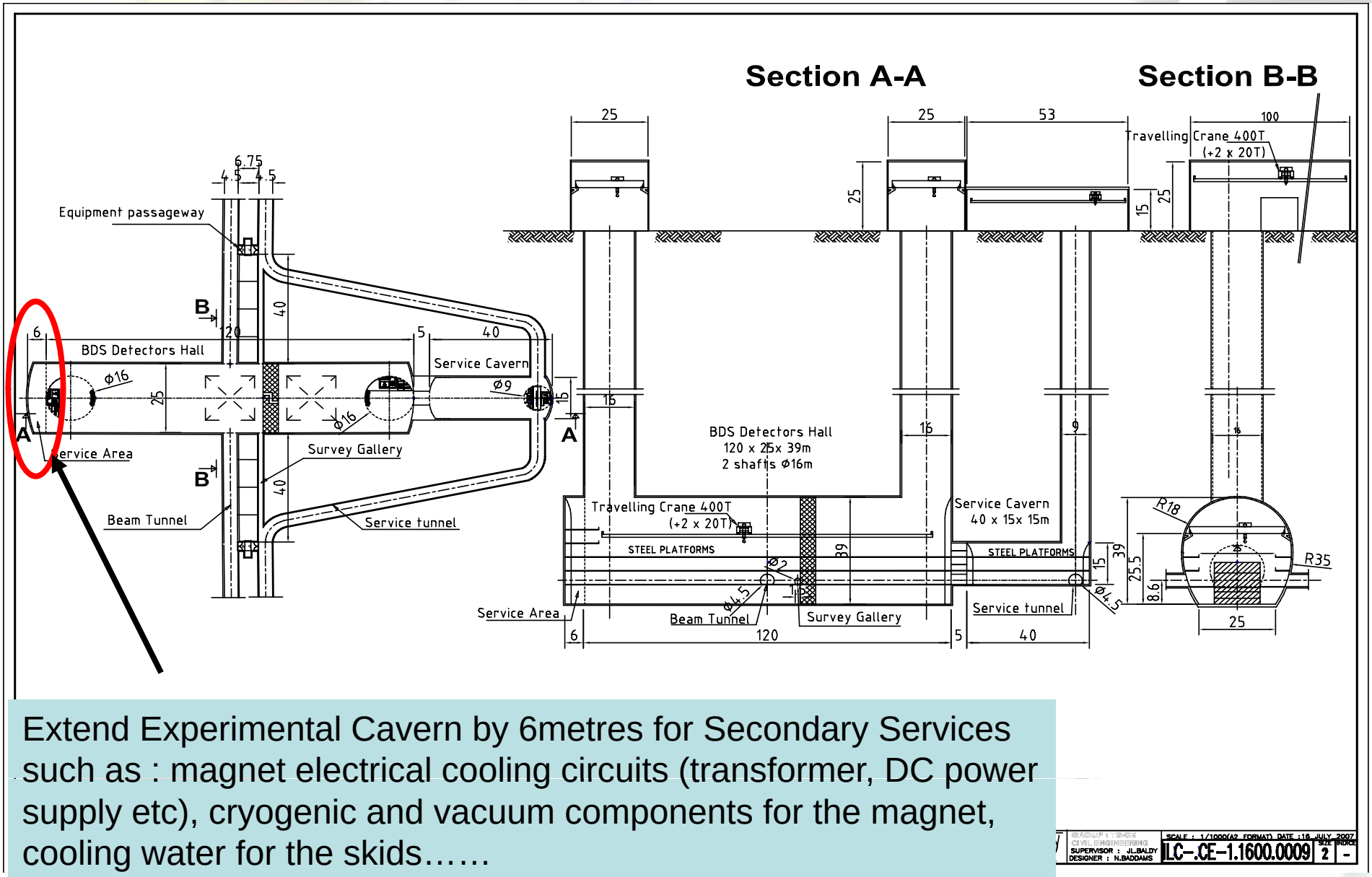
Extra costs for cavern v savings in services need to be assessed

With 2 service caverns, perhaps lifts, staircase could be removed in Exp. Cavern ?

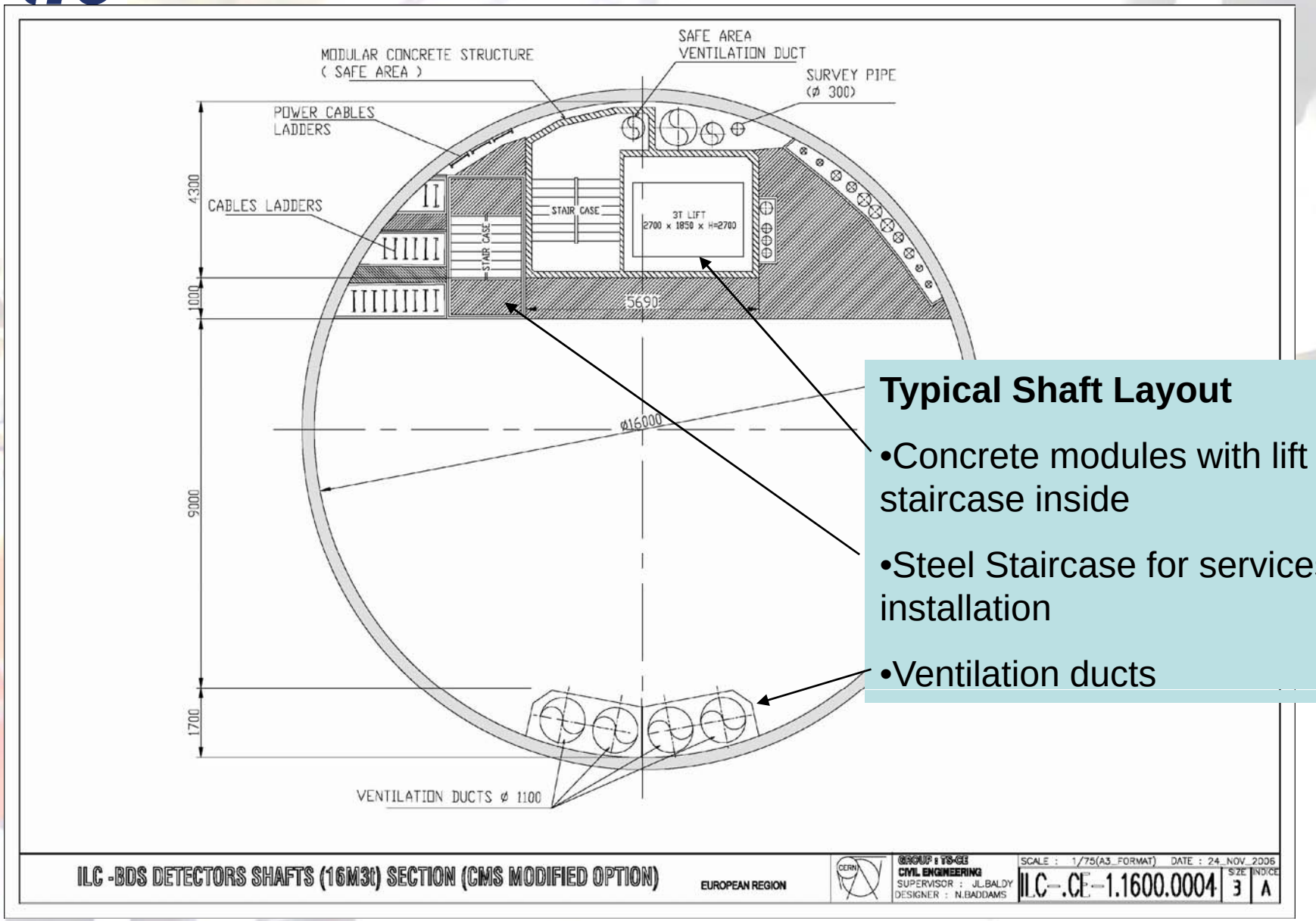


Passage ok for service pipes + magnets

Emergency escape tunnel needed

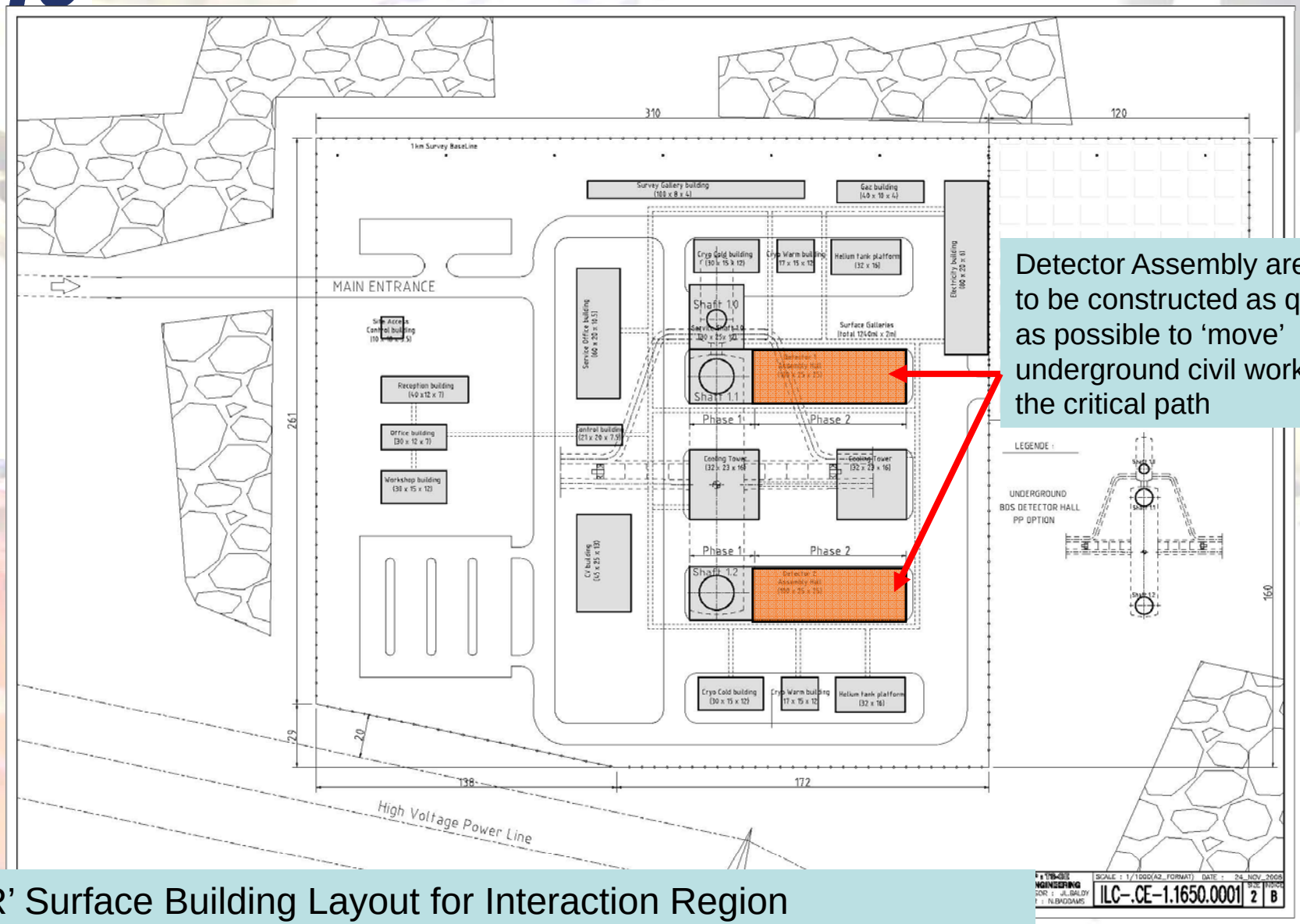


Extend Experimental Cavern by 6metres for Secondary Services such as : magnet electrical cooling circuits (transformer, DC power supply etc), cryogenic and vacuum components for the magnet, cooling water for the skids……



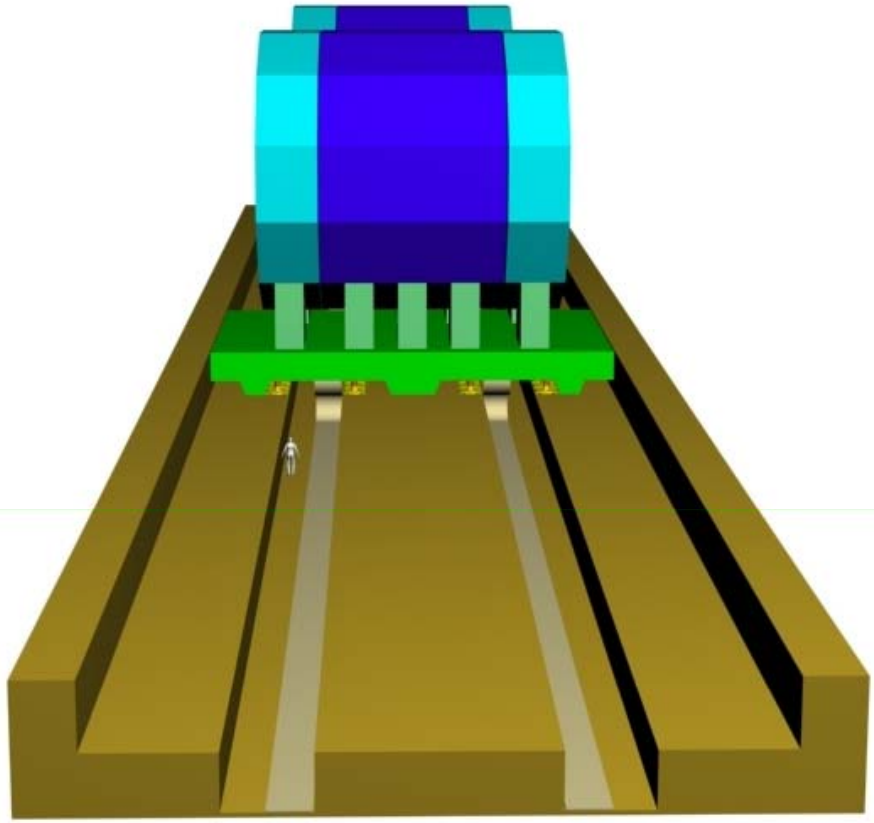
Typical Shaft Layout

- Concrete modules with lift & staircase inside
- Steel Staircase for services installation
- Ventilation ducts



Detector Assembly areas to be constructed as quick as possible to 'move' underground civil works off the critical path

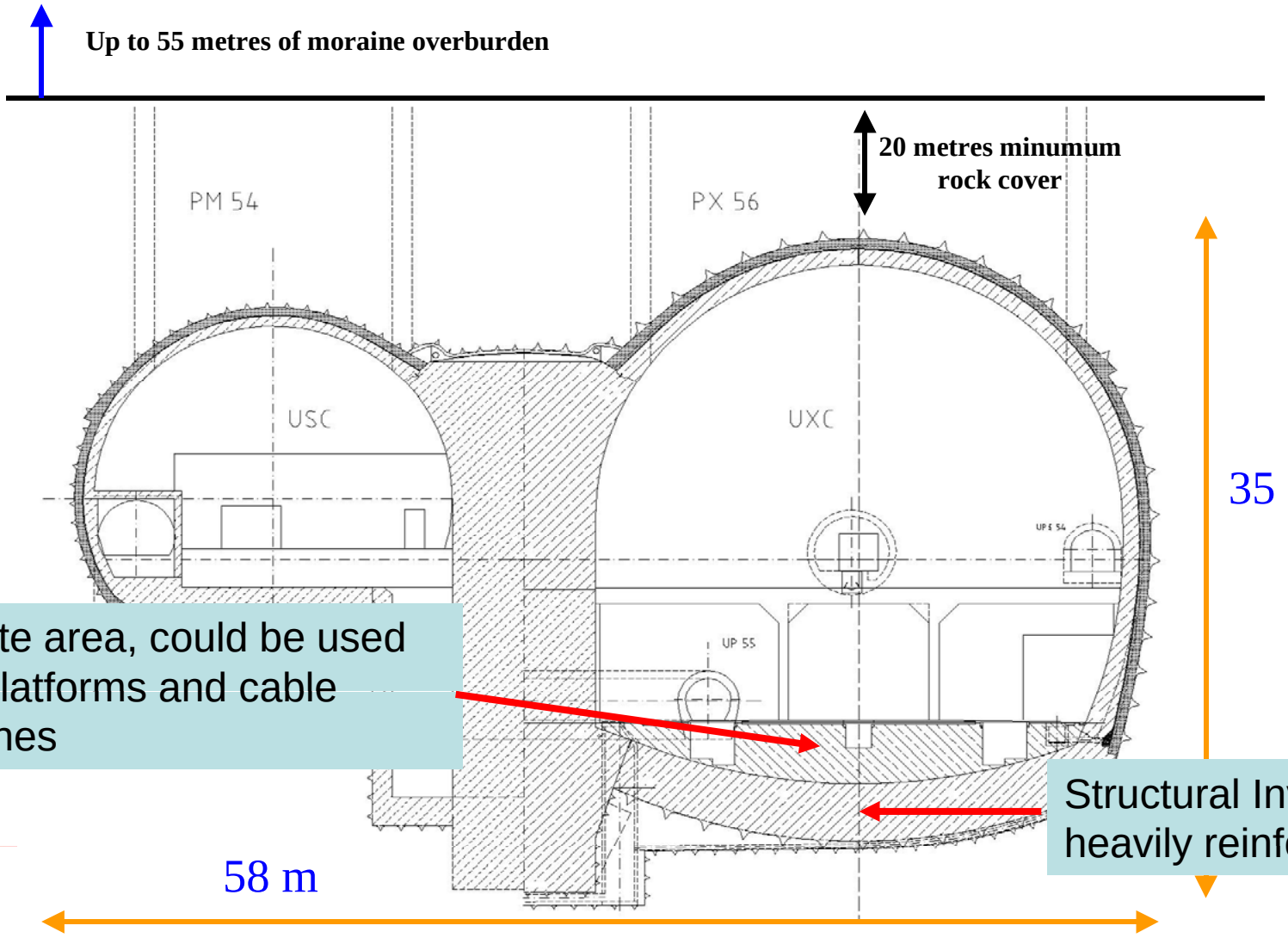
'RDR' Surface Building Layout for Interaction Region



Cable chains : CERN propose at least 2 chains for detector services. (Concept by H.Gerwig & A.Gaddi CERN)

Trenches to be formed in the cavern floor invert (non structural concrete)

Section through cavern complex at point 5



Infill concrete area, could be used for sliding platforms and cable chain trenches

Structural Invert heavily reinforced

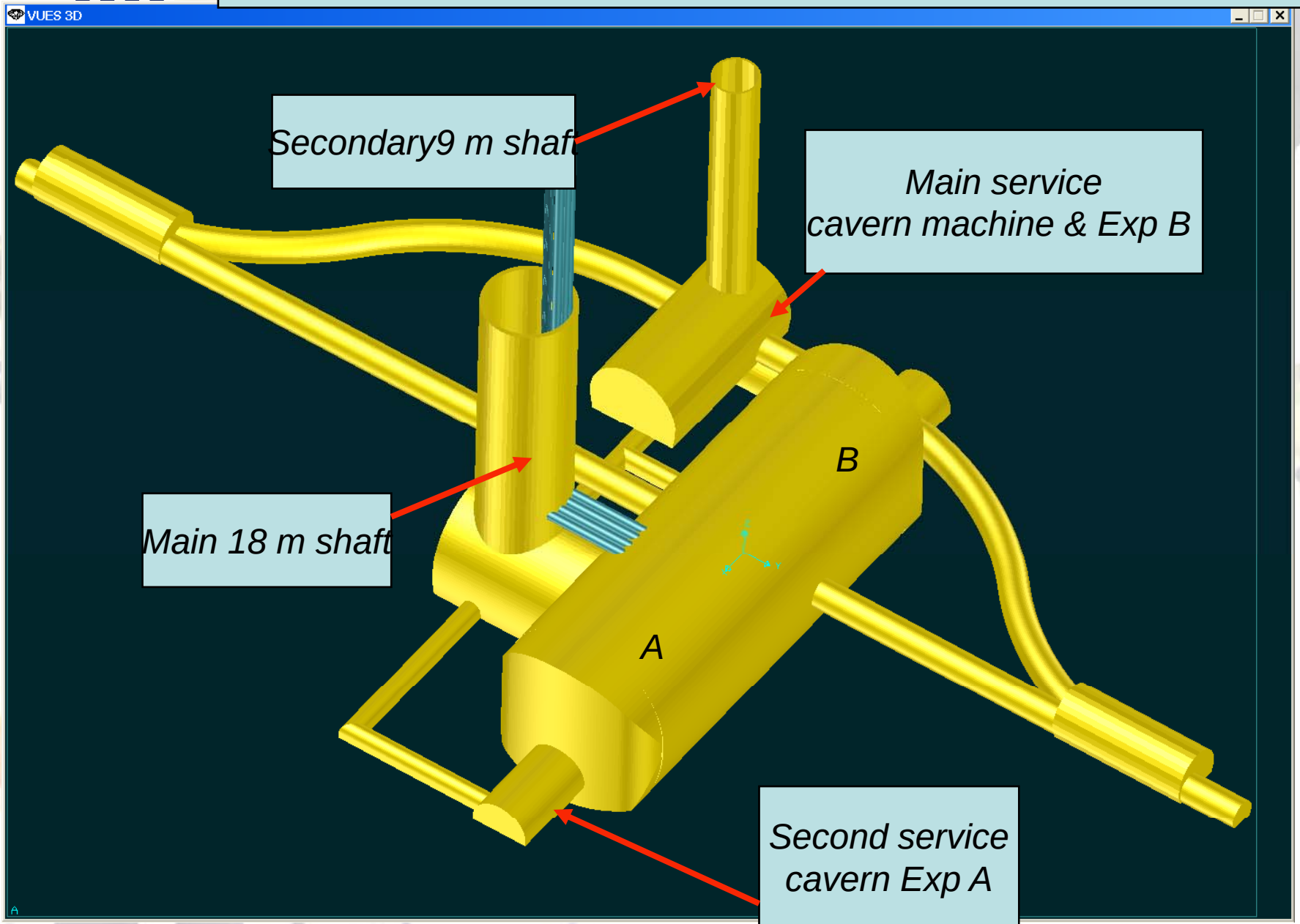
- Why Single Shaft Alternative:

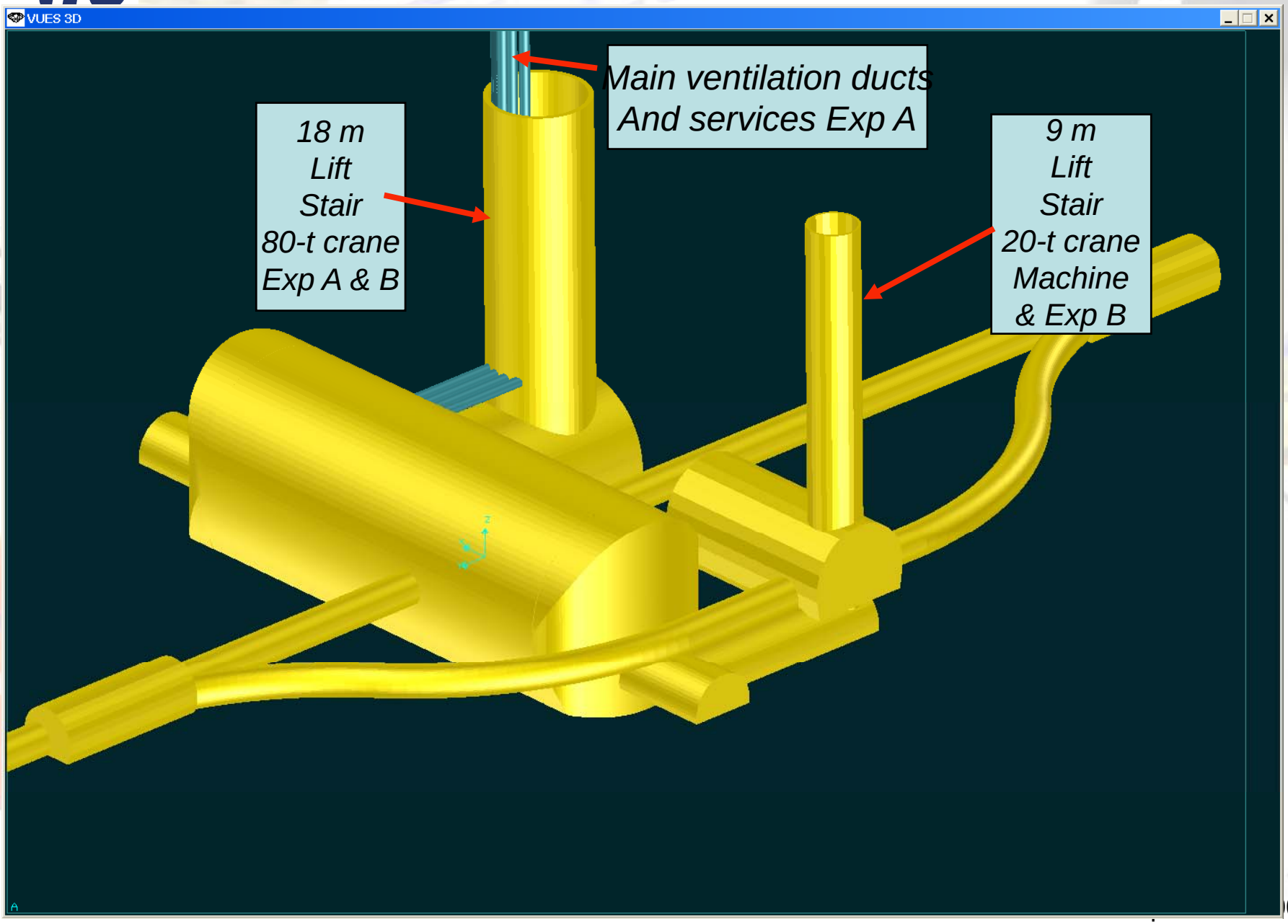
  (proposed by A.Herve CERN)

  – Cost savings for civil engineering (approx. $10million)

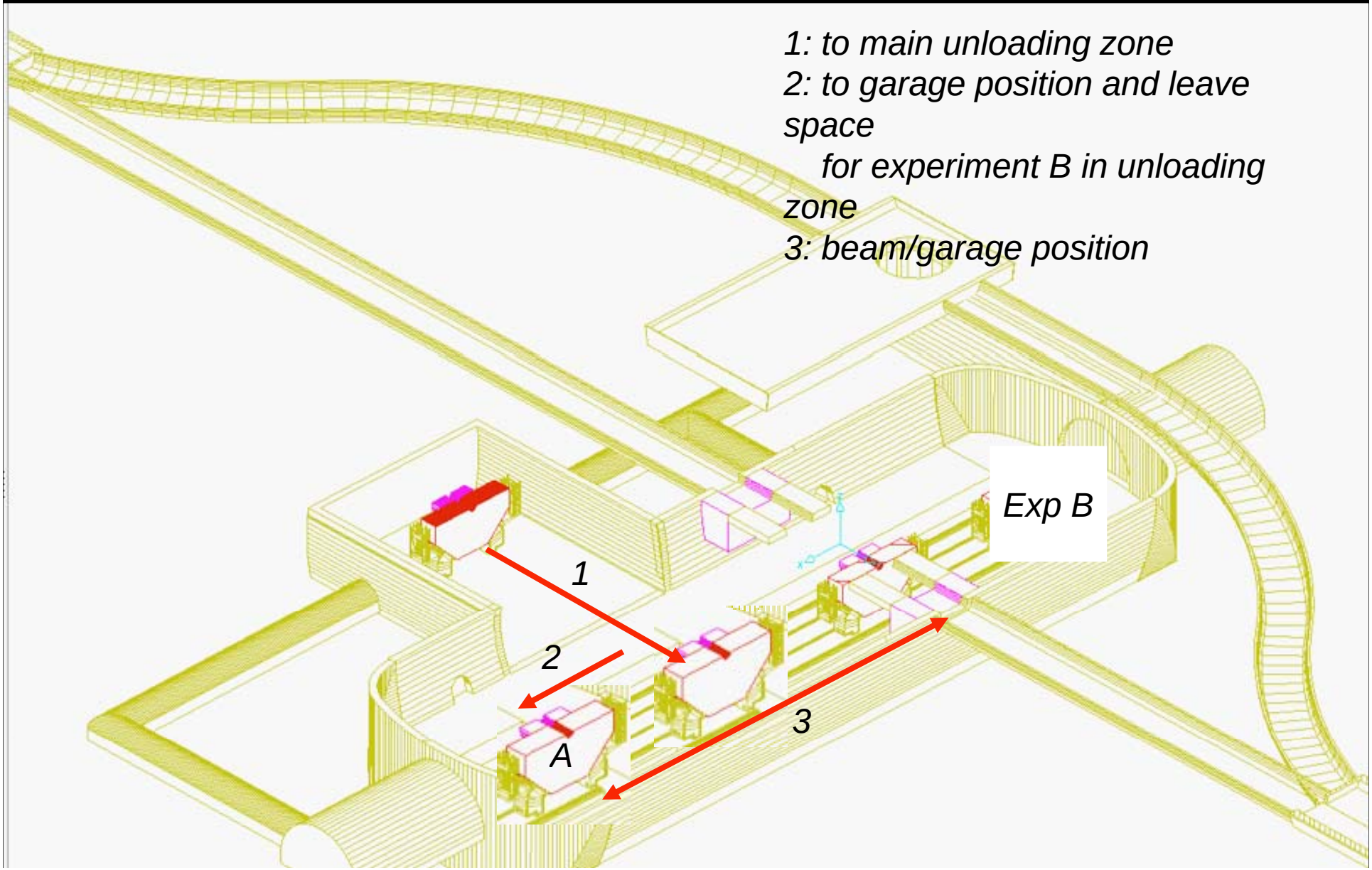
  – Can simultaneously perform lowering in shaft and normal work in Experimental Cavern

General view of Proposed One Shaft Option

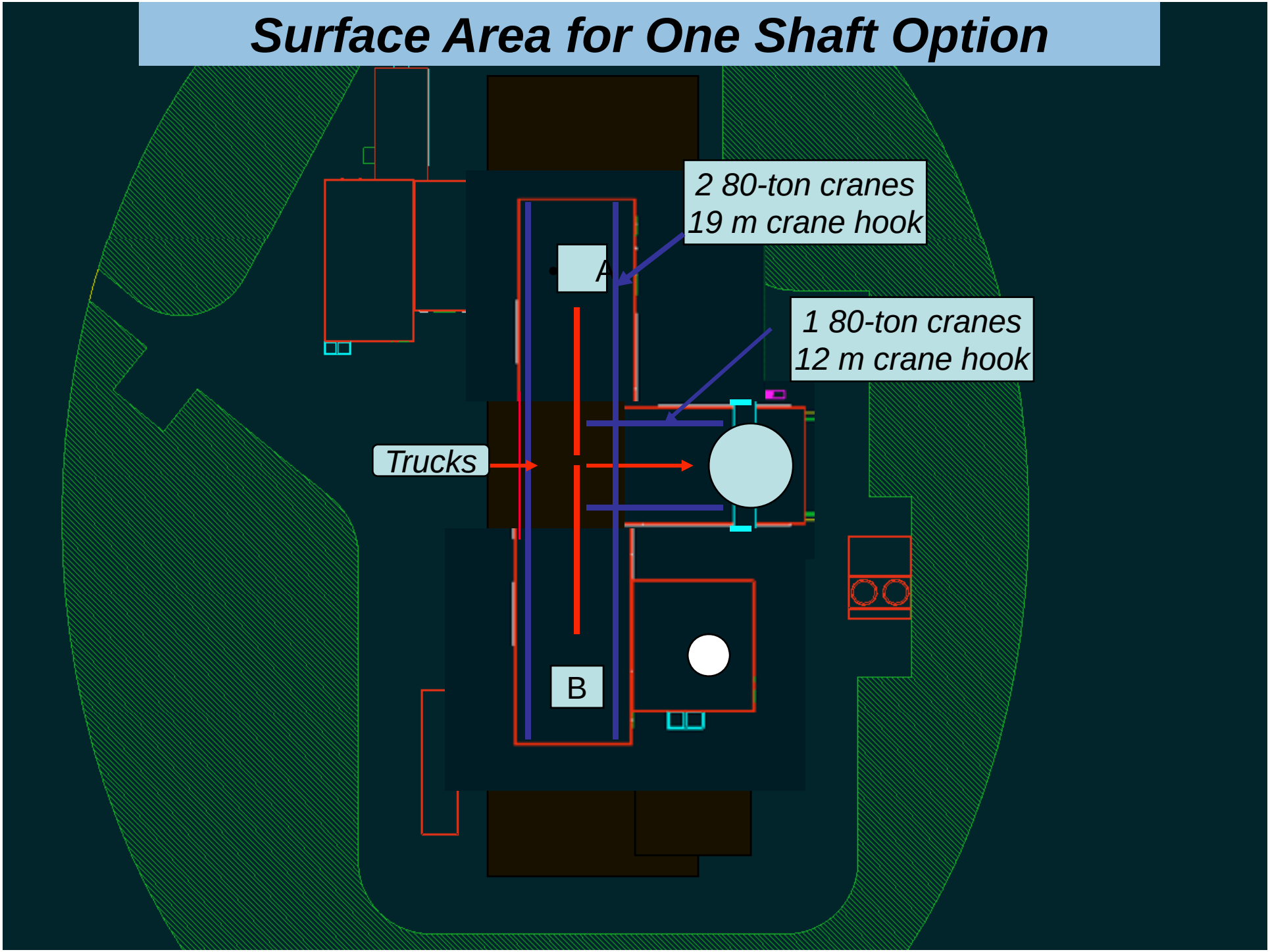



VUES 3D
Main ventilation ducts
And services Exp A
18 m
Lift
Stair
80-t crane
Exp A & B
9 m
Lift
Stair
20-t crane
Machine
& Exp B

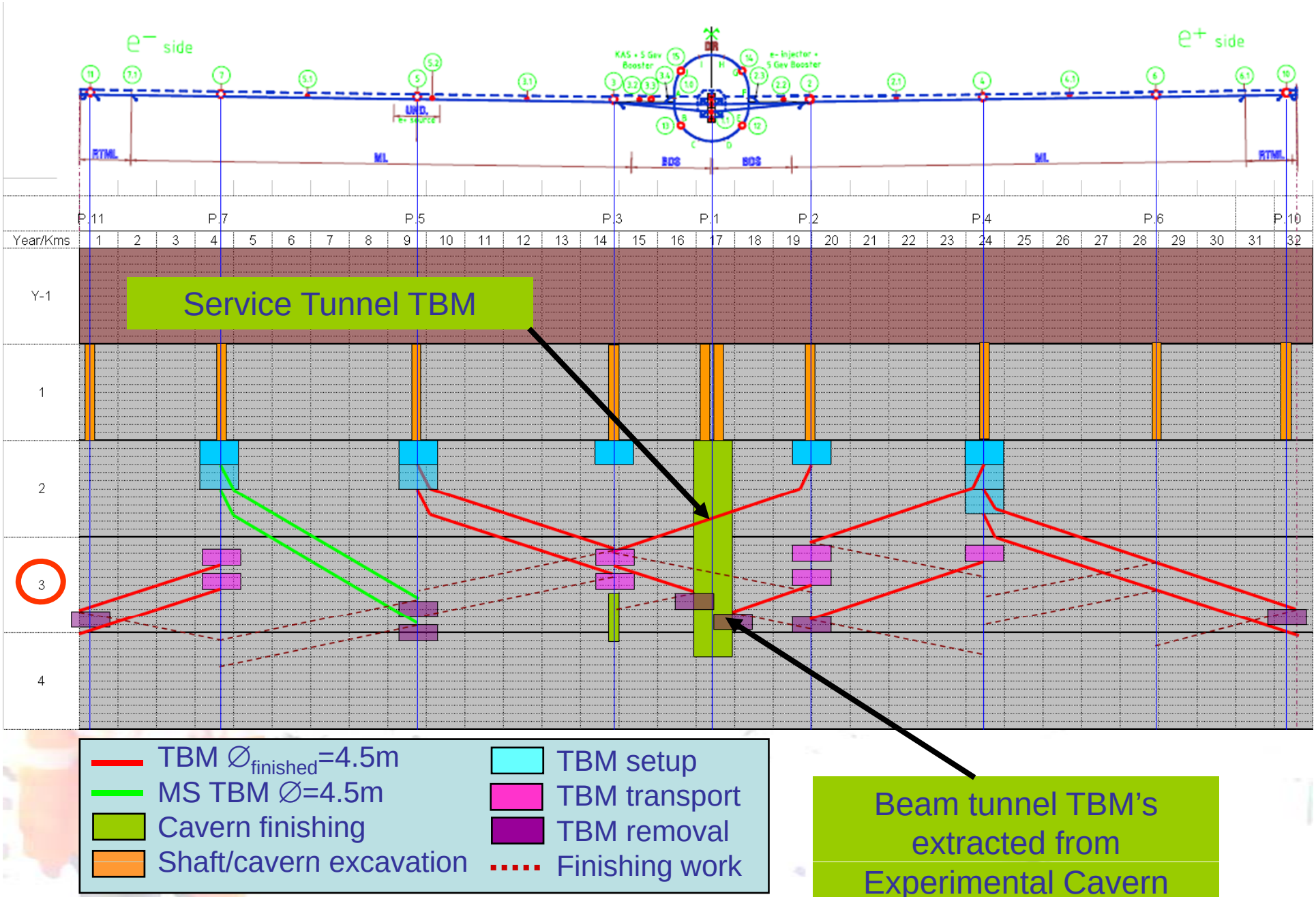
Movements of Experiment A

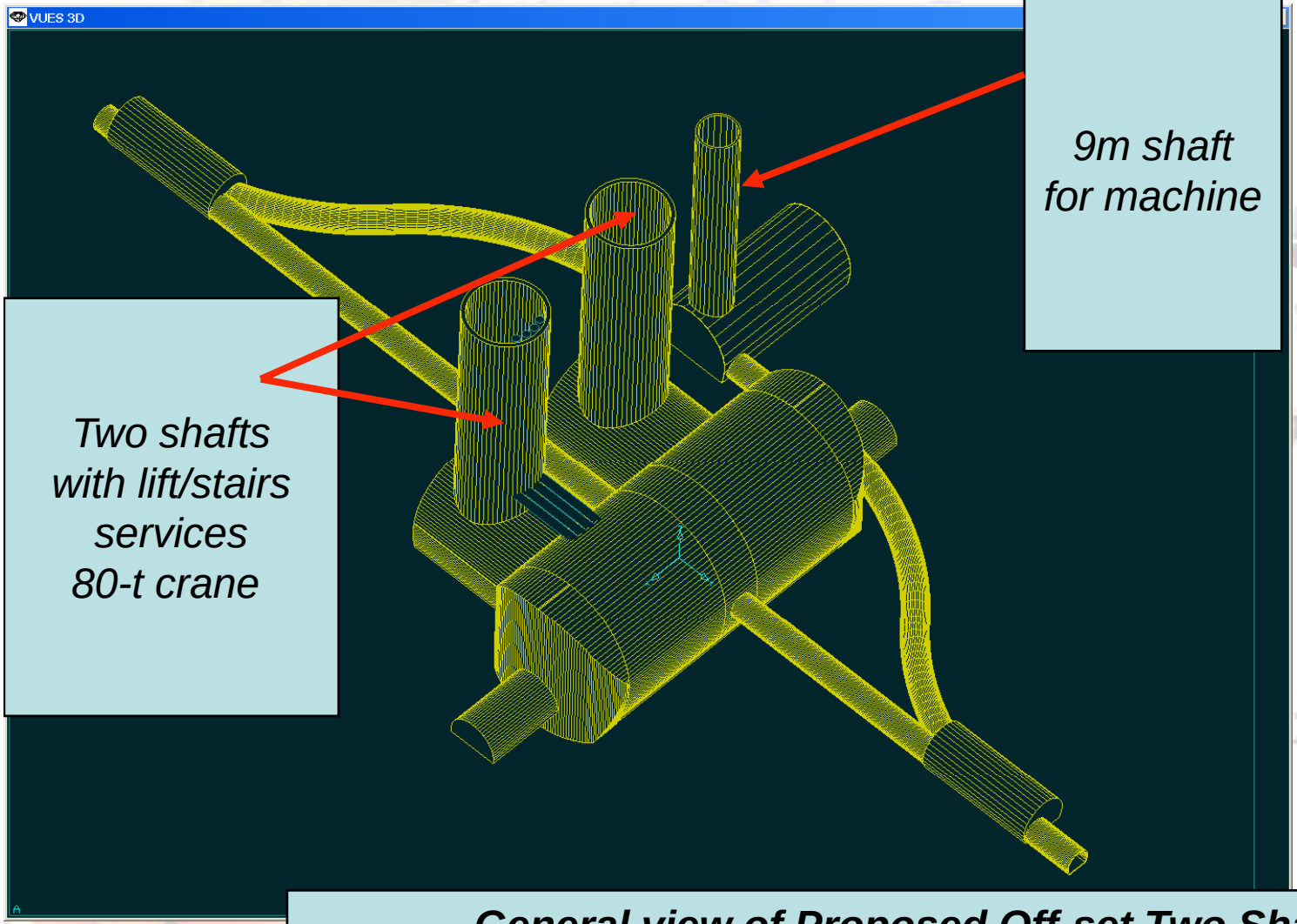


Surface Area for One Shaft Option

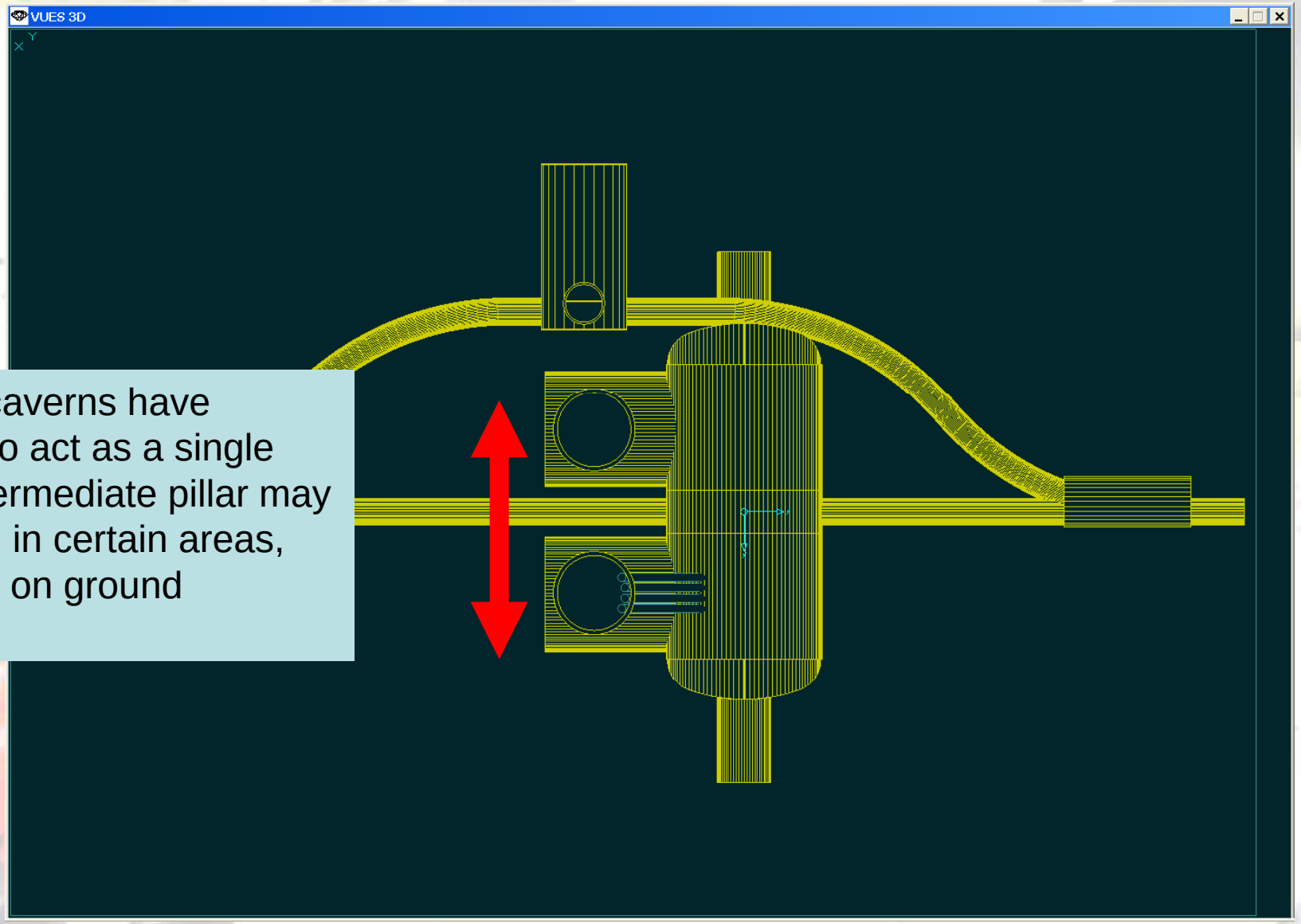


- Disadvantages of single shaft Option :
  - Detector B is in a less favorable position
  - If Detector B needs ‘major’ repairs, neither detector could be on-line (eg magnet removal)
  - Lifts & staircase have to be included in experimental shaft
  - If delays incurred both TBM’s could arrive at experimental cavern at the same time, more flexibility with 2 shafts for finishing works/fitting out

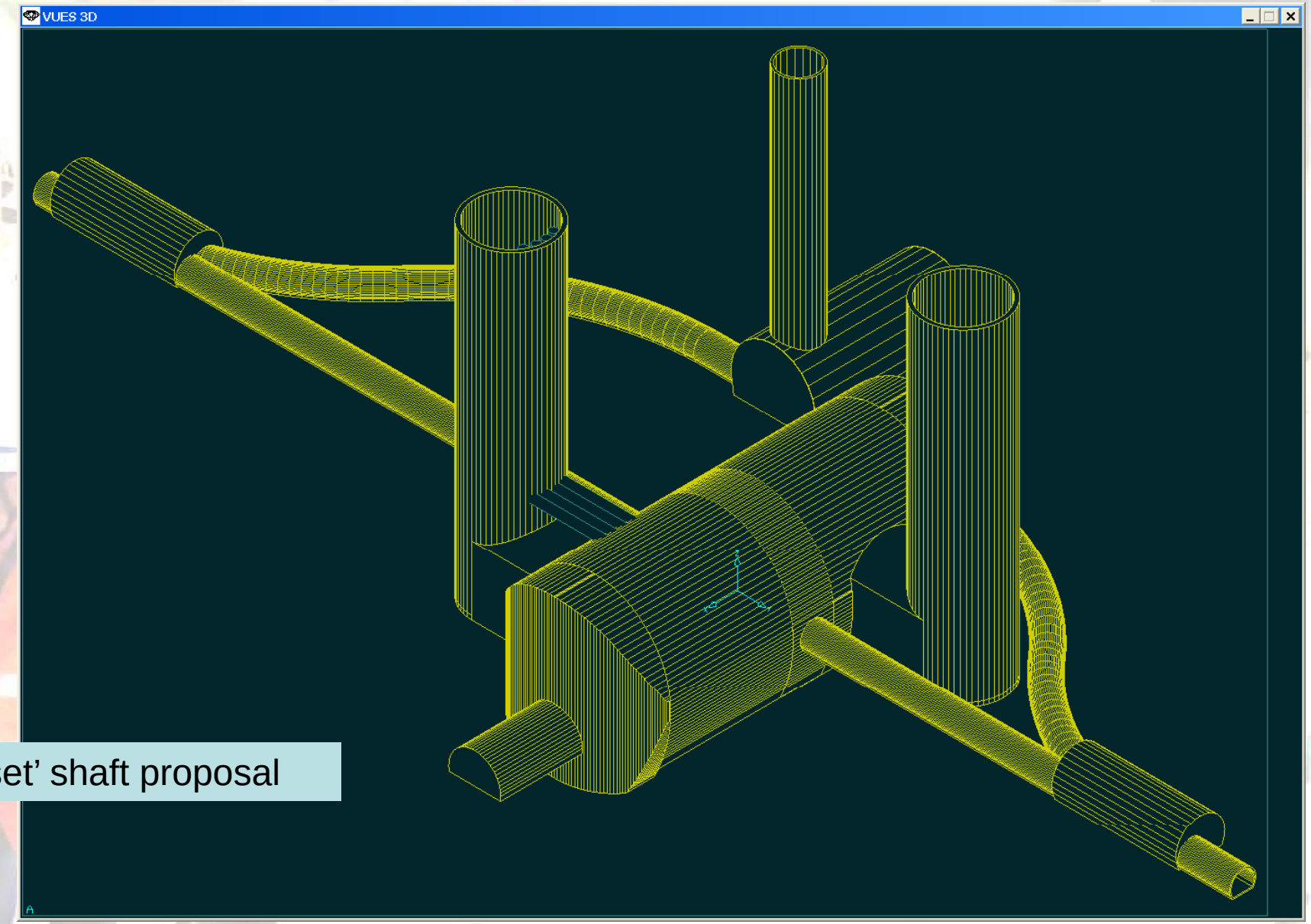

e⁻ side
e⁺ side
P.11
P.7
P.5
P.3
P.1
P.2
P.4
P.6
P.10
Year/Kms
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Y-1
1
2
3
4
Service Tunnel TBM
TBM ∅finished=4.5m
MS TBM ∅=4.5m
Cavern finishing
Shaft/cavern excavation
TBM setup
TBM transport
TBM removal
Finishing work
Beam tunnel TBM's extracted from Experimental Cavern



General view of Proposed Off-set Two Shaft Option

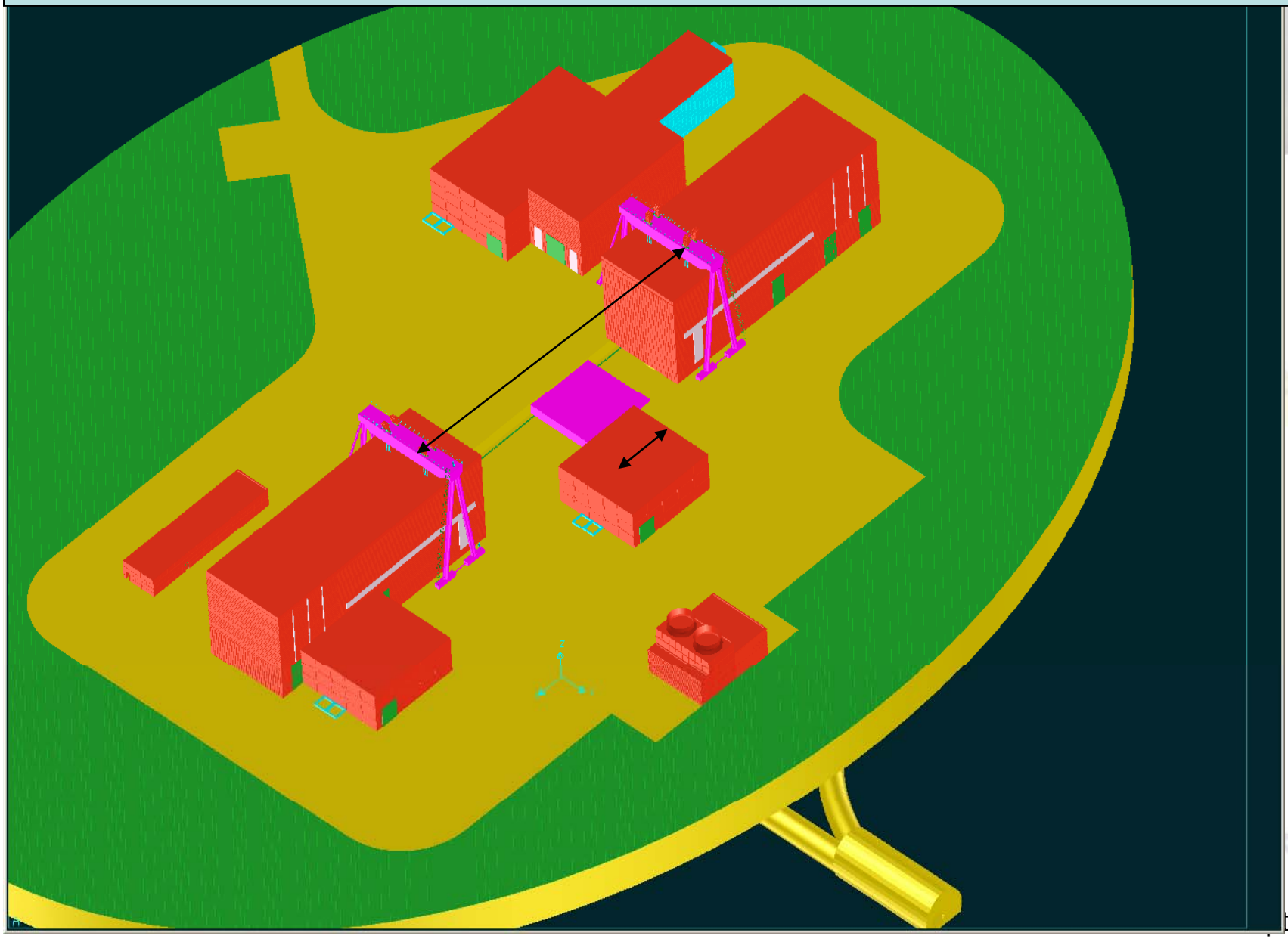


Two side caverns have tendency to act as a single span – intermediate pillar may be needed in certain areas, depending on ground conditions

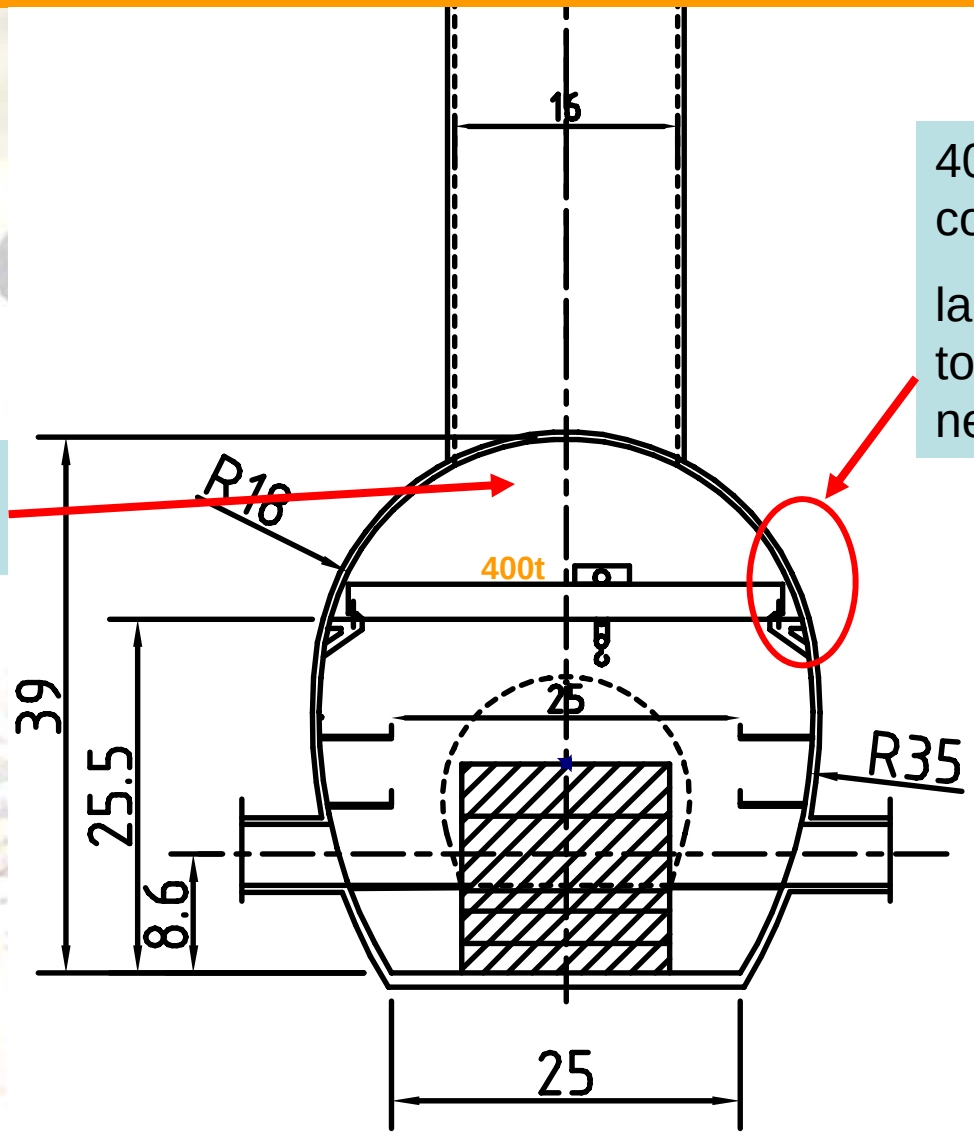


Two ‘offset’ shaft proposal

Surface area would be a variation of what has been looked at with less distance between the shafts



Lot of lost space

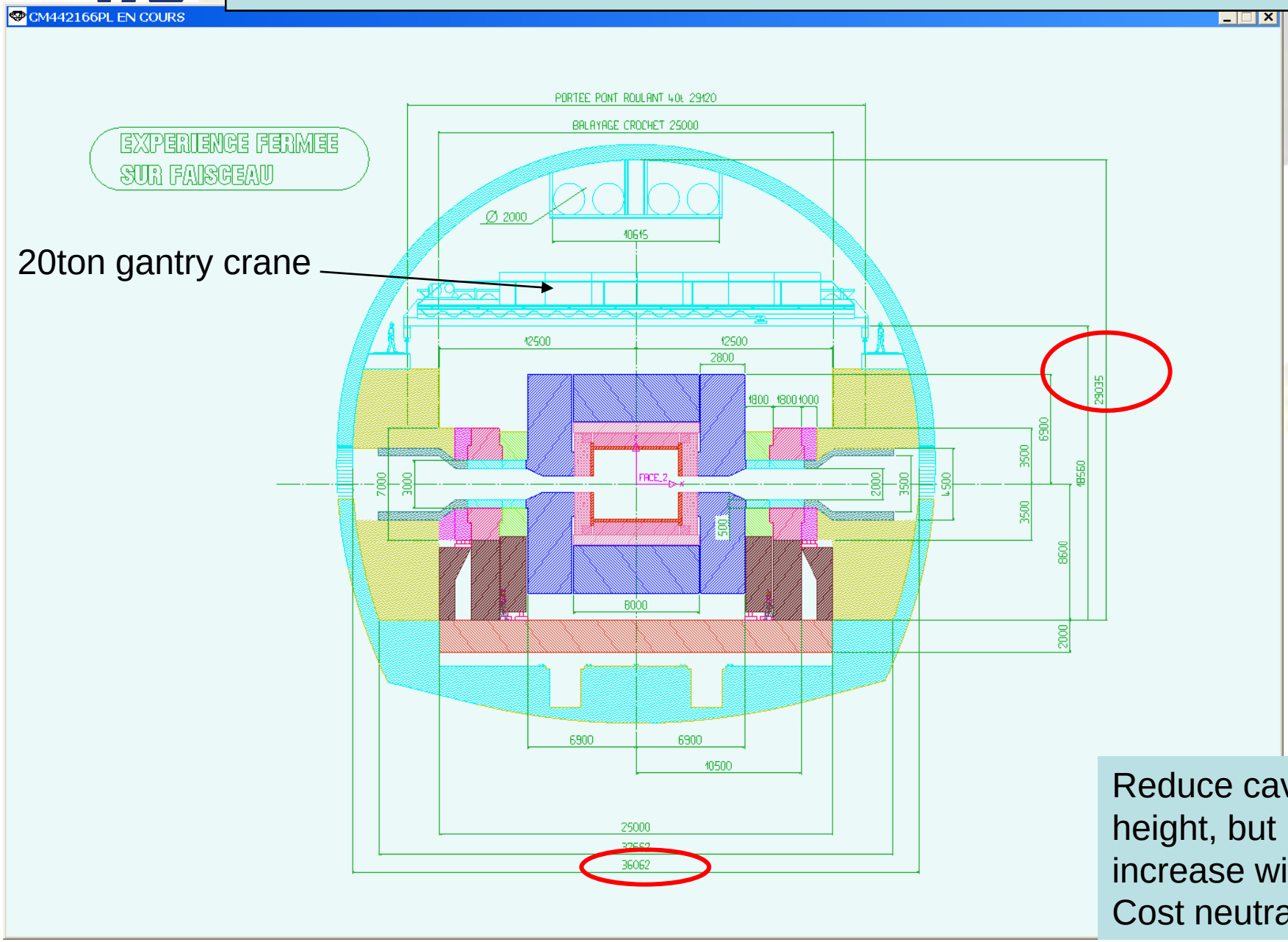


400 ton gantry crane is the cost driver

large steel columns down to floor level would be needed

RDR Baseline Layouts for Interaction Region

GLDc in beam position V1



Reduce cavern height, but increase width ? Cost neutral.

Workshop on ILC Interaction Region Engineering Design

SLAC, September 17-21, 2007

http://www-conf.slac.stanford.edu/ireng07/

- Goal: To review and advance the design of the subsystem of the Interaction Region of ILC, focusing in particular on their integration, engineering design and arrangements for push-pull operation.
- … goal is to make progress on the design of the ILC IR through focused preparation before and during the workshop…
- The International Program and Advisory Committee is being formed. Its charge includes organization of preparatory work before the workshop and production of conceptual solutions and drawings that could be further discussed and reviewed at the workshop…
  - this is an attempt to align the organization of the workshop with EDR WP organization ➔ how to do it optimally?

IR Eng. workshop: tentative working groups

Group A	**Overall detector design, assembly, detector moving, shielding.** Detector design for on-surface assembly and underground assembly procedures. Beamline Pacman shielding, detector shielding design.
Group B	**IR magnets design and cryogenics system design.** Cryogenic system design, connections, flexible cryo lines, safety issues. IR magnet engineering design, support, integration with IR, masks, Luminosity & Beam calorimeters, design of IR vacuum chamber, connection to elements, assembly-disassembly procedures, integration of near IR masks and overall integration of crab cavity.
Group C	**Conventional construction of IR hall and external systems**. Lifting equipment, IR electronics hut, cabling plant, services, shafts, service caverns, utilities, movable shielding; design solutions to meet alignment and vibration tolerances
Group D	**Accelerator and particle physics requirements.** Including masking, collimation, shielding requirements, image charges, wakes, external radiation, accelerator physics & optics design and constraints on IR engineering design, on alignment tolerances and stability for the IR components and IR hall floor.

Group C Conveners :

Vic kuchler

Atsushi Enomoto

J Osborne

Working Group C Proposed Topics (as of 31 August) :

Asiri	SLAC	C	1	Seismic reqts - plenary	
Corvin	SLAC	C	1		
Gaddi	CERN	C	1	An integrated design for ILC Detector Services (+ T reqts)- plenary	A.Gaddi
Gronberg	LLNL	C	1		
Lackowski	FNAL	C	1	Utilities requirements. Intro & discussion - plenary	wg-c
Tomassini	INFN	C	1	Upgraded IR of DAFNE, Eng. design -plenary	guess
Volk	FNAL	C	1		
Ruland	SLAC	C, B, A, D	1	Alignment - plenary?	
Enomoto	KEK	C-convener	1	Life safety constraints and requirements. Intro & discussion - plenary	wg-c
Kuchler	FNAL	C-convener	1	Push-pull constraints & criteria. Intro & discussion - plenary	wg-c
Osborne	CERN	C-convener	1	Civil Engineering Works and Services Installation for IR - plenary	author

Conclusions / Comments

•Infinite number of Civil Engineering layouts possible : Feedback needed from Detector Communities at SLAC Workshop, to 'advance' the design.

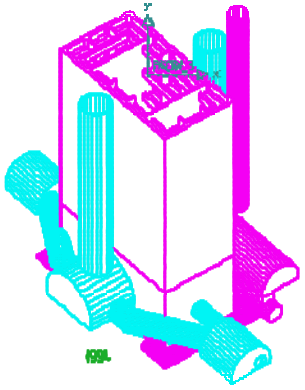
• 'Concept' layouts & alternatives to be presented at SLAC Workshop to stimulate discussion and provoke Value Engineering exercises e.g. Two service caverns.

AT130314PL EN COURS

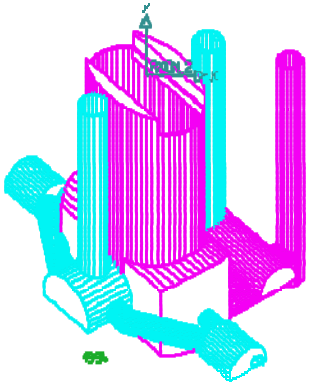
ATLAS design progression for experimental area prior to award of civil engineering contract :

1993

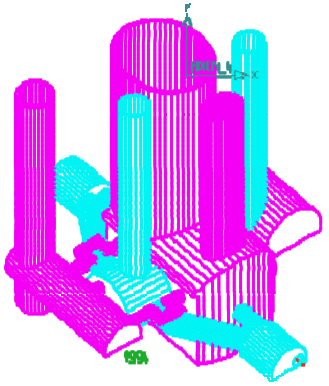
PUITS ELLIPTIQUE 44 × 28



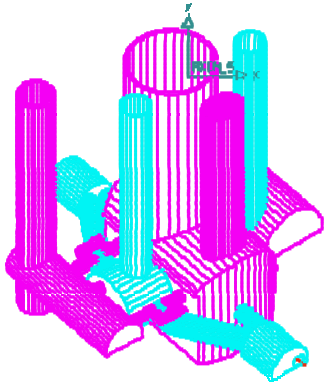
PUITS CARRE



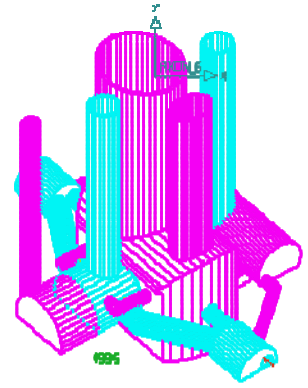
PUITS ELLIPTIQUE 44 × 28



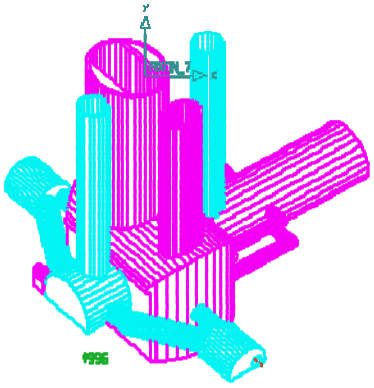
PUITS ELLIPTIQUES 36 × 28 ET 13.5 × 9.4



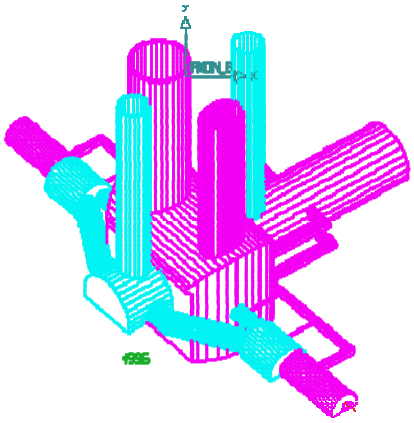
EXPERIENCE ATLAS POINT 1



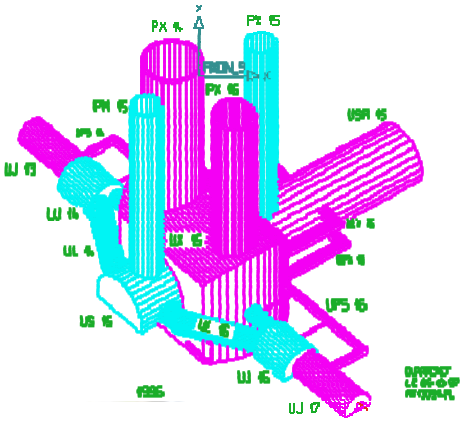
PUITS ELLIPTIQUES 29 × 25 ET 13.6 × 9.4



PUITS ELLIPTIQUES 26.5 × 22 ET 13.4 × 9.2



PUITS Ø 18 ELLIPTIQUE 13.6 × 9.4



PUITS Ø 18 Ø 12.6

1996