PROGRESS ON DEVELOPING LAYOUTS FOR SURFACE SITES FOR FCC

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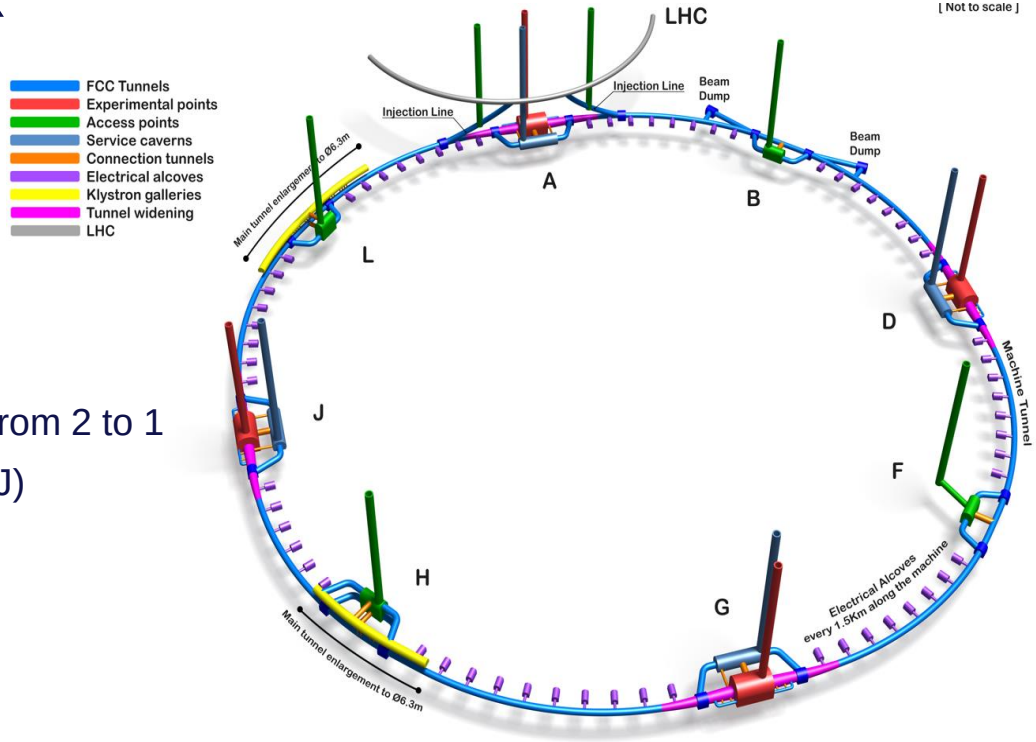
Agenda

1. Main changes impacting Surface Sites since CDR
2. “Eight–Point” placement challenges for civil engineering
3. Collaboration with Fermilab
4. Point A as an Experiment site
5. Point B as a Technical site
6. Work to be done prior to mid-term review

Main Changes Since CDR

- Tunnel circumference reduced to ~ 91 km
- Reduction from 12 to 8 access points
- Reduction of access shafts to UX caverns from 2 to 1
- 4 Experimental Sites for ee and hh (A,D,G,J)
- 4 Technical Sites for ee and hh (B,F,H,L)



Schematic of Underground Civil Engineering

Progression of Study to Date

- At the CDR stage, specific surface site locations were not defined.
- As such no site-specific layouts were developed, and costings were undertaken on the basis of generic sites for experimental and technical areas.
- Tunnel alignment progress has allowed us to move forward on the development of some specific surface sites with the aim of determining their suitability as experimental areas of technical areas.
- Site visits have been made to all potential sites.
- Preliminary draft layouts have been prepared for several sites (A,B, D) and these will continue to evolve.
- Meetings with Host State Authorities has given us additional insight into the possible challenges and opportunities of the sites and these will be further investigated in the coming months and years.
- The surface site developments are being progressed in very close collaboration with the underground engineering team, the placement team and the infrastructure team.

Eight–Point placement challenges

The surface sites are mainly located in rural areas although in some cases existing developments are within a few hundred metres.

Typical impacts will include:

- Visual impact (buildings, water vapour)
- Noise impacts (cooling towers, transformers, cryoplant)
- Environmental impacts and releases to the Environment (dust, water, air)
- Impacts on future land use
- Heightened traffic
- Demand on local services

Typical existing semi-rural location – LHC Surface Site

Collaboration with Fermilab

- CERN and Femilab (working on behalf of DOE) have commenced work on a collaboration for FCC surface sites.
- Fermilab will provide resources to undertake preliminary surface civil engineering designs for two surface sites. One Experimental Area and one Technical Area.
- The Fermilab contribution includes a set of preliminary drawings and 3D models with associated specifications and bills of quantities.
- CERN will use these drawings, models and bills of quantities to develop cost estimates for these two surface sites.
- These costs will then be extrapolated to the other 6 surface sites to obtain a full cost of surface works at the eight sites.
- Fermilab may also take part in review of the underground works if sufficient resources are available.

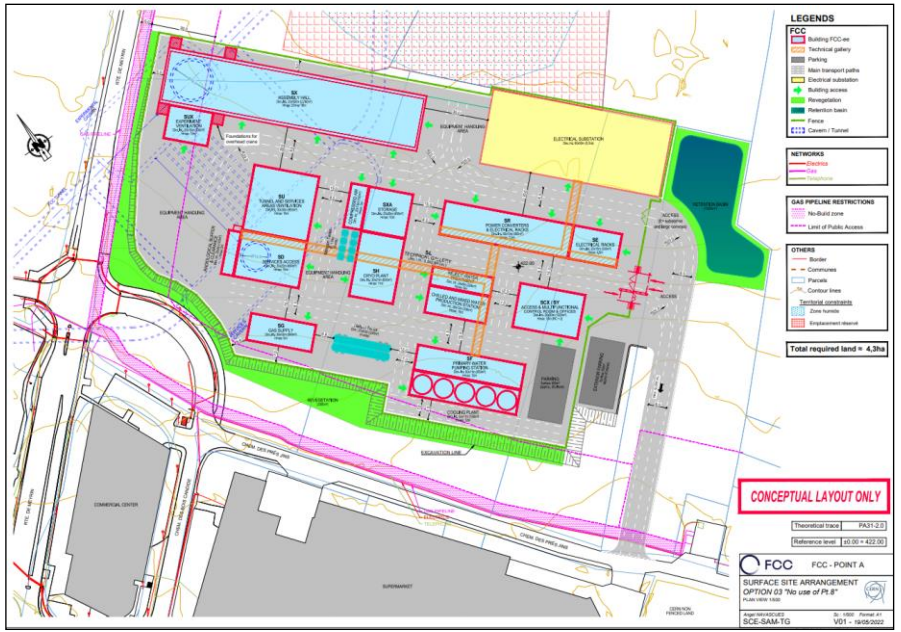
Point A - Experiment Site

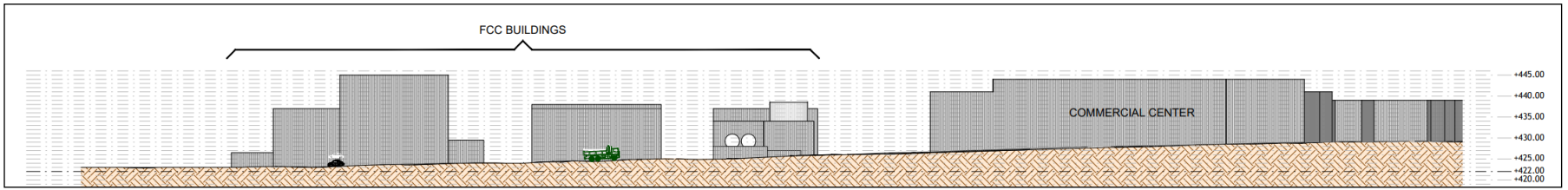
Main characteristics:

- PX shaft close to the main road
- Close to existing retail development and proposed hospital
- Re-use of LHC Point 8 where possible

Specific Challenges:

- Integrate into partially urbanised area
- Develop site adjacent to major gas pipeline
- Reduce impact or improve adjacent environmentally sensitive “Humid Zone”





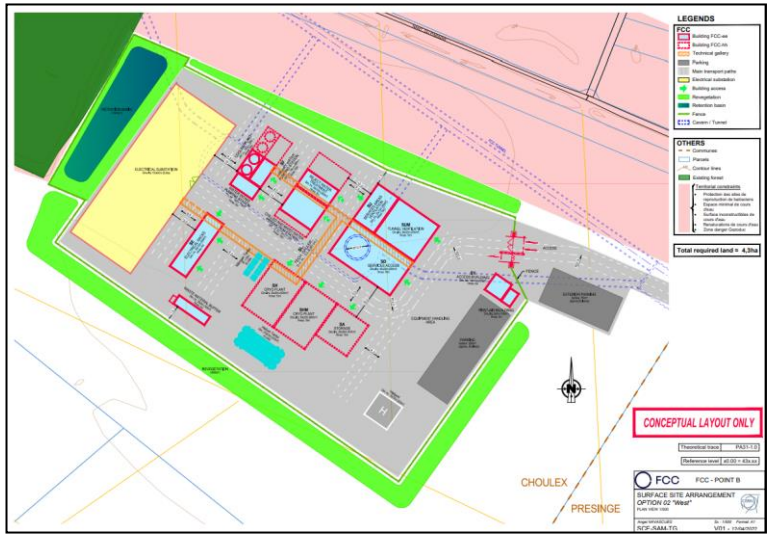
Point B - Technical site

Main characteristics:

- Located in Switzerland
- Significant increase in building footprint to be anticipated from ee to hh
- Some flexibility in the location of the access shaft

Specific Challenges:

- Flat, rural environment
- Protected stream / fauna in close vicinity
- Presence of large houses and farms within few hundred metres
- Reuse of excavated material to mask site within existing environment



Work to be completed prior to mid-term review

Freezing of requirements:

- Tunnel alignment and surface site locations
- Confirmation of assumptions for surface site area availability
- Building size requirements in particular ee and hh experimental surface halls
- Confirmation of crane capacities (especially for experimental halls)

Civil engineering:

- Drawings, models and bill of quantities for Point A and Point B to be developed with Fermilab
- Drawings to be developed internally at CERN for the other six points
- Cost estimates for Point A and Point B to be prepared and extrapolated to the other six surface sites.

THANK YOU FOR YOUR ATTENTION