Update on LBNF to DUNE Collaboration

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LBNF Update – U.S. Funding Status

- Budget agreement reached; appropriation in FY19 at $95M… compared to President's Budget Request of $55M, and House/Senate committee marks of $80M/$82M!
- Received funding for April at 1/12 of $95M; DOE HEP has said we should receive 95% of balance of $95M in May.
- Directed Beamline team to accelerate FY19 Oct-Mar plan by 6 months, to accomplish as much as possible sooner than we were anticipating.

LBNF Update - LBNF/DUNE-US DOE Critical Decision Strategy

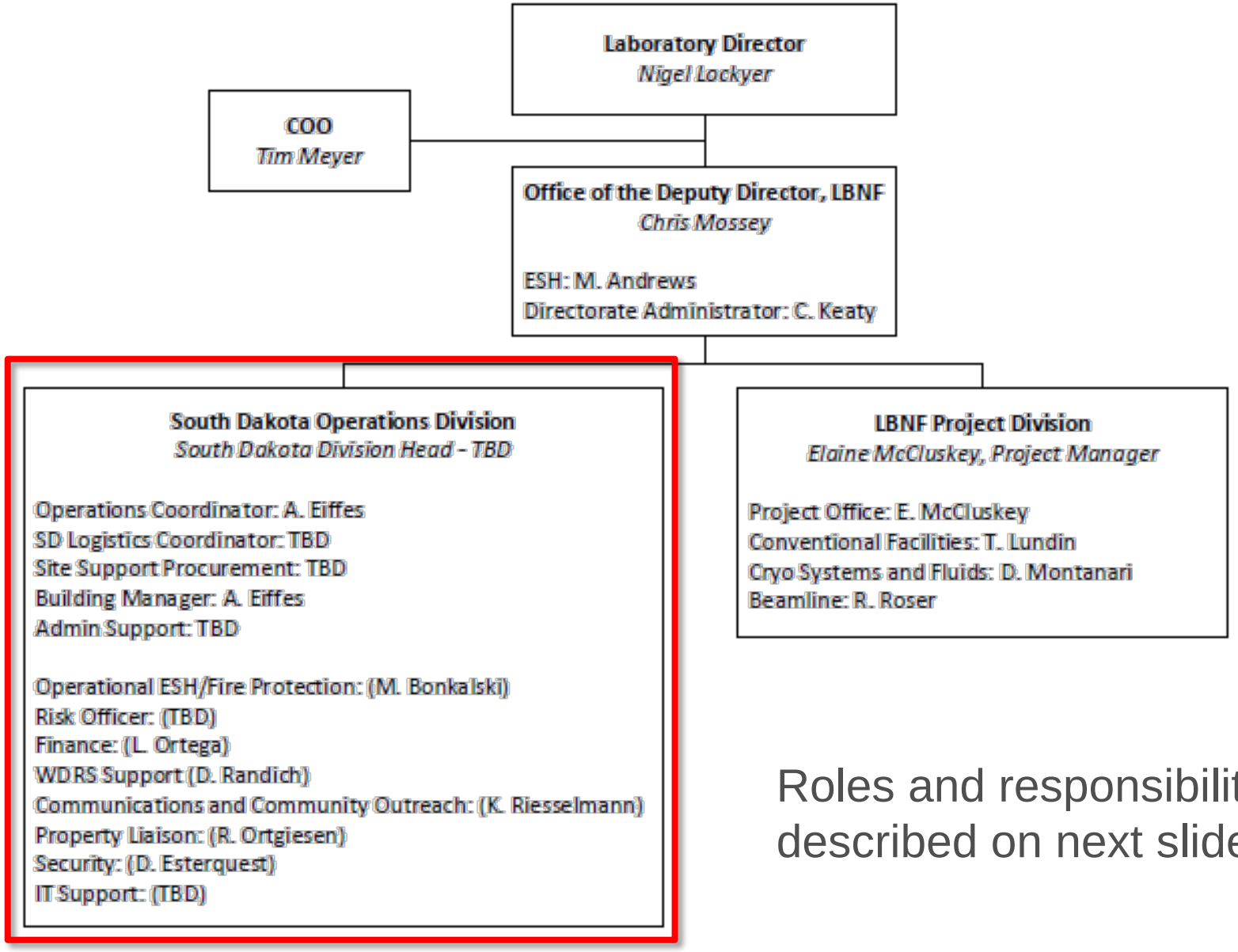
- Based on discussions with OHEP, OPA, DUNE, international partners and a recommendation from SPAC, project is planning CD-2 baselining in 2019.
  - Far Site scope designs will be complete or well-understood.
  - Near Site scope designs will be less than full preliminary design, but feel risks will be understood and managed.
  - Design maturity & completion timeline outlined in LBNF/DUNE-US Design Plan
- Balance of Far Site scope to be reviewed for CD-3b approval at same time as CD-2.
  - Remaining 20% of FSCF with designs complete.
  - DOE cryogenics scope with LN2 Systems design/fab/install contract in place and prices in hand.
  - DOE Far Detector scope with all prototyping complete and final designs underway.
- NSCF and DOE Beamline scope will be reviewed for CD-3 in 2022 when NSCF design is complete and Beamline is well-underway.
- Timing dictated by prior and near-term funding constraints to progress the designs.

LBNF Update - DOE IPR Recommendations Summary

- 28 recommendations, highly focused on reducing risk, partner development, and preparations for CD-2 review in 2019
- Those focusing on LBNF (or overall project management):

	Readiness for CD-2	Partners	Move const'n forward	Procurement	Staffing
Beamline	3	3			
Cryogenics					1
CF	2		1		
ESH			3		
Cost/ Schedule	1				
PM	4			1	1

LBNF Update: New Fermilab Organization at SURF



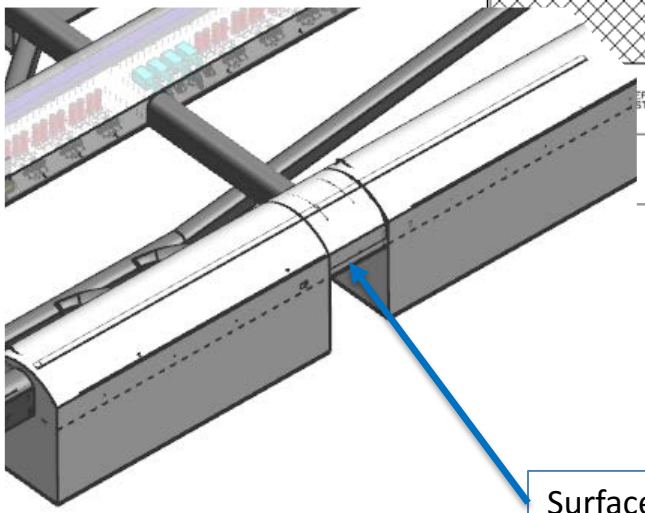
Roles and responsibilities described on next slide

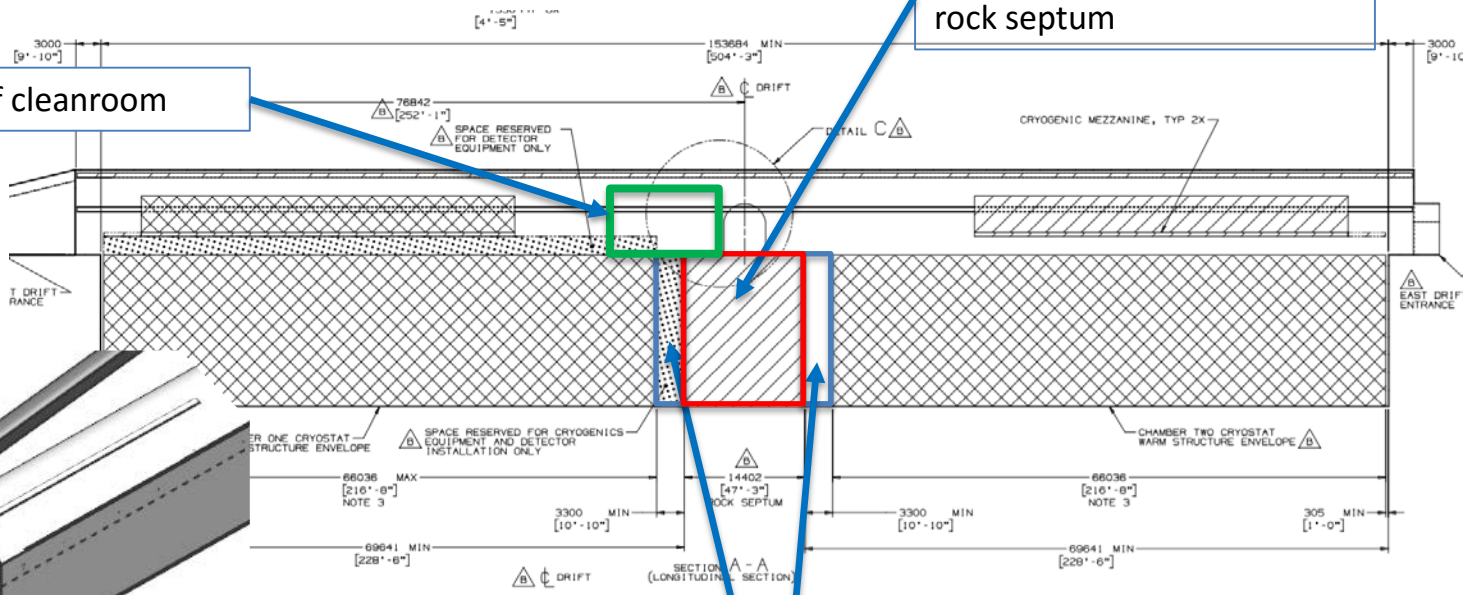
Fermilab Organizations at SURF: Roles and Responsibilities

- LBNF Division at SURF:
  - Execute LBNF project in accordance with DOE O 413.3 and all Fermilab policies and procedures (ESH&Q, acquisition, etc)

- SD Operations Division at SURF:
  - Serve as single point of contact in South Dakota for Fermilab/DOE
  - Ensure host lab support functions are transparently, consistently, and efficiently provided to:
    - LBNF/DUNE projects during construction phase
    - DUNE international collaboration during operations phase
  - Serve as technical manager for SURF services contract
  - Serve as POC to monitor and track progress on all corrective actions related to SURF
  - Manager of FRA/SDSTA partnership agreement/MOU

LBNF Update – EFIG recommendations
Rock Septum Change





2D view of cross section of rock septum

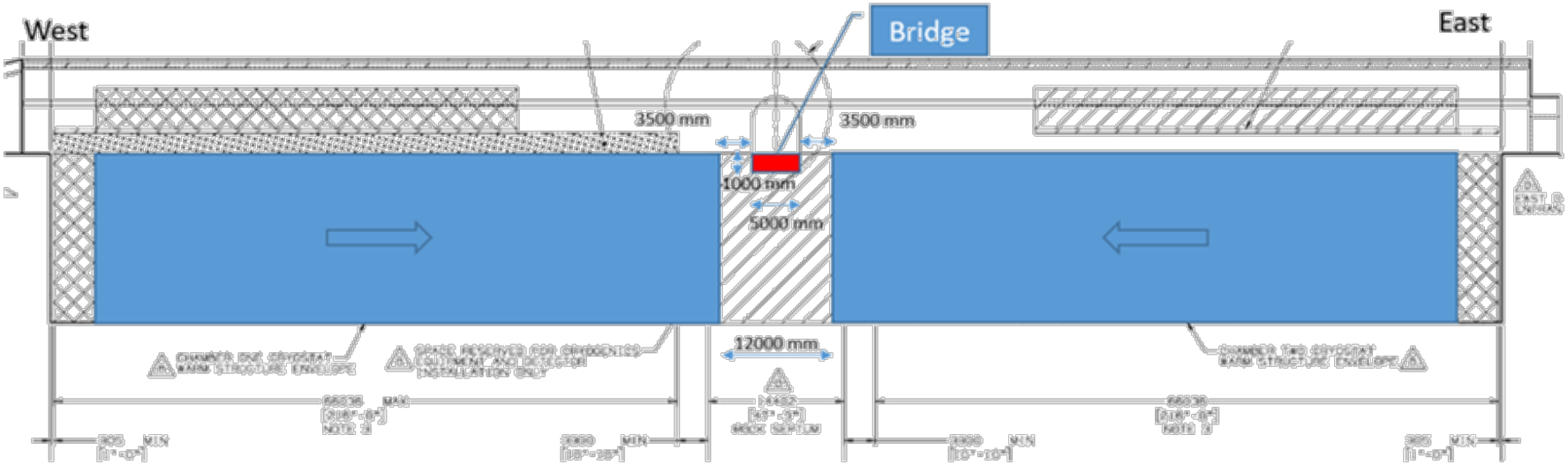
Proposed location of cleanroom

Surface of the rock septum at 4850

Outline of current 3.3 m space for installation of inner membrane and detector components into cryostat and location for cryogenic pumps for operation

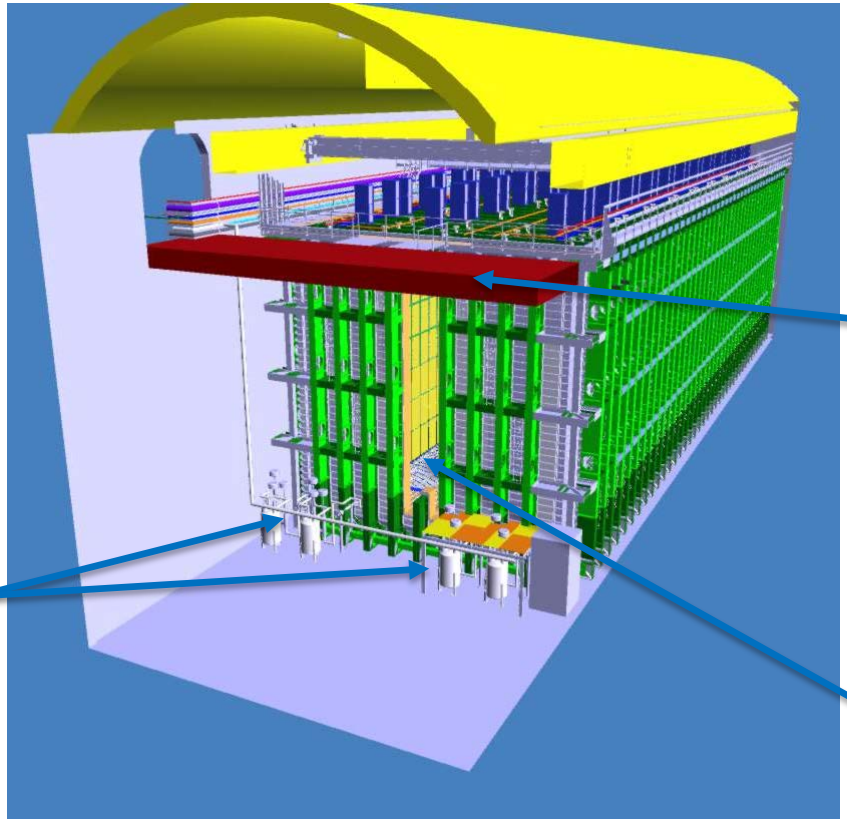
Details of Rock Septum removal

- Remove rock septum down to 4910 level
- Move east CS 4.5 m to the west, and west CS 4.5 m to the east
- Build 5.00 m wide bridge between north and south drifts
- Reduce cavern length by 9.002 m
- Moves the cleanroom for detector installation below the 4850 level to liberate the space above. This reduces the interferences with overhead conveyances, rack installation and materials moving into the CUC.

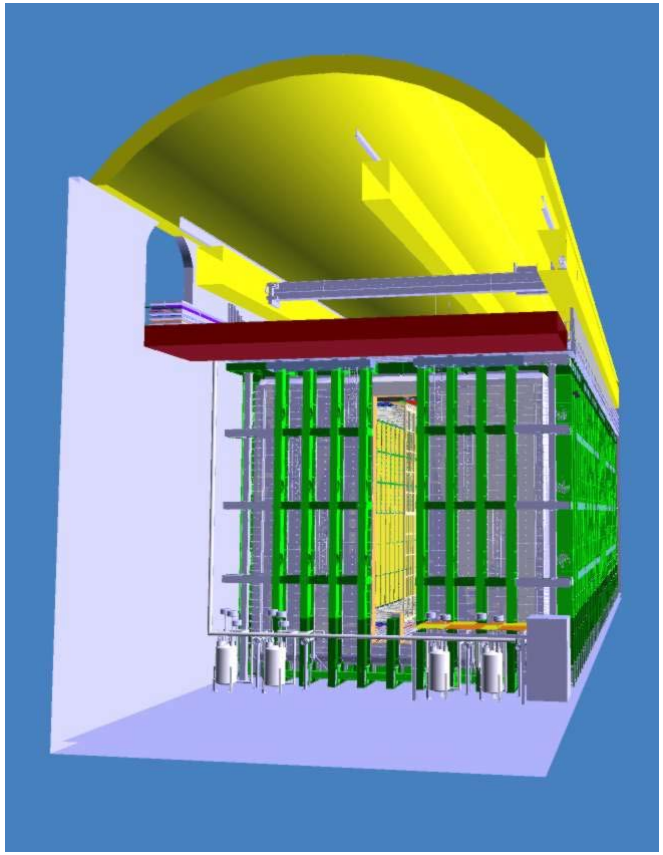


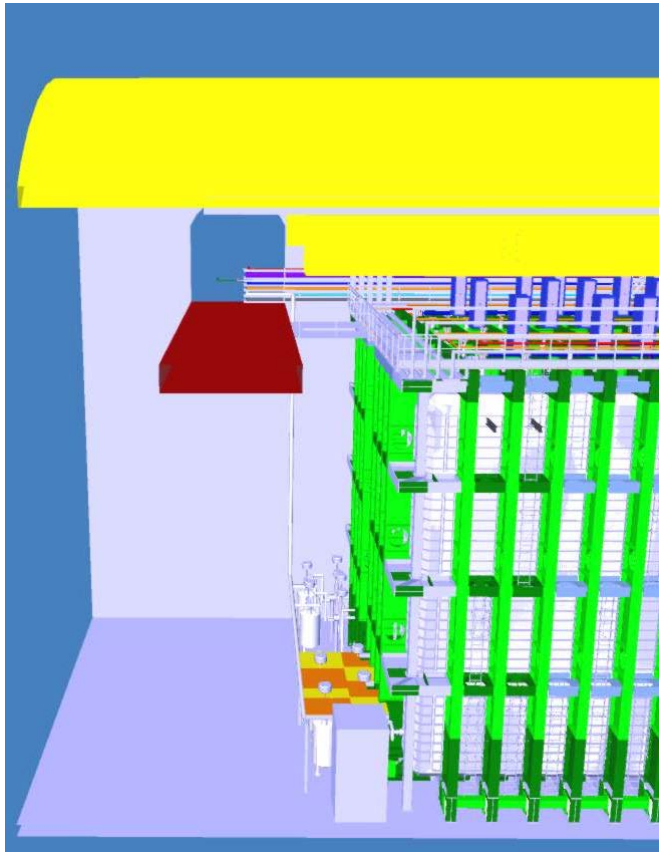
South elevation view

ISO sectioned view with no rock septum, bridge added and cryogenics pumps



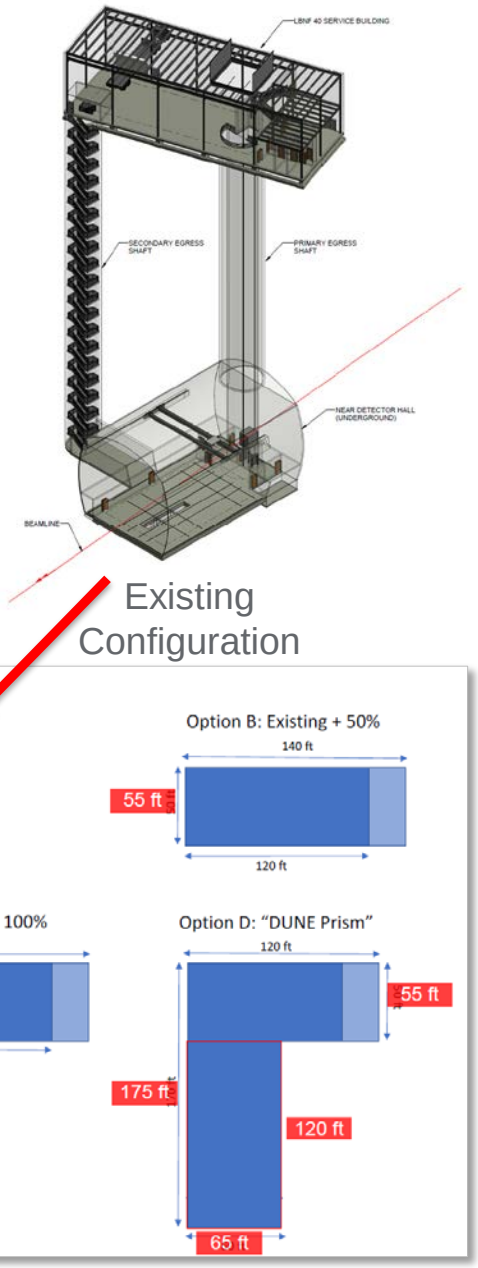
More views with rock septum removed



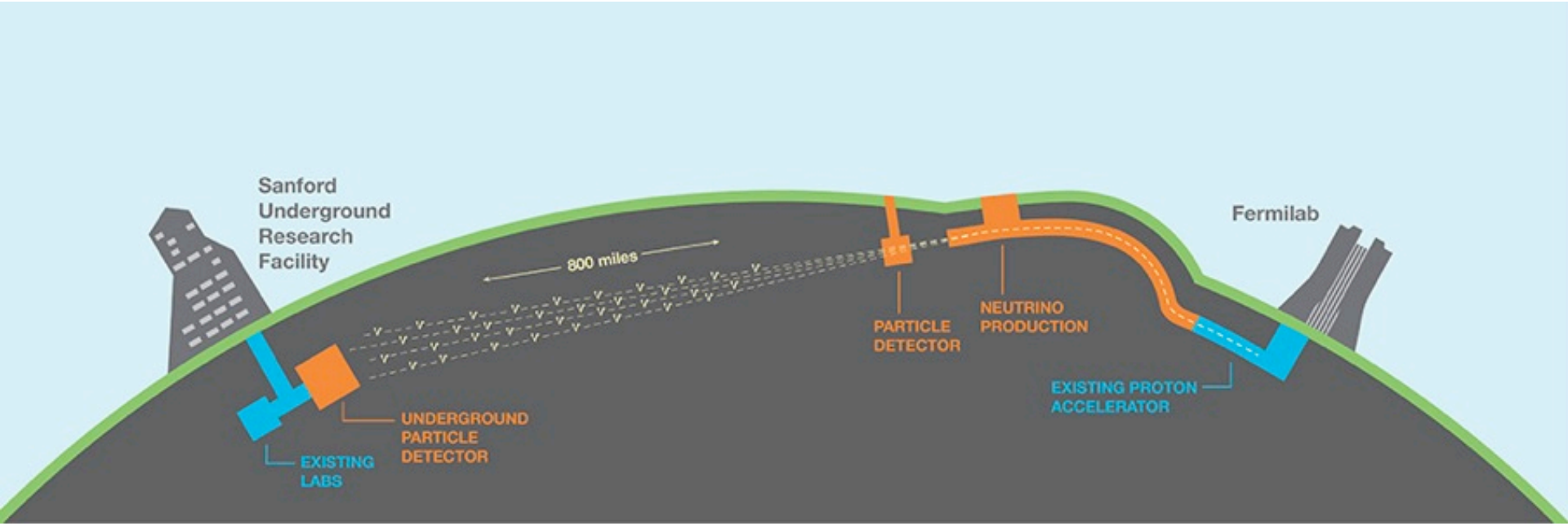


LBNF Update: Near Detector Complex Status and Plan to CD-2

- Working to understand ND requirements and CF implications. Changes in ND configuration produce cost and schedule impacts
  - Larger caverns and shafts take more time and cost more
  - May require additional ground support
- Must make timely decisions to achieve CD-2 in Dec 2019
  - Jun 2018 – Finalize detector hall and shaft configurations and locations
  - Sep 2018 – Geotechnical site investigation
  - CY2019 – Preliminary Design of Near Site CF including the Near Detector Complex
  - Oct 2019 – CD-2 Review



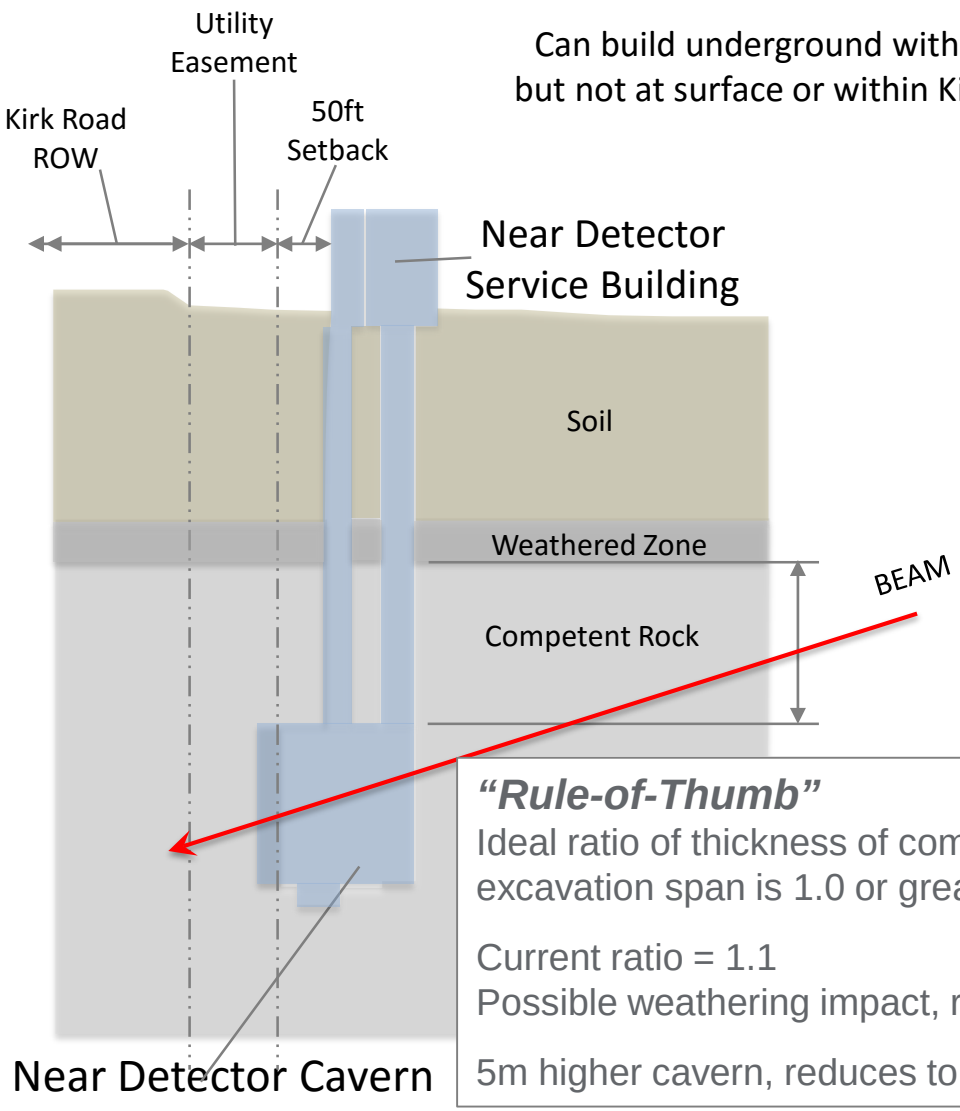
Questions?


Sanford
Underground
Research
Facility
800 miles
Fermilab
PARTICLE
DETECTOR
NEUTRINO
PRODUCTION
EXISTING PROTON
ACCELERATOR
UNDERGROUND
PARTICLE
DETECTOR
EXISTING
LABS

- Backup

Competent Rock Cover-to-Cavern Span Ratio

- The size, configure-tion, and location of the Near Detector Complex are subject to both horizontal and vertical constraints:
  - Location of beam
  - Proximity to easements and property line
  - Rock overburden – soil borings will help us understand what the actual overburden is



"Rule-of-Thumb"

Ideal ratio of thickness of competent rock to excavation span is 1.0 or greater

Current ratio = 1.1
Possible weathering impact, reduces to 0.9

5m higher cavern, reduces to 0.6