FAARM Collaboration Meeting

Requirements, Conceptual Layout

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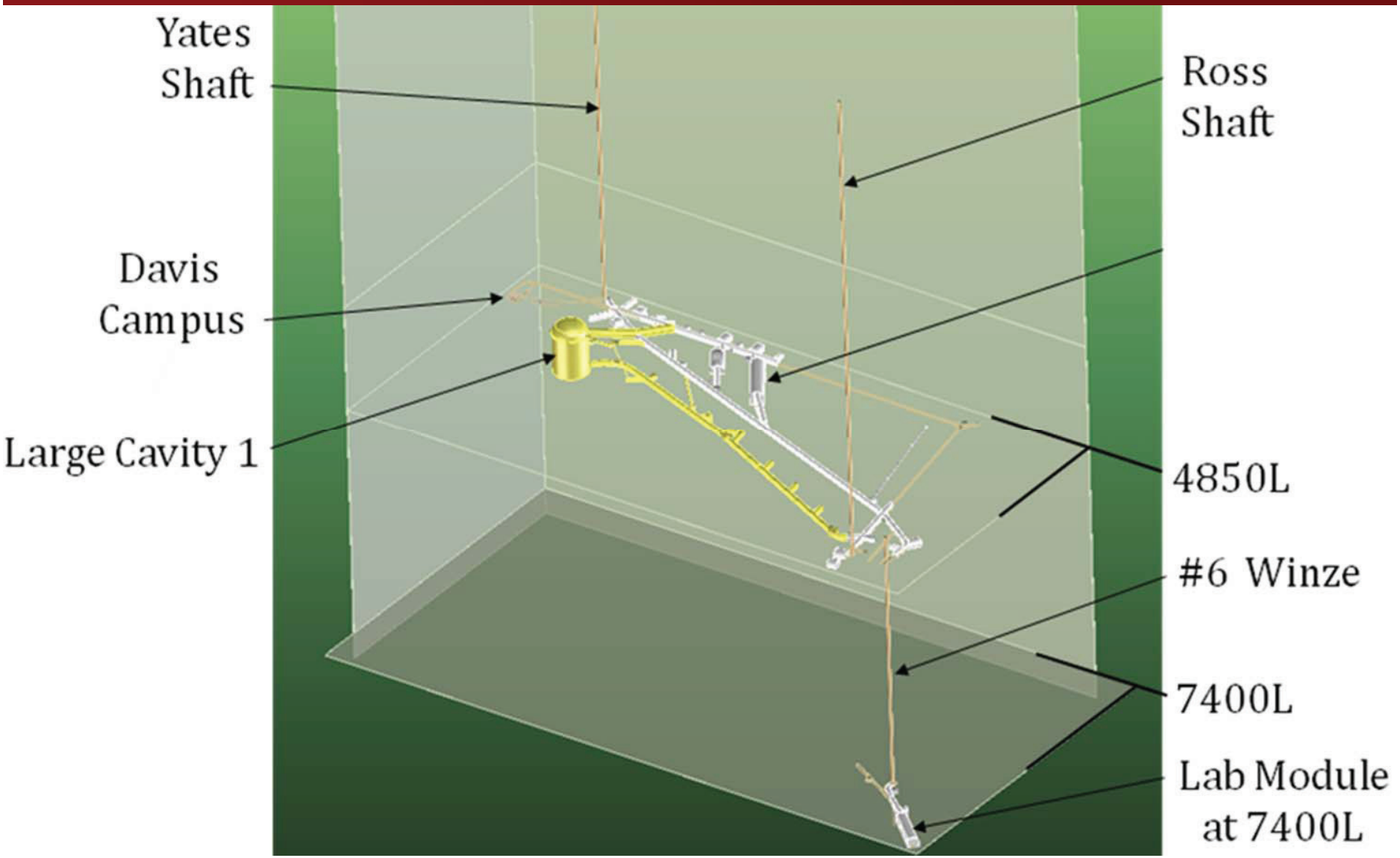
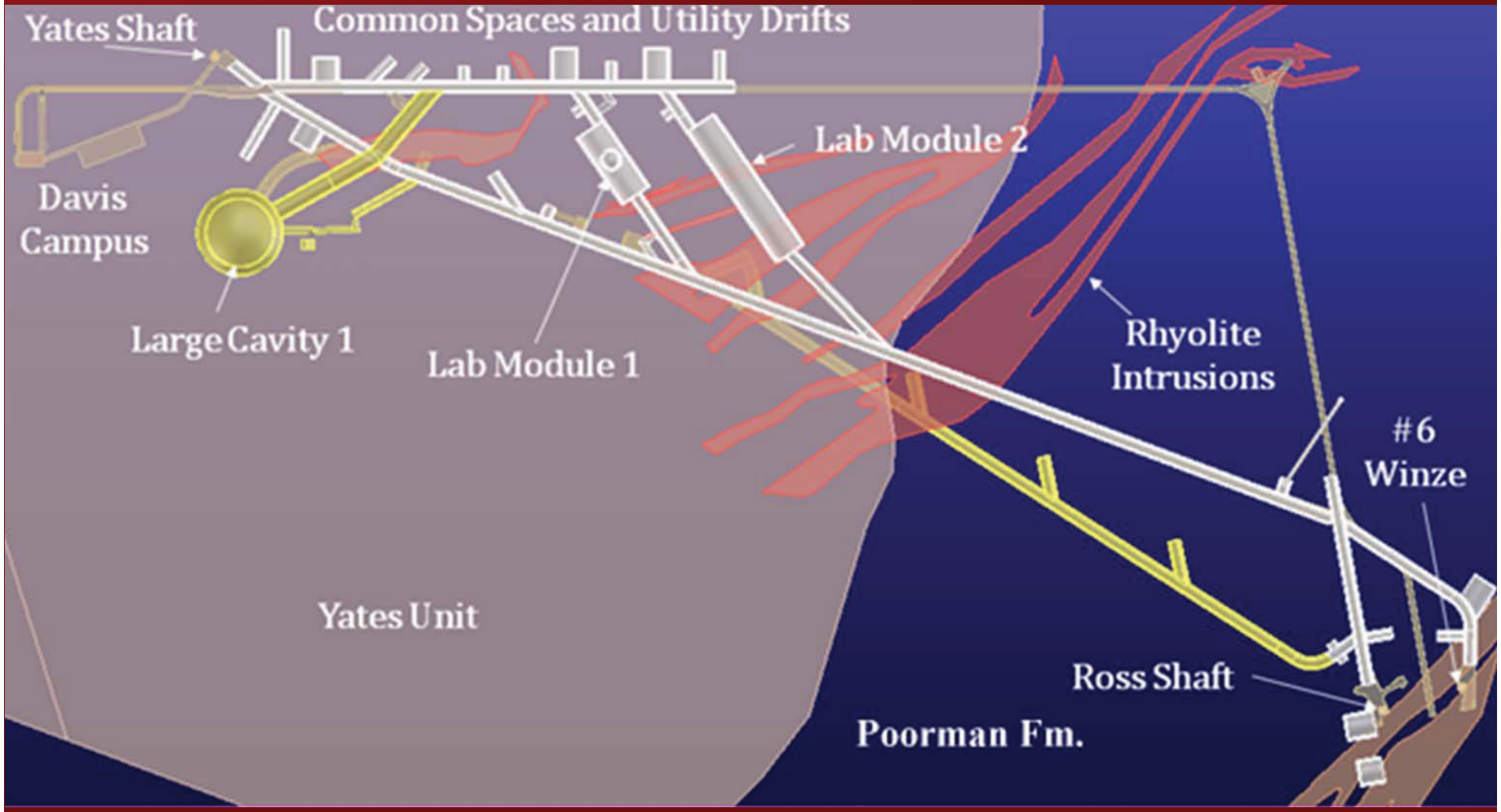
Topics

- DUSEL modules at 4850
- Summary of Spaces
- FAARM Conceptual Layout
- Unresolved issues
- Discussion

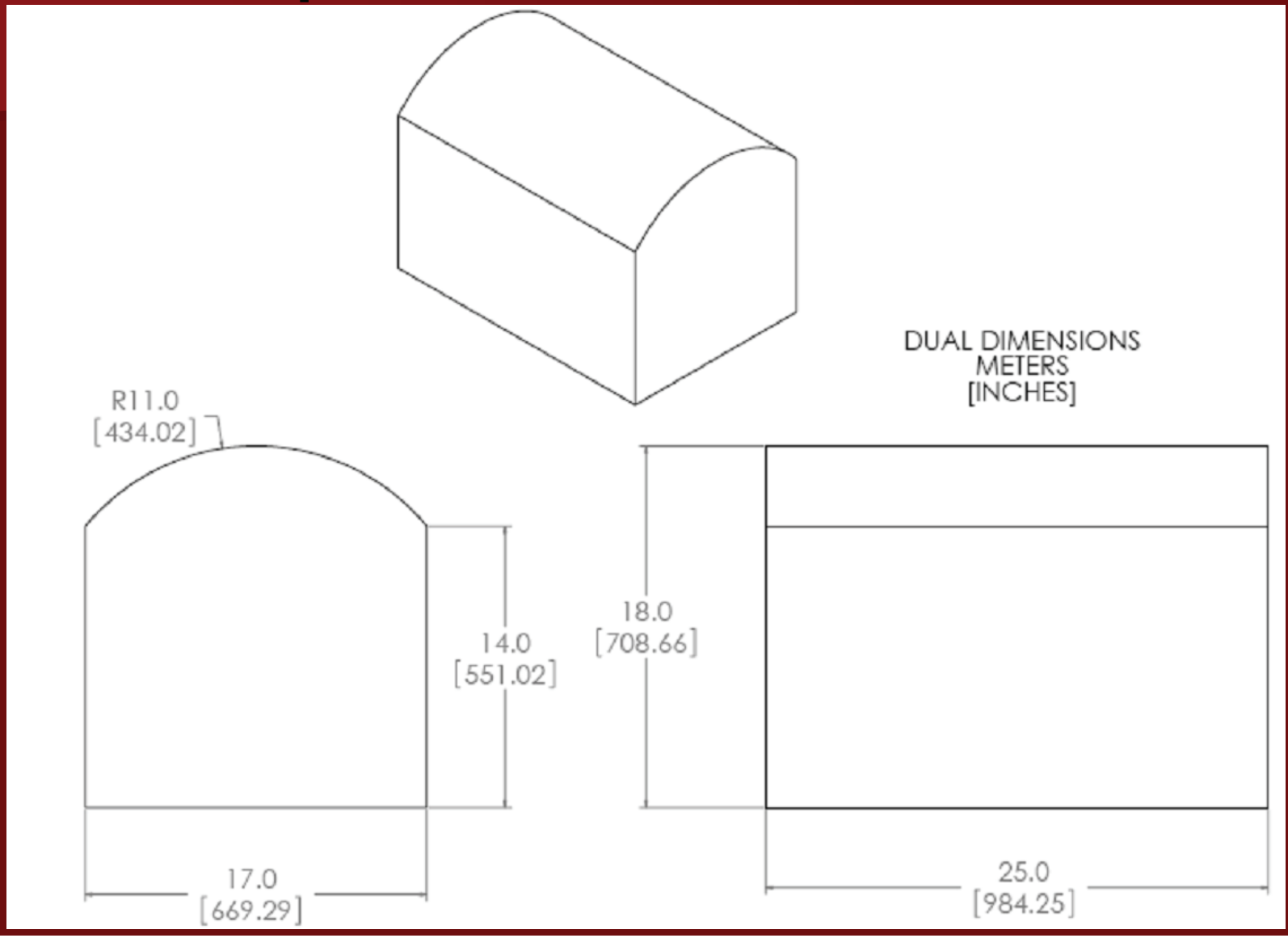
DUSEL Level Perspective



4850 Level Plan



DUSEL-prescribed Cross Section



Spaces

- Clean Facility Req.
- Water Shield
- Ultra-Sensitive Immersion Tank
- Gamma Counting Stations
- Alpha Counting Stations
- Beta/Alpha Sensitive Surface
- Novel Screeners and R&D Space
- Clean Machine Shop
- Wet Chemistry
- Bio storage and sample prep
- Cryogen infrastructure
- Water purification infrastructure
- Electroforming

Space Sizes

- Machine Shop—10m x 6.5m
- Transition & Cart Airlock—2.5m x 9.5m
- Chemistry Lab—6m x 5.5m
- Bio/Sample Prep—10m x 6m
- Office—4m x 10m
- Storage—2.5m x 10m
- Radon control equipment—8.5m x 2.5m
- Electrical—8.5m x 2.75m
- Mechanical—8.5m x 12m

Adjacencies

- First floor
  - Transition & cart airlock
  - Machine shop
  - Water shield human access
- Top floor
  - Immersion tank sample access
- Second floor
  - Most everything else
- Remote, dirty space (top floor)
  - Mechanical/electrical/radon mitigation

Equipment Inside Shield

- 4 m, top loading immersion tank
- R & D/novel screeners—3.5m x 2m
- Gamma Screeners—6m x 4.25m
- Alpha-Beta screeners—1.6m x 3.6m

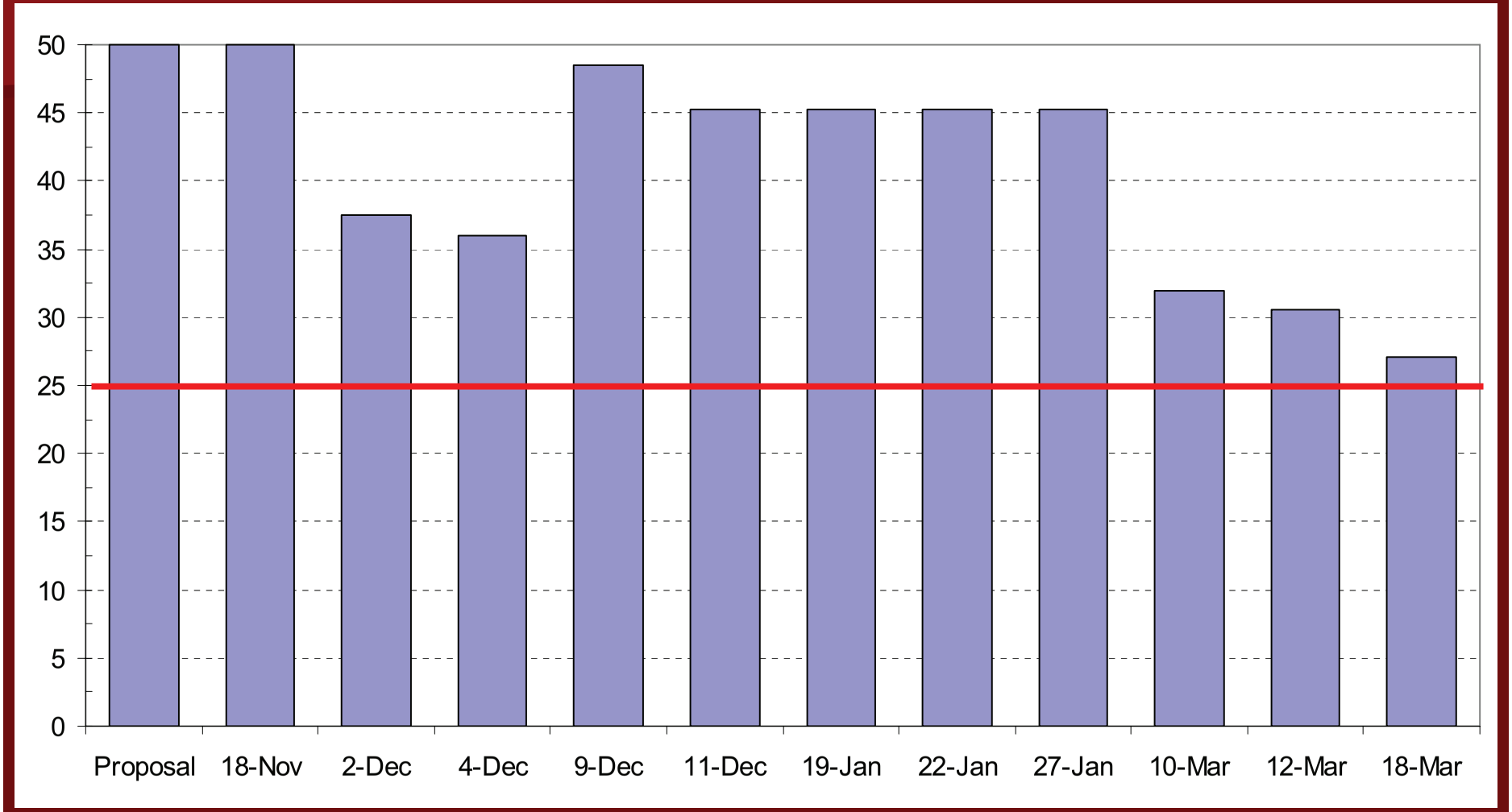
Cleanliness Conditions

- Standard office/lab cleanliness outside FAARM
- Transition space—is that
- Mechanical-electrical spaces—standard utility spaces
- All else—certain number of air changes per hour with reliance on protocol

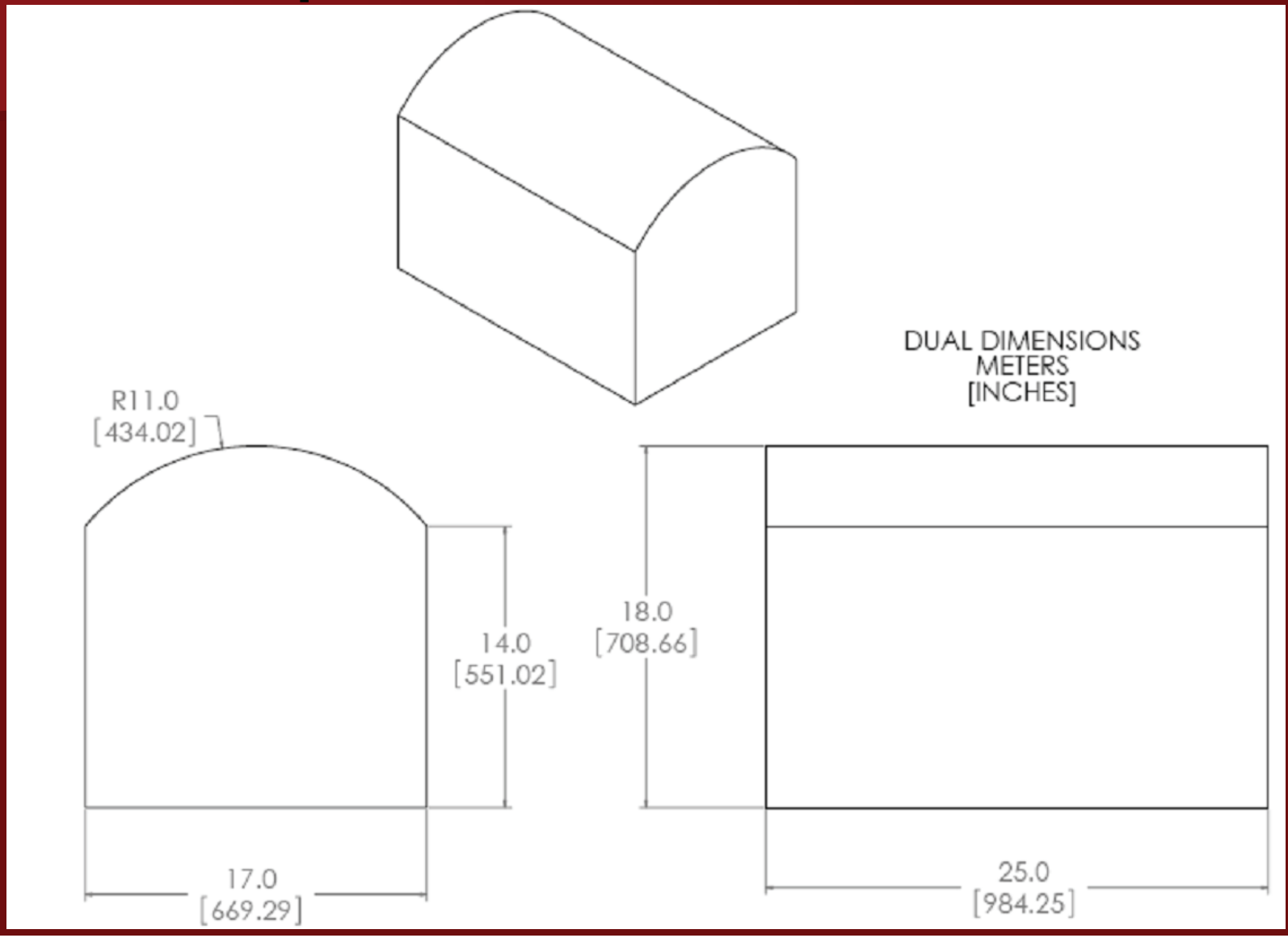
Power

Description	Base Power Consumption (kW)	Diversity Factor	Power with Diversity Factor (kW)	Comment
Clean Facility Requirements				N.A.
Water Shield	5	1	5	Estimated by dlp, possible shared with others
Veto Shield	5	1	5	Estimated by dlp, confirm with Prisca
Ultra-Sensitive Immersion Tank	20	1	20	Confirm with Kara Keeter
Gamma Counting Stations	15	1	15	From FAARM documentation
XIA Alpha Counting Stations	1	1	1	from Richard Schnee
Emanation chambers	1	1	1	From Prisca Cushman
Other Alpha/Beta counters	2	0.5	1	
Beta/Alpha Sensitive Surface Screeners	10	1	10	From FAARM documentation, 10 clean, 5 dirty
Novel Screeners and R&D Space	10	0.5	5	Estimated by dlp
Clean Machine Shop	10	0.25	2.5	Estimate based on Majorana
Wet Chemistry	5	0.5	2.5	Estimated by dlp
Bio storage and sample prep	5	0.5	2.5	From FAARM documentation, 20 amps at 220 v
Cryogen infrastructure				N.A.
Water purification infrastructure	10	1	10	Estimate based on LUX
Radon mitigation				Not included at this time
Electroforming				Located in another space
Intermediate Overburden Level				N.A.
Surface				N.A.
Lighting	22.7	0.7	15.9	Space by space summary
Miscellaneous receptacle loads	22.7	0.2	4.5	
Control room and office	5	0.7	3.5	
Air handlers	75	1	75	Extrapolated from LUX/MJ
Subtotal	224.3		179.4	
Chillers	112.2		89.7	50 percent of subtotal
Total (all on)	**336.5**	**Diversity**	**269.1**	

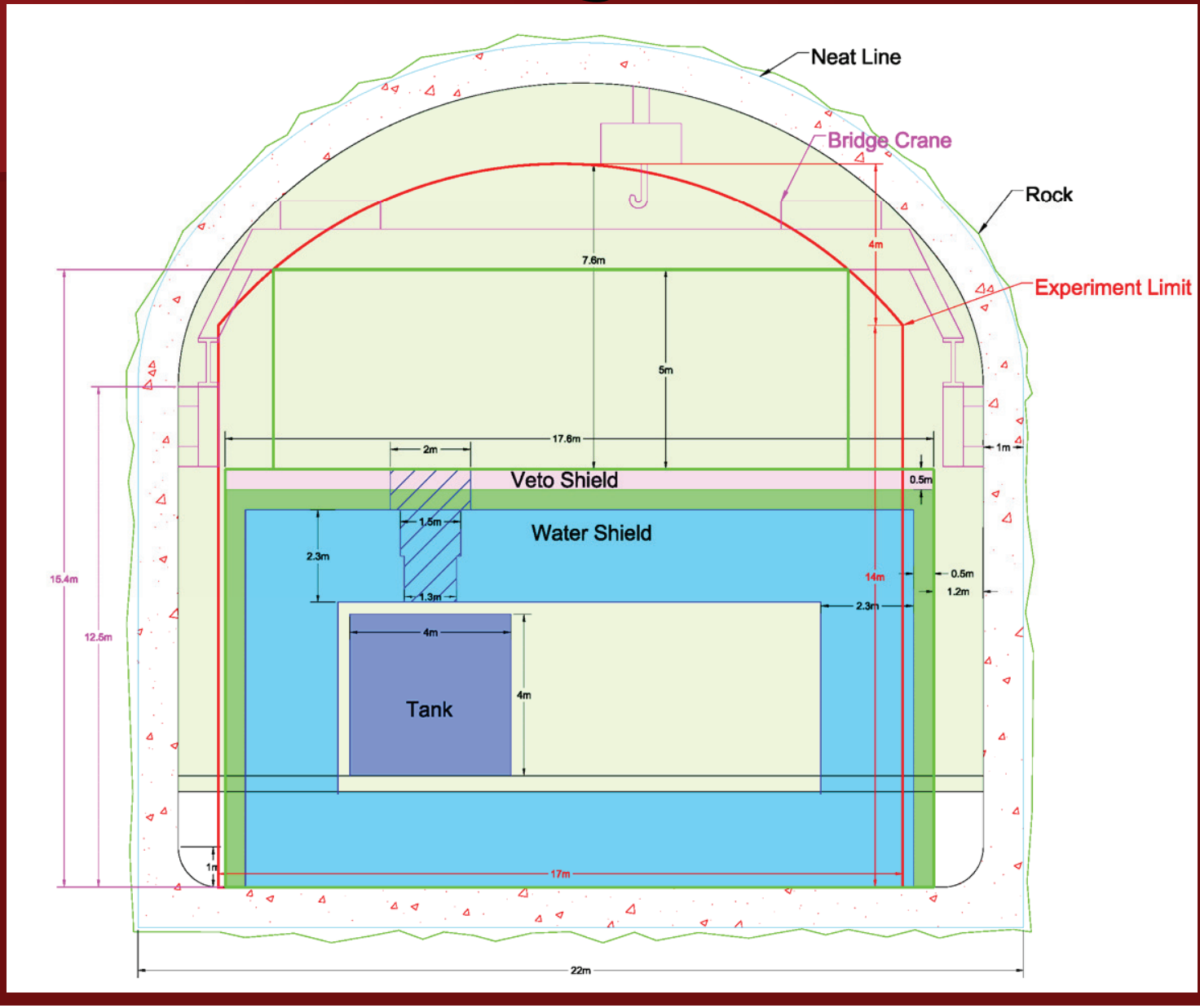
Layout Historical Perspective



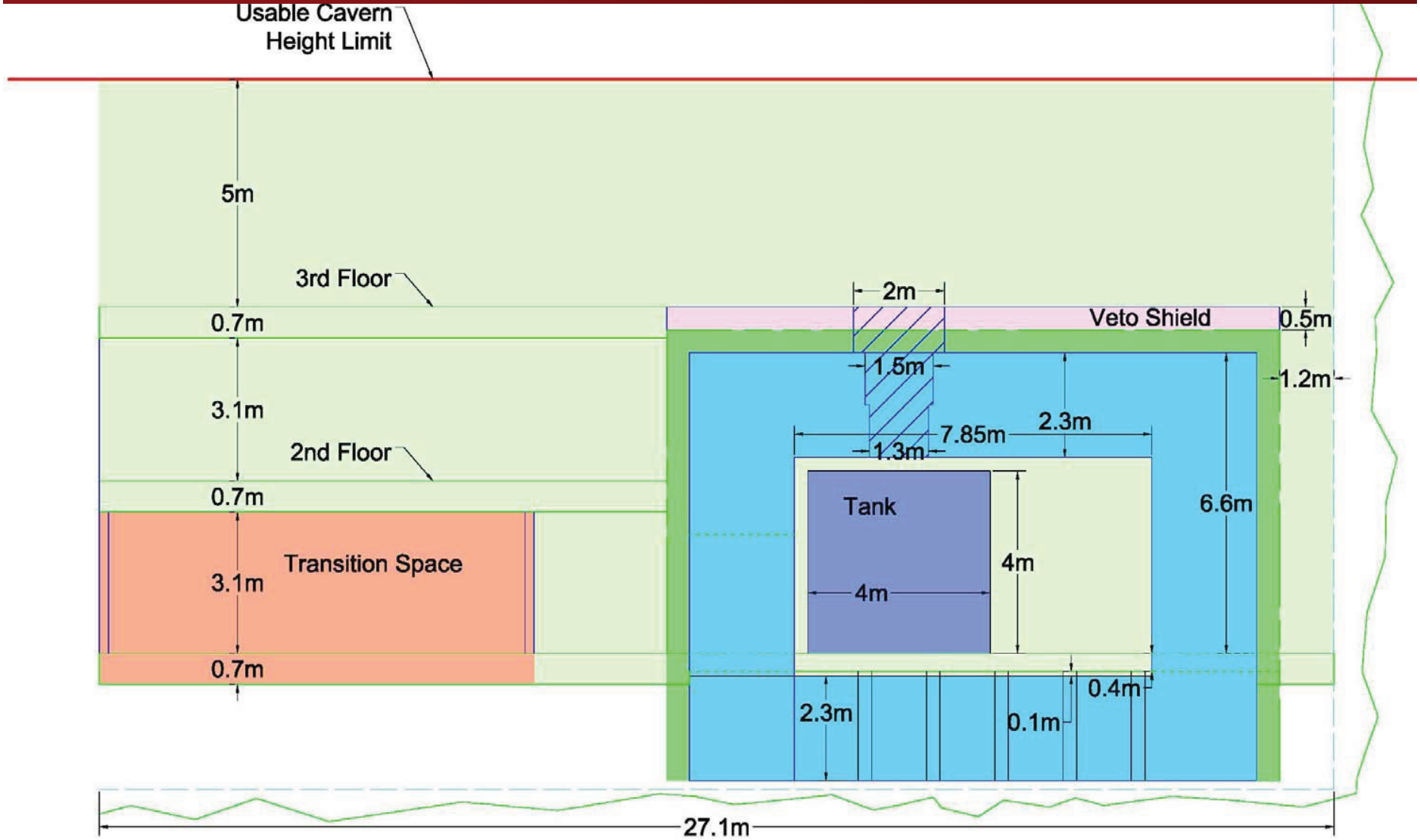
DUSEL-prescribed Cross Section



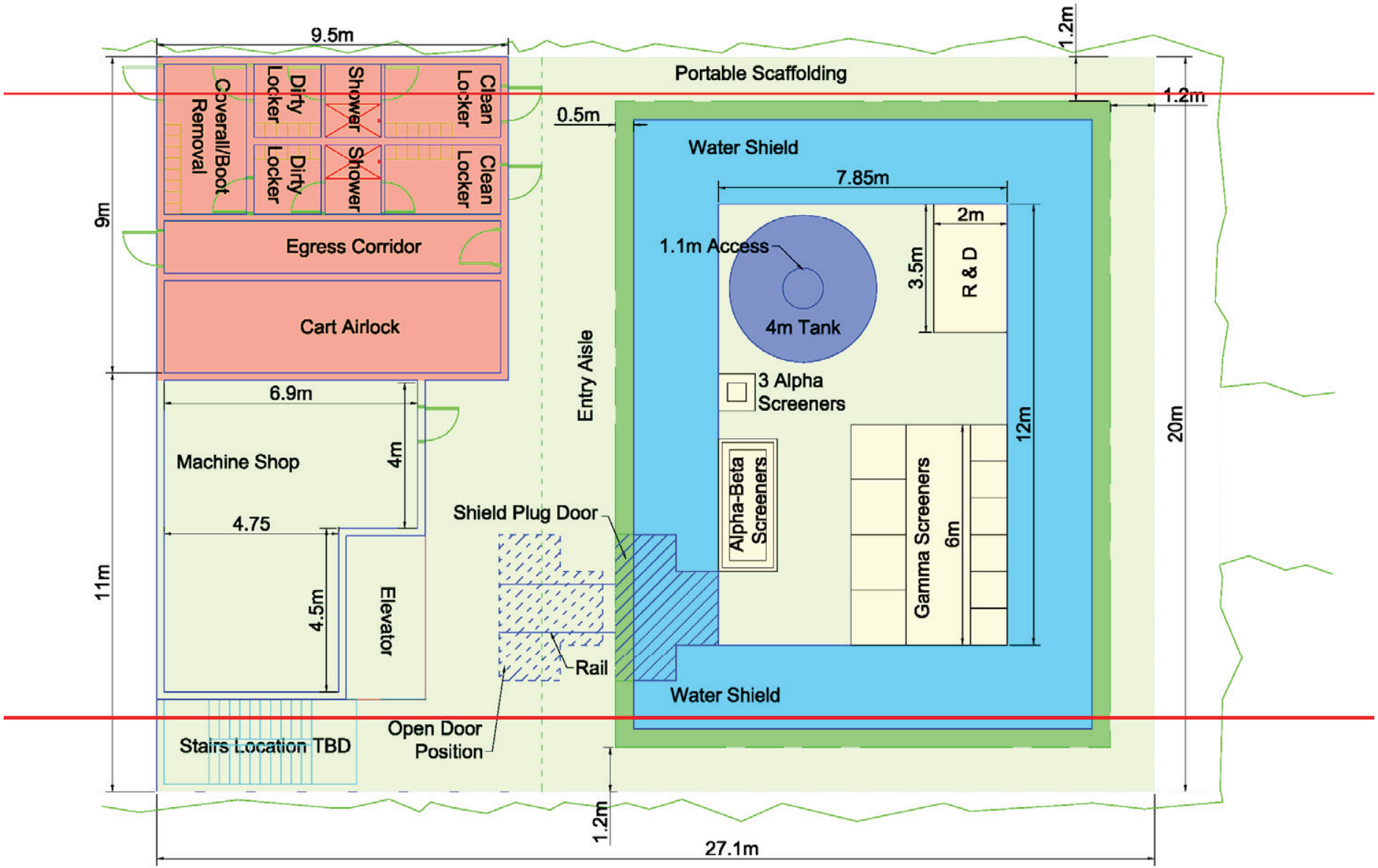
Section Through Water Shield



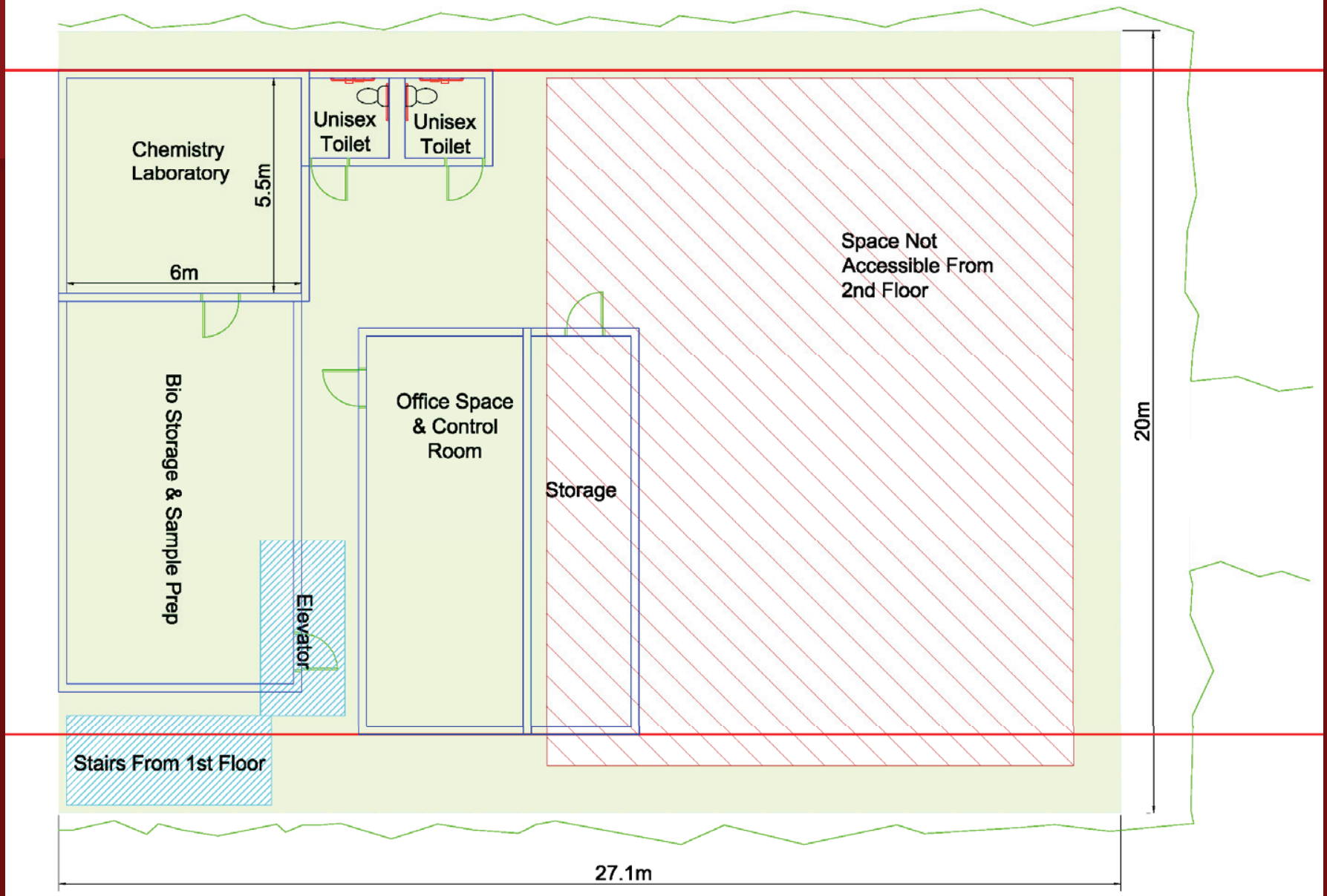
Longitudinal Elevation



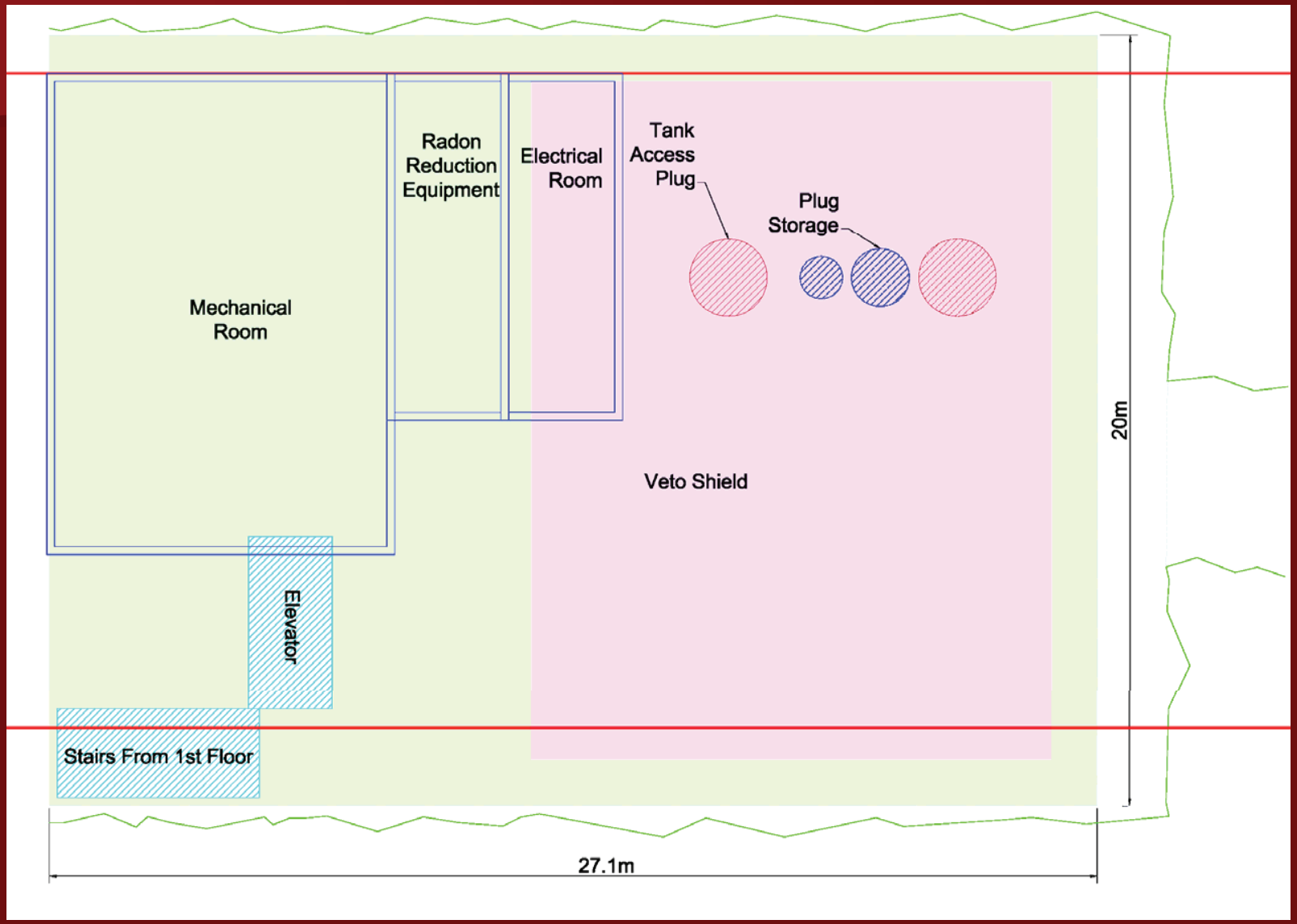
First Floor Plan



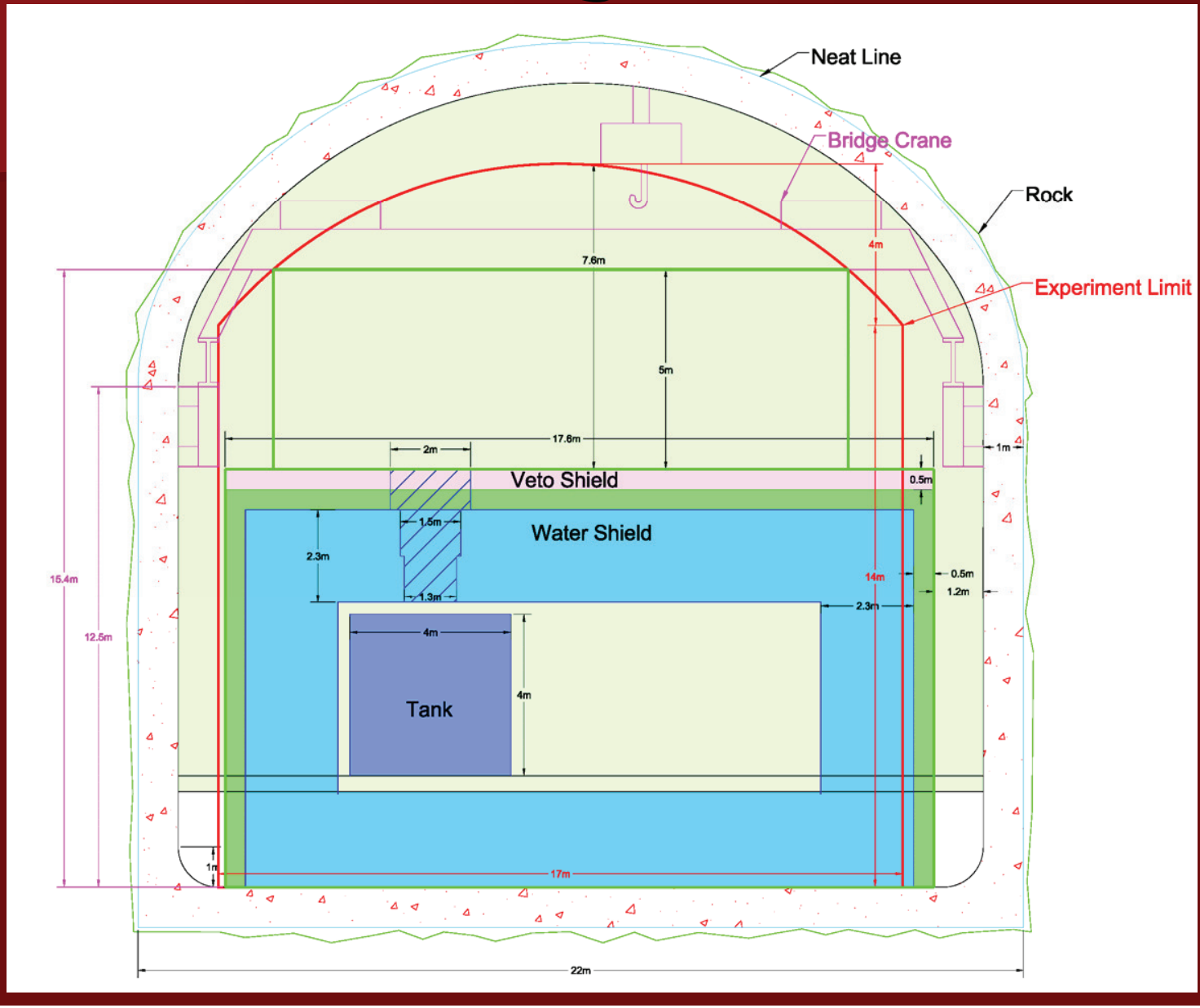
Second Floor Plan



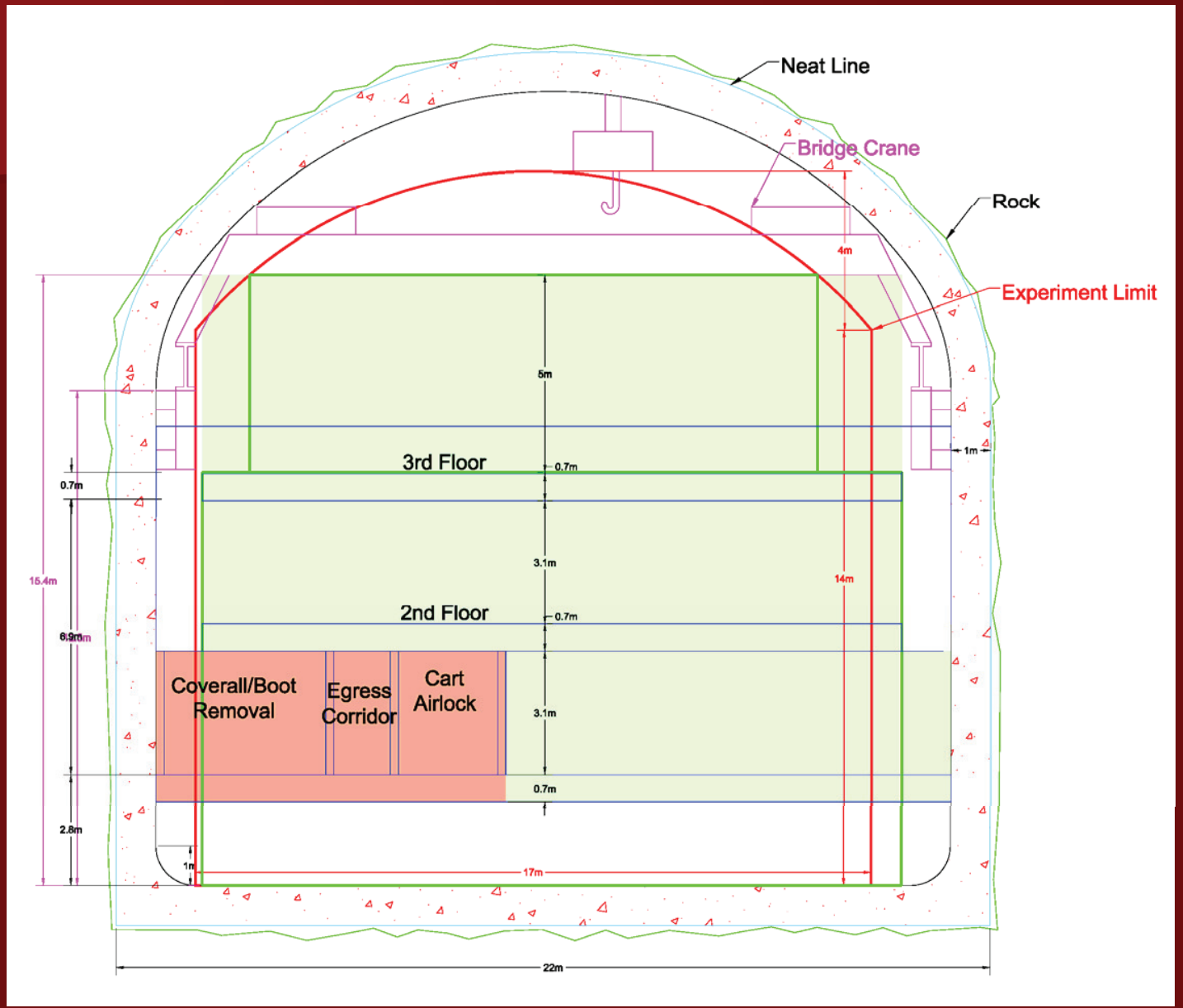
Third Floor Plan



Section Through Water Shield



Section Through Transition



Issues to Resolve

- Fit within prescribed width, length, height
- Resolve nature of space outside prescribed envelope
  - Total stay out, or
  - Some acceptable uses
  - Egress?
- Due to FAARM clean space, is separation wall necessary?
- Floor elevations and grade changes
- Material handling

Additional layout discussion?

Work Breakdown Structure

- Requirements Definition
- Conceptual Design
- Preliminary Design
- Final Design

WBS

- Procurement, Fab and Assembly
  - Experimental Apparatus
    - Water shield
    - Water shield instrumentation
    - Veto shield
    - Immersion tank
    - Ultra-pure water system
    - Gamma screeners
    - Alpha-Beta screeners
    - R & D and novel screeners
    - Cryogen systems
    - Radon system
    - Machine shop equipment
    - Chemistry lab equipment
    - Biology lab equipment

WBS

- Procurement, Fab and Assembly
  - Civil-Architectural
    - Site Preparation
    - Concrete
    - Masonry
    - Metal
    - Wood and Plastics
    - Thermal and Moisture
    - Doors and Windows
    - Finishes
    - Specialties
    - Equipment including material handling
    - Furnishings
    - Special Construction

WBS

- Procurement, Fab and Assembly
  - Infrastructure
    - Heating, ventilation and air conditioning
      - Air handlers
      - Chillers
      - Ducting systems
      - Radon removal
      - Clean class filtering
    - Fire Protection
      - Water-based sprinklers
      - Special sprinklers for selected areas
    - Plumbing
      - Sanitary
      - Grey water
      - Groundwater

WBS

- Procurement, Fab and Assembly
  - Infrastructure
    - Water Purification
      - Immersion tank
      - Water shield
    - Electrical
      - Clean power
      - Industrial power
    - Lighting
      - General
      - Task
    - Security System
    - Fire detection and alarm
    - Voice/Data Cabling & Data Network Equipment

Additional discussion?