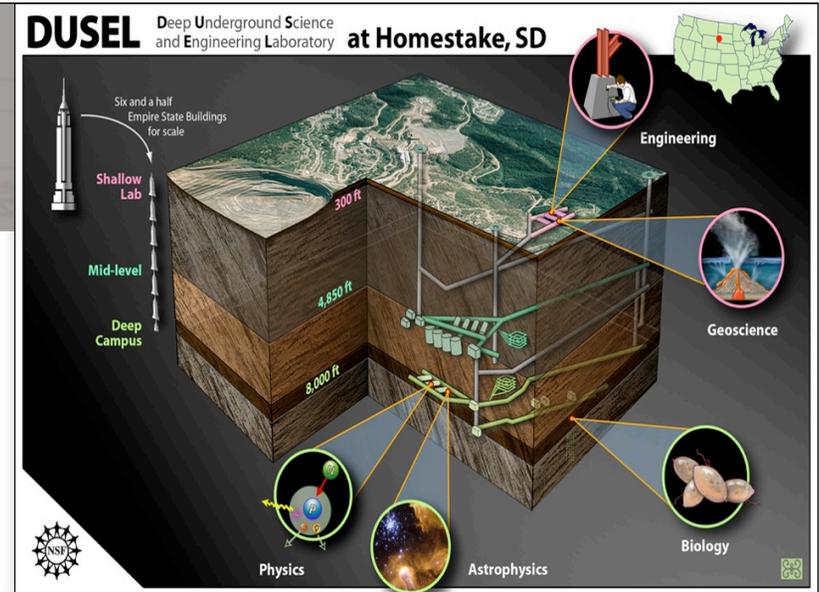




# Outline of Today's Presentation

- The DUSEL Project Update
  - Staff, Organization, Scope
  - Facility Design Efforts
    - Surface Facility
    - Underground Infrastructure
    - Geotechnical Inspections and Design
  - Sanford Lab Progress
    - 4850L & Davis Cavity
    - EIP
  - DUSEL's Science Program
- Summary



## v DUSEL Project Staff

- **Project Director - Design & Construction (UCB)**
  - Kem Robinson - 510 642 1973
- **Director - EH&S (SDSM&T)**
  - Susan Von Stein - 605 722 8650
- **Deputy Project Manager (SDSM&T)**
  - Mike Headley - 605 722 8650
- **Associate Project Director (UCB)**
  - Jim Yeck (start summer 2009)
- **Manager - Project Systems Support (UCB)**
  - Kurt Deshayes - 510 486 7866
- **Two Mining Engineers (SDSM&T)**



# v Project Offices

- **UCB Campus: Main DUSEL Project Office**
  - 2440 Bancroft Avenue, 3<sup>rd</sup> floor
    - 12 minute walk from BART (Berkeley)
    - 8 minute walk from UC Physics
    - 15 minute walk from LBNL (PD, NSD, ESD, ENG)
    - 2 minute walk from ~8 espresso bars
  - 10,000 square feet of offices
    - RES co-located with DUSEL
    - space for visitors - long and short term
- **SDSM&T Project Office, Rapid City Campus**
  - ready in August
  - 5000 square feet

# DUSEL Project Office in Berkeley



Physics

BART

DUSEL

Sproul Plaza

# Infrastructure, Facility, and Geotechnical Design/Site Assessment

- the Project is using contractors for initial assessments
  - Surface Facility Assessment and Design - HDR
  - Underground Infrastructure Assessment and Design - ARUP
  - Geotechnical Site Assessments for Large Cavities and Lab Modules (4850L) - RESPEC
- Contract expansions and new contracts established as funds are available
- Additional RFPs
  - Excavation Design - [open](#)
  - Lab Module Design and fit-out - [open](#)

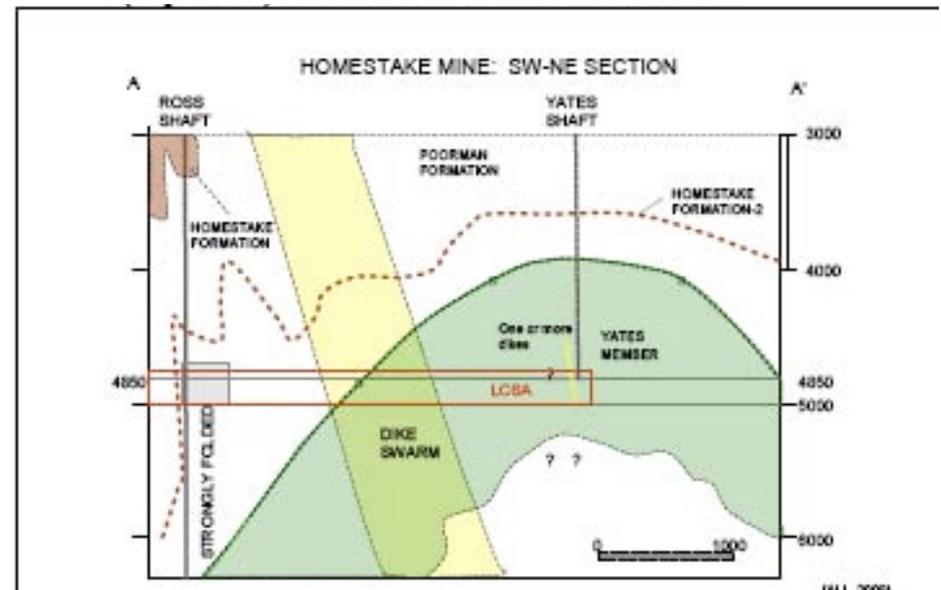
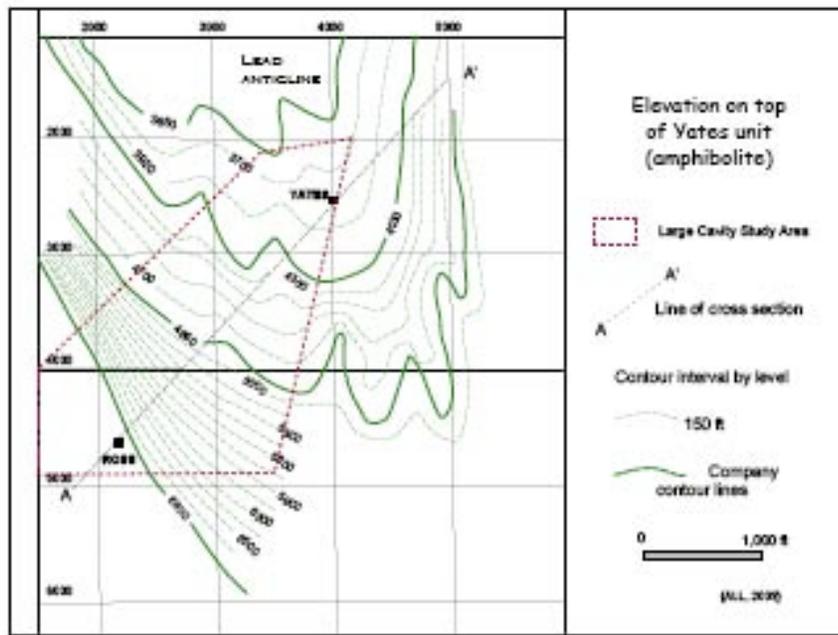
# Infrastructure, Facility, and Geotechnical Design/Site Assessment

- Geotech Site Investigations
  - 3D geological model developed ✓ (being refined)
  - laser mapping of the 300L completed ✓
  - 4100 to 4850L preliminary geological/structural mapping developed ✓ (addition work initiated)
  - coring and testings to initiate work on the 4850L in July/August
    - Lab Modules
      - preliminary siting & orientation
    - Large Cavity
      - Initial sites identified, to begin characterization
      - geotechnical investigation campaign initiated

# Geological Model

LONGSECTION OF THE HOMESTAKE MINE

- Developed with existing information and preliminary geological mapping ✓
- Additional mapping and refinement underway
- Geostructural Engineers engaged ✓



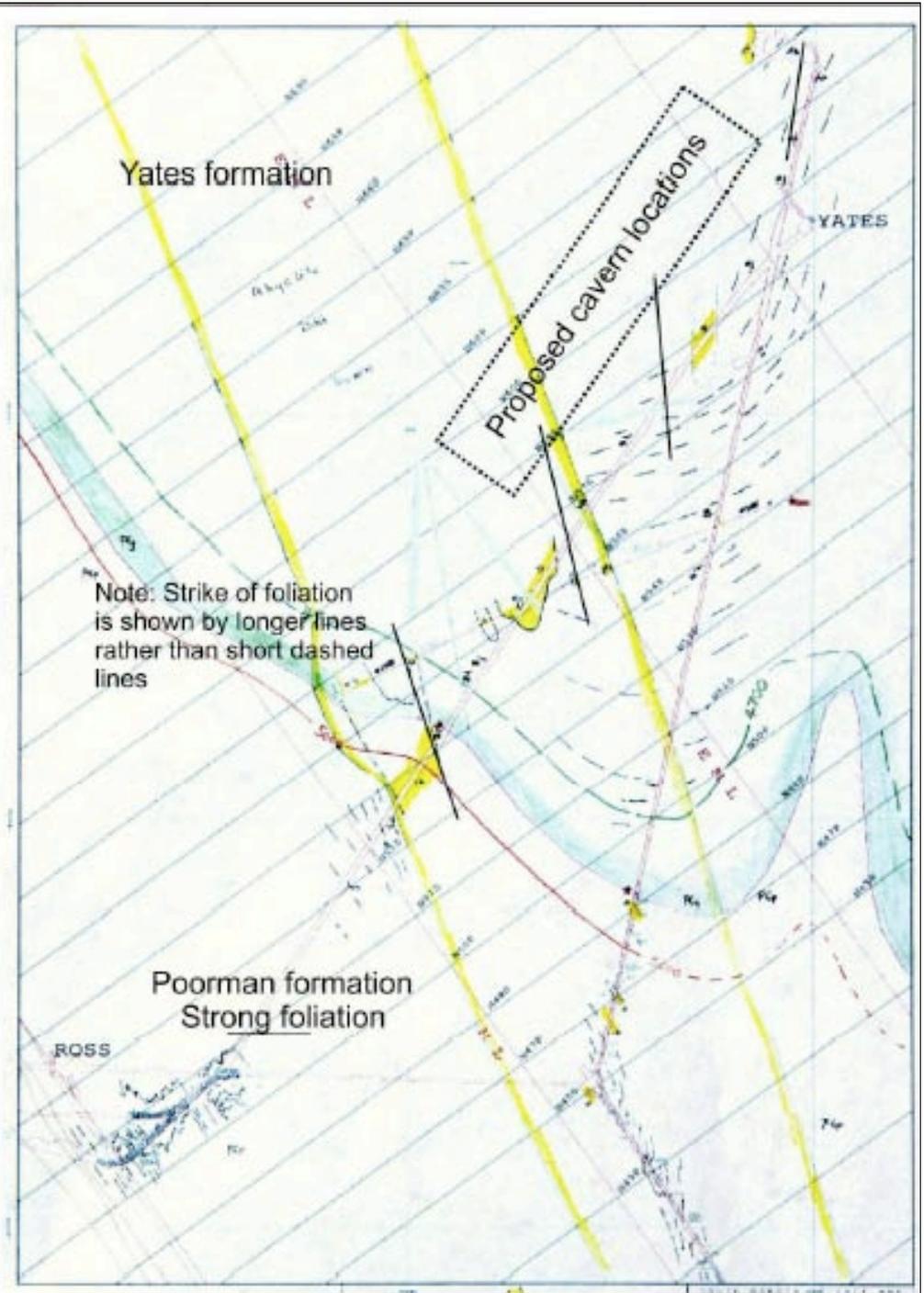
# Large Cavity Advisory Board and Geological Advisory Committee Meetings

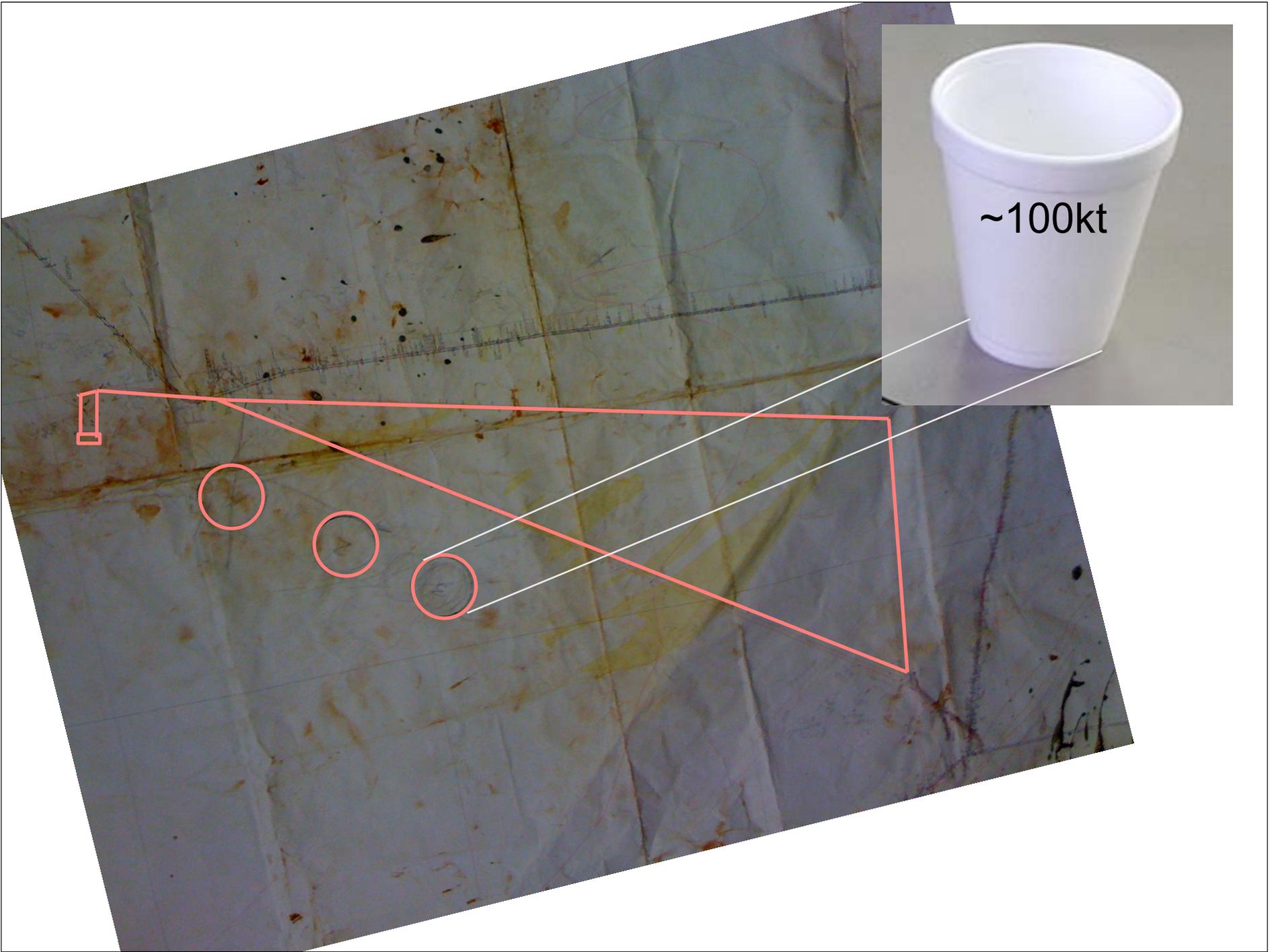
- Meeting in Lead, 6 - 11 July
- Reviewed Plans, Inspected 4850, 4100, 2000, ...
- ***It was clear from the week-long inspection/discussions that much progress has been made in developing and initiating a site investigation plan. The LCAB wishes to commend all of those involved in achieving this progress.***
- ***Based on the site inspections the LCAB is confident that the first 100 kiloton cavern, with a right cylinder configuration, can be constructed safely and economically in the more massive amphibolites of the Yates Member at the 4850 level. The general location would be to the west of the Yates shaft with one cavern diameter (approximately 60 meters) separating the cavern from the existing and planned drifts and caverns.***

# Large Cavities

LONGSECTION OF THE HOMESTAKE MINE

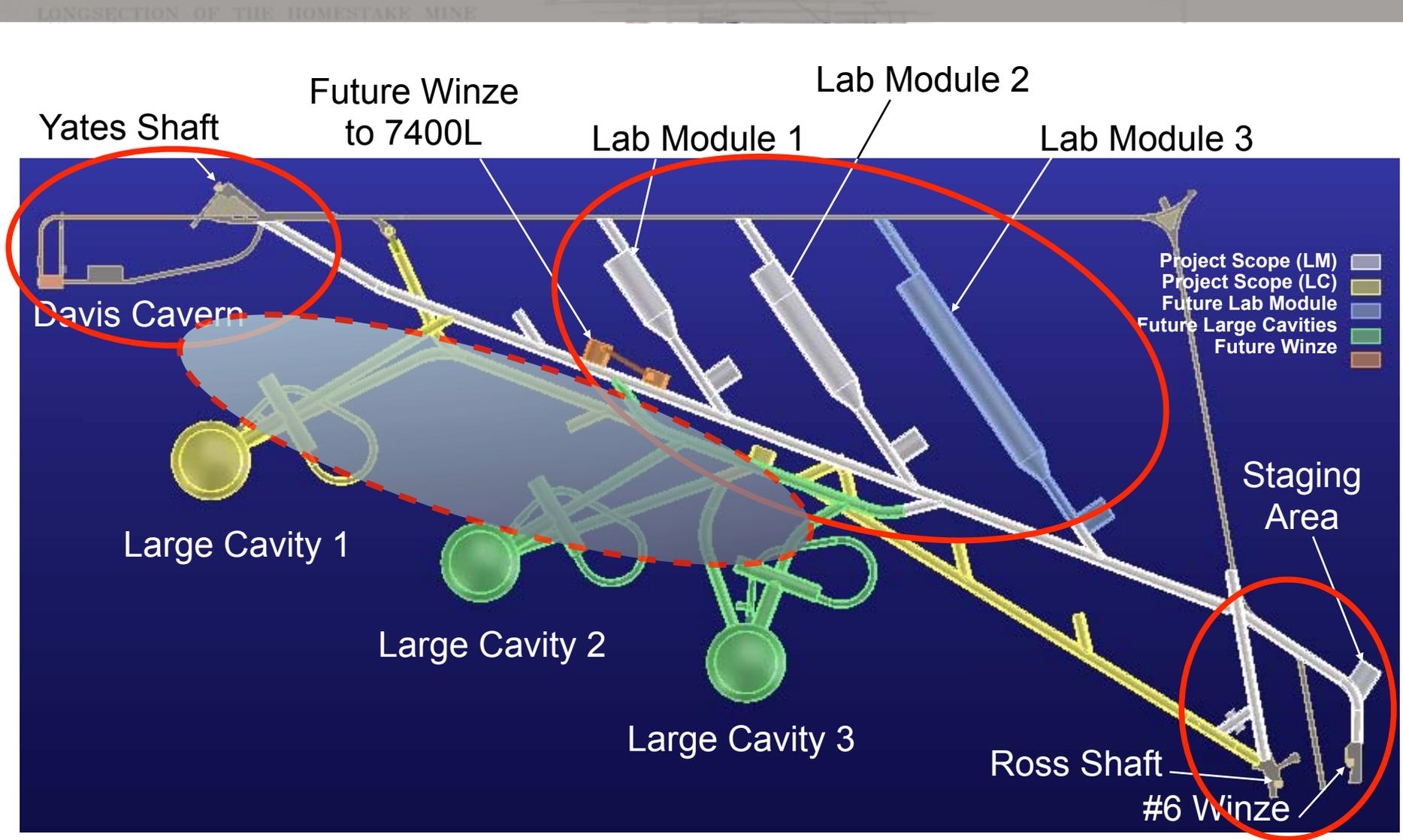
Working Map from LCAB Report





~100kt

# DUSEL 4850 Level Development: 3 Lab Modules, 1 Large Cavity & New Lower Winze



# LCAB continued...

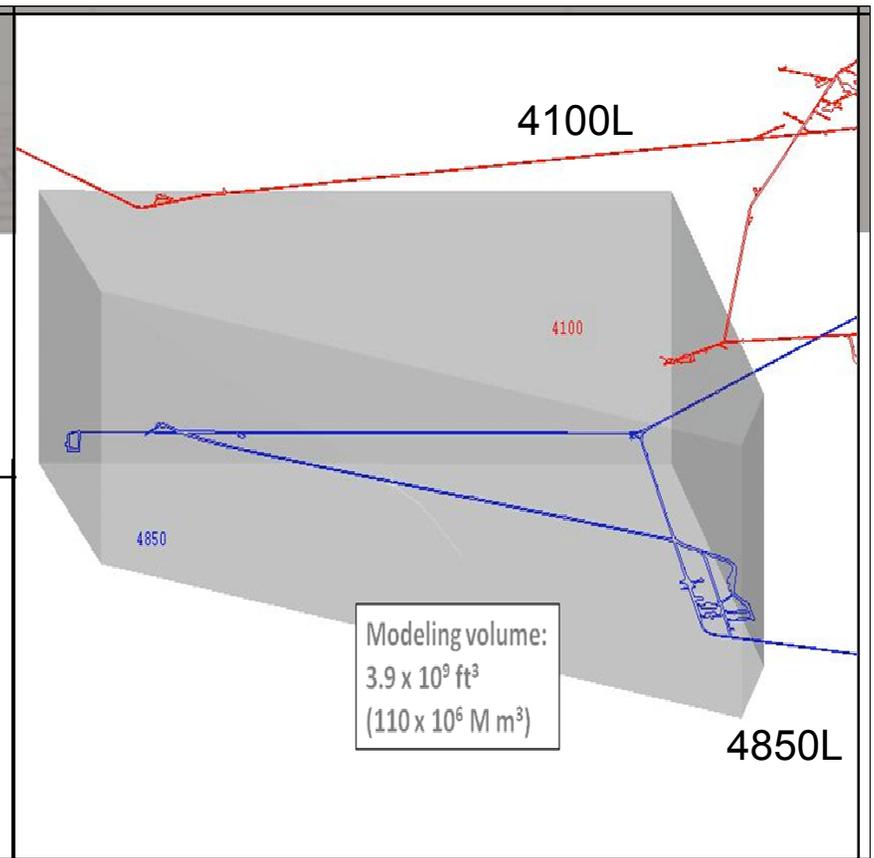
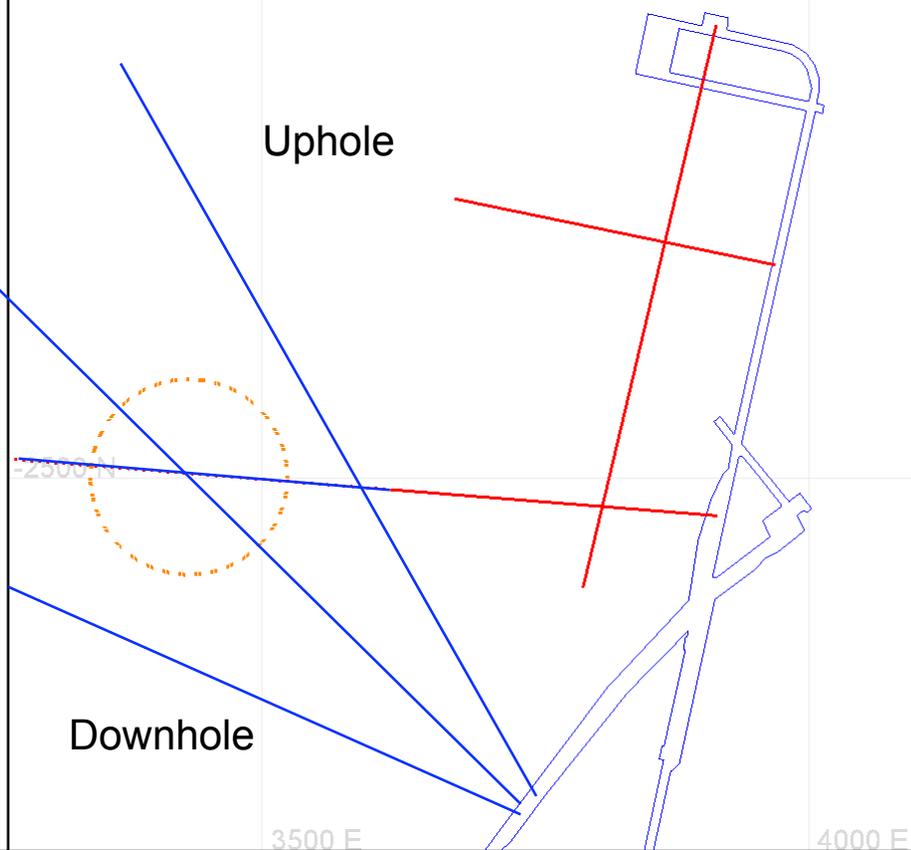
- *The mapping of geologic structures is critical in siting the large caverns. **The LCAB is pleased with the progress that has been made in providing a geological model for these structures and is supportive of the plan for experienced engineering geologists and Homestake geologists to work together to develop the geologic model for the site and to characterize the rock mass properties at the 4850 level.** The geologic mapping of the drifts to determine the location, orientation and character of geologic structures will serve as the basis for geologic interpretations of rock structures in the Yates Member in areas away from the drift. Drilling to the vicinity of the proposed cavern location will be used to confirm the rock mass conditions mapped at the drift. An exploratory drift should then be driven to the probable cavern location to provide more complete information on geologic conditions and to confirm and adjust the location of Large Cavern No.1 (LC1). **This exploratory drift should be constructed prior to finalizing the design for the cavern.***
- *The excavation/support sequence of the cavern is critical for the short (Excavation) and long (Operational) term stability of the cavern. The sequence described in the report permits the excavation and support of the cavern with the minimum of rock movement and relaxation of the surrounding rock stresses. **In all of the excavation sequences proper controlled blasting techniques must be employed.***

## LCAB Continued ...

- *During the discussions on cavern locations the LCAB was asked whether a 300 kiloton cavern in the shape of a “letterbox” could be accommodated in the same location as that proposed for the three 100 kiloton cylindrical caverns. Caverns of this letterbox shape and of the size required are widely used for underground hydroelectric powerhouses and the construction methodology is well established. There are some construction advantages for these excavation shapes as compared with the cylindrical shapes proposed for the 100 kiloton caverns and **the LCAB is confident that a single 300 kiloton cavern could be constructed safely and efficiently in the Yates Member if required.***

# Next steps ... more mapping and testing

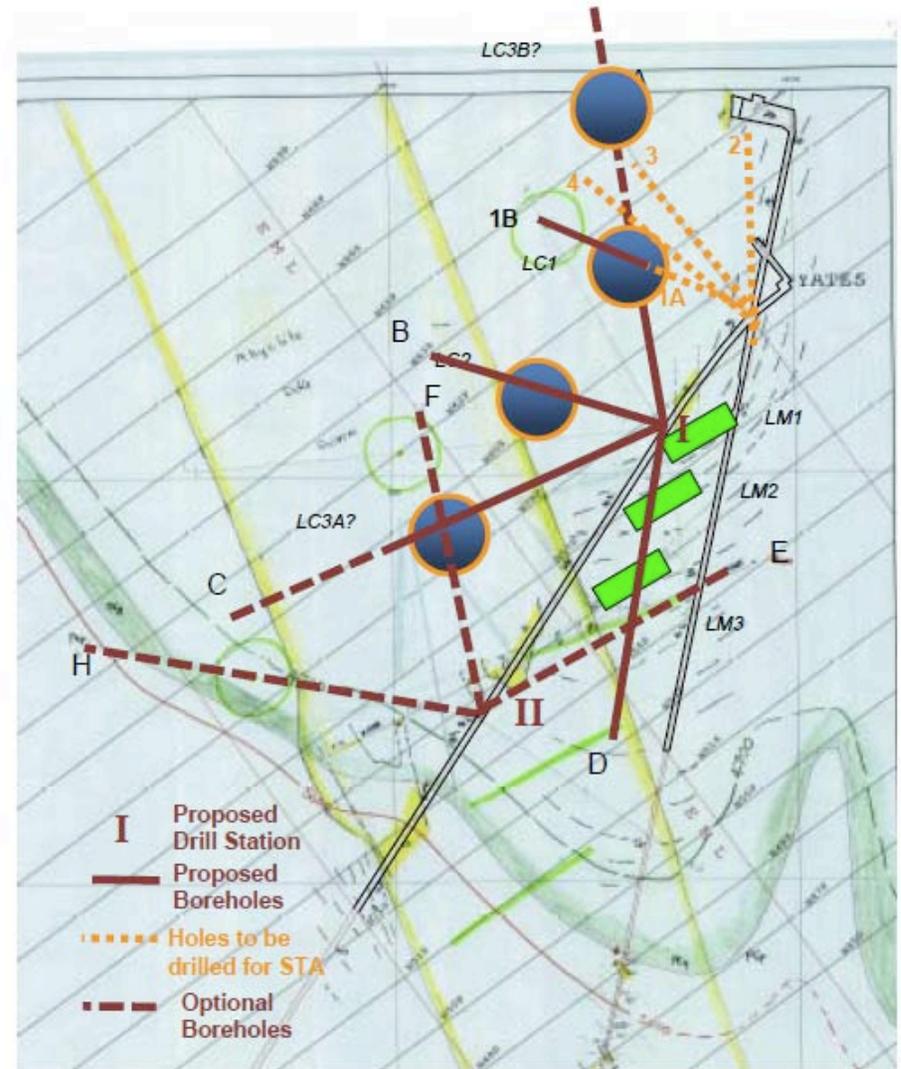
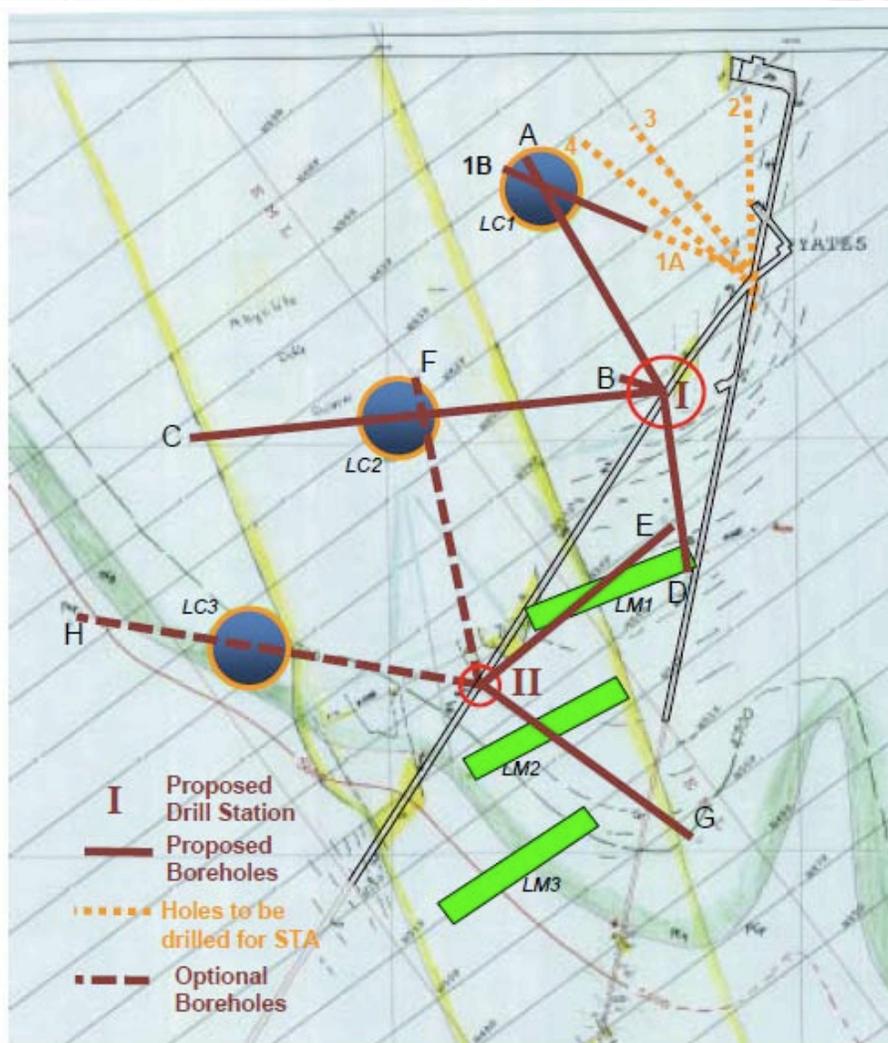
LONGSECTION OF THE HOMESTAKE MINE



Additional holes to be obtained to survey the surrounding area.

Precise coring locations and sequencing being determined.

# Additional coring and testing to be conducted in the vicinity of LC1



Locations of the cores, tests, and sequencing being refined

# Infrastructure, Facility, and Geotechnical Design/Site Assessment

- **Surface Facility**

- building assessments - 14 buildings initially

- infrastructure

- power
- sewers
- water
- IT
- roads
- security
- ...

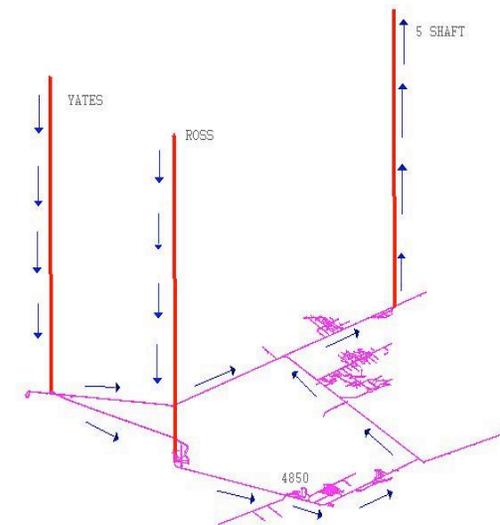
- preliminary assessment report completed ✓  
to be followed by preliminary design for upgrade  
and estimate



# Infrastructure, Facility, and Geotechnical Design/Site Assessment

- **Underground Infrastructure Assessment**

- hoists & motors
- shafts
- ventilation
- ground conditions
- utilities
- life and fire-safety plans
- level inspections and documentation
  - ground conditions
  - hazard assessments
  - mitigation plans drafted



# Infrastructure, Facility, and Geotechnical Design/Site Assessment

- Following initial geotechnical siting and infrastructure assessments this summer
  - excavation design - RFP out ✓
    - lab modules 4850 (extrapolated to 7400)
    - large cavity
  - lab module, LC design and buildout - RFP out ✓
    - using current (initial) requirements
- Extensions to existing contracts and additional contracts being negotiated/developed
- Education and Outreach Design integrated into Surface and Underground efforts

# Infrastructure, Facility, and Geotechnical Design/Site Assessment

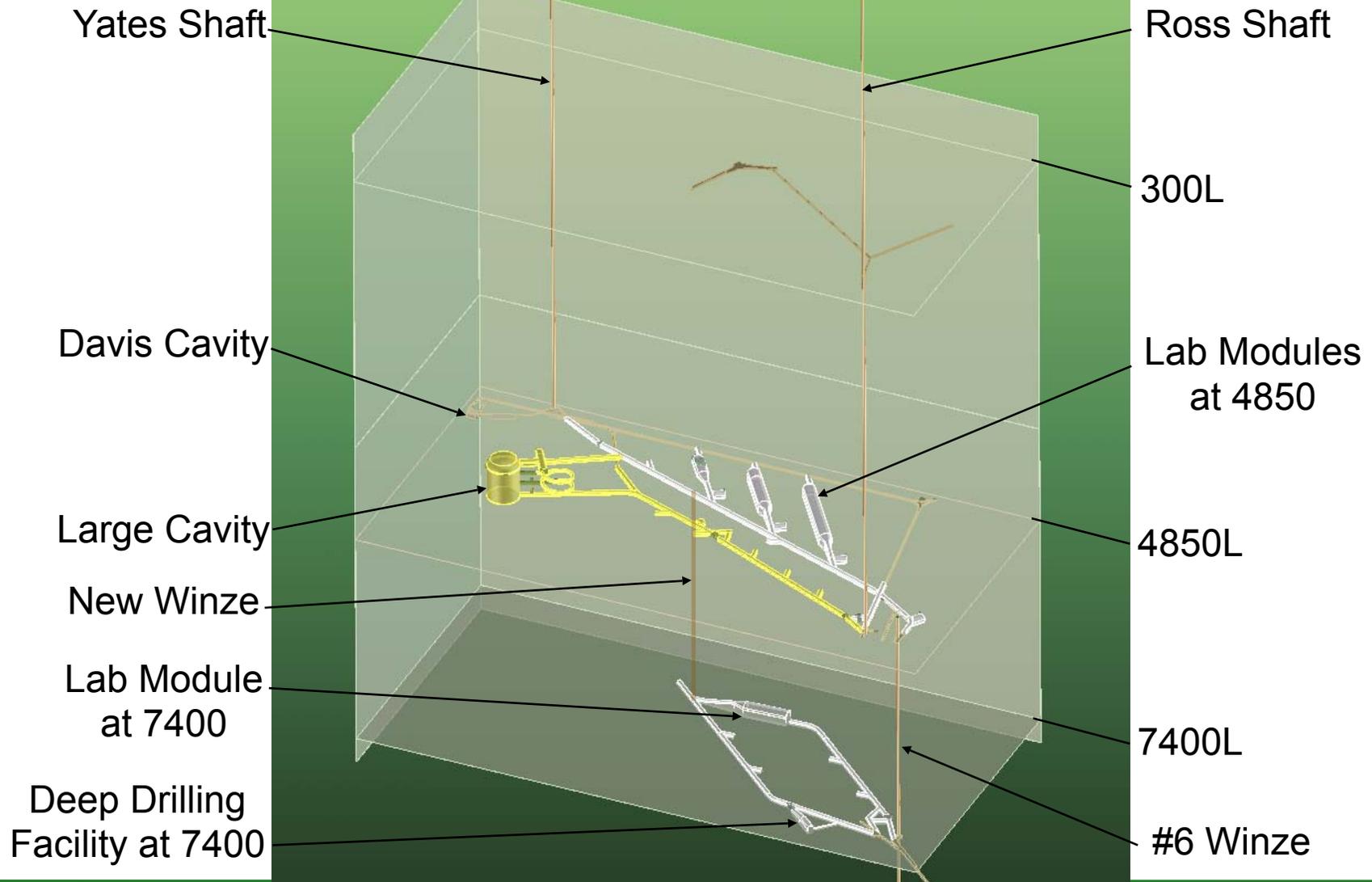
- **Safety Codes and Plans**
  - documentation developing
  - OSHA requirements and codes established
  - safety program in place
    - no lost-time injuries in 2009
    - significant increase in activity on the site
  - Emergency Response and Life Safety Programs in place, additional development for DUSEL required
- **Individuals planning > 5 days on site should**
  - enroll/take OSHA 30 hour course + local orientation
  - 10 hour OSHA course + local orientation for short stays

# Infrastructure, Facility, and Geotechnical Design/Site Assessment

- Environmental Impact Statement work initiated
  - ANL (environmental division) lead with NSF
    - draft schedule
      - NOI Summer 2009
      - Scoping meetings Summer 2009
      - Draft EIS Fall 2010
      - ROD Late 2011
    - (clearly the ISE impacts the EIS)
    - first meetings occurred in Berkeley and Lead ✓
- Significant Cultural Outreach efforts continuing ✓

# DUSEL Preliminary Underground Campus Development, MREFC Scope

LONGSECTION OF THE HOMESTAKE MINE



# South Dakota and Sanford Lab Participation in Preparing for DUSEL

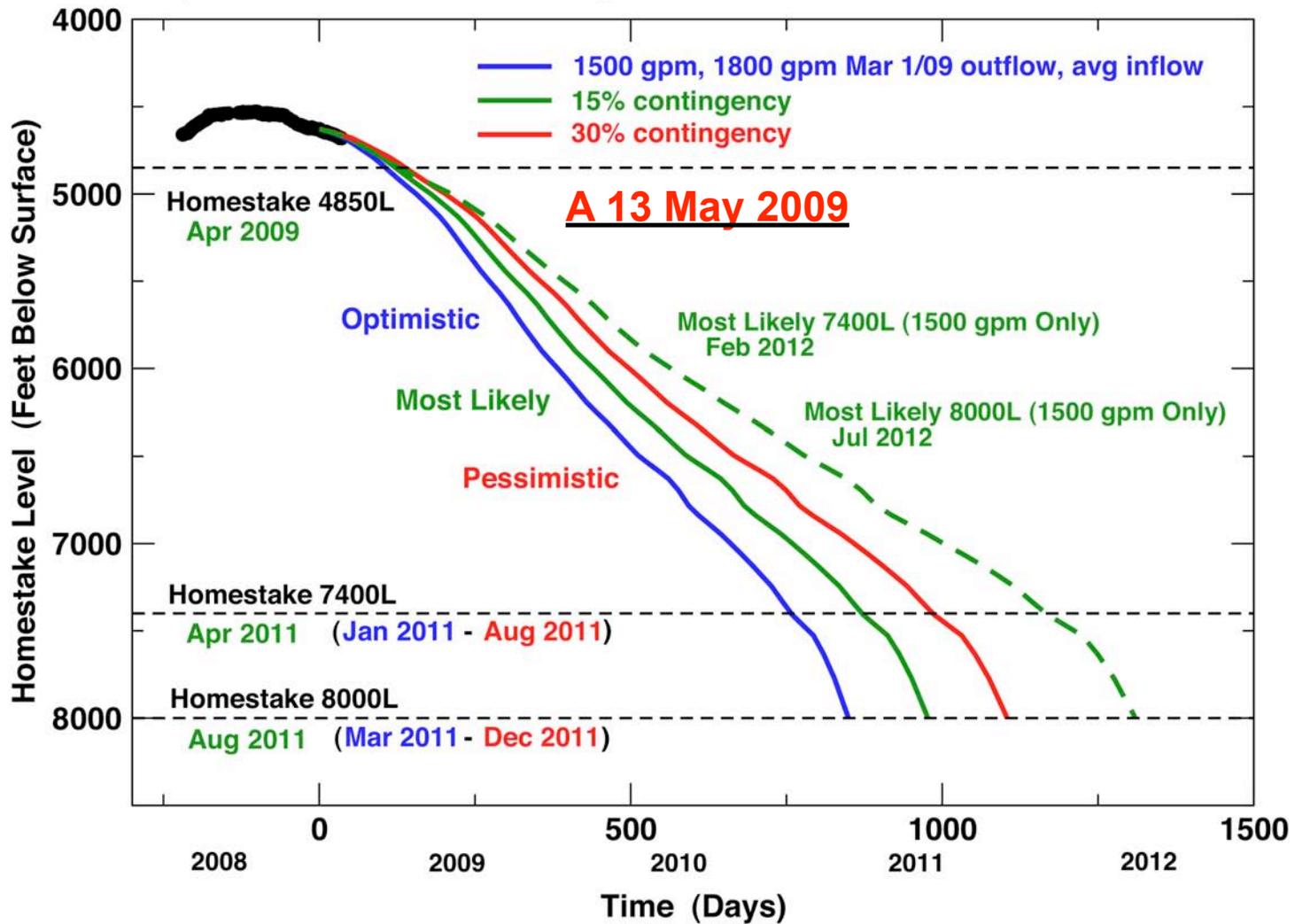
- Major Financial Support from the State of South Dakota
- Partnership to “achieve DUSEL”
- DUSEL assimilates Sanford Lab at MREFC Construction
- Facility Work Initiated (Site Preparation and Risk Reduction)
  - Rehabilitation of Surface and Underground Infrastructure
  - Initial Operations, Environmental, and Safety Programs
  - Trained, Skilled Workforce
  - Early Science Program
- Additional Efforts for DUSEL underway
  - Rock Disposal Sites - *Agreement in Principal* with Barrick to use the “Open Cut”, alternative sites identified
  - Coordinated Drilling and Drifting Programs



# Dewatering Projection to 7400L and 8000L

## DUSEL Dewatering

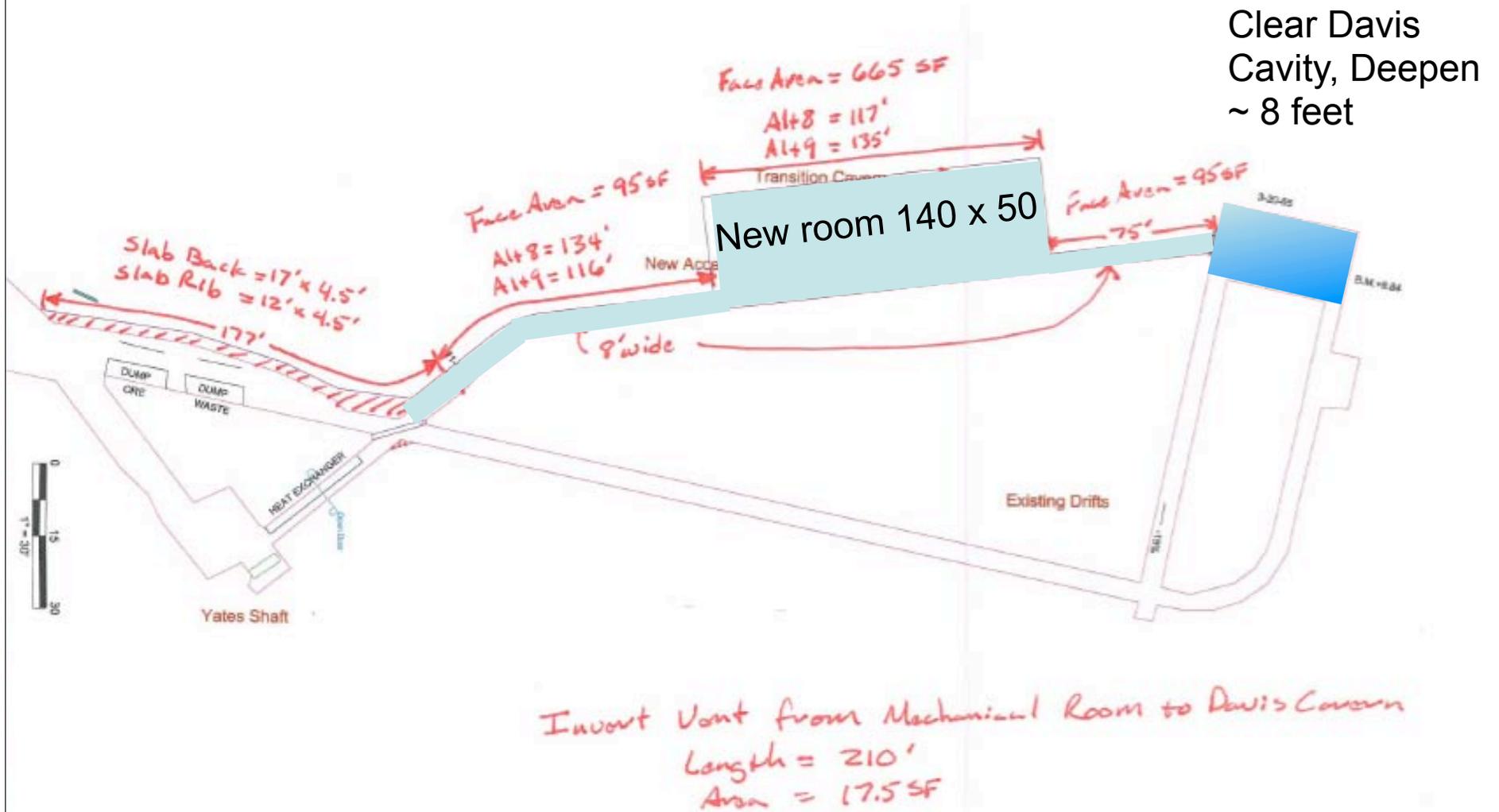
Projection for the 8000L starting Dec 1/08 based on the Barrick mine model





# Davis Cavity, New Room & Access Drift

LONGSECTION OF THE HOMESTAKE MINE



# Sanford Lab's Early Science Program

- LUX Dark Matter Experiment
- Majorana Demonstrator (DBD)
- *Low Background Counting*
- *Low Background Xtal Growth*
- BioGeoEng
  - Seismic arrays
  - Biology
  - ...
- DUGL - seismic assessment (for potential future gravity wave experiments)
- Education and Outreach

# DUSEL's Integrated Suite of Experiments being defined

- **S4 collaborations are being contacted by NSF**
  - notice of intention to fund
  - cooperative agreements with the NSF
  - coordination with the facility team
  - flexibility in preparing the MREFC
    - in particular phasing of the design of the ISE wrt facility
- **Meeting in Lead for S4 PIs and potential ISE collaboration leaders**
  - 1-3 October 2009

# ISE workshop: 1 - 3 October

1. Foster and develop experimental programs at DUSEL
2. Hear status updates from the agencies, the facility, and from the large cavern activities.
3. Understand the timeframe needed for deliverables for the MREFC.
  - a. Allow S4 awardees, S5 proponents and others the opportunity to meet.
  - b. Search for commonalities that may influence the MREFC.
  - c. Explore E&O interactions
4. Explore S5 possibilities
  - a. Ideas beyond S4
  - b. Longer term development
5. Explore locations for specific experiments utilizing the Vulcan database and go underground to site these experiments and to inspect the facility.

# Facility Interactions w/ S4 Collaborations

- **Project team is contacting S4 awardees**
  - Lesko - 510 642 0147
  - schedule initial discussions between science collaborations and facility team
    - MREFC deliverables and schedules
    - toolboxes
    - requirements and reviews
- **Project is migrating to a new document server**
  - Establishing open folders with documents suitable for the different collaborations and general science
  - Purchased and being installed on hardware in July
  - LBNE folders will be a high priority

# Summary of DUSEL Progress

- Substantial growth of the DUSEL organization
- Good progress in facility development
- Integrated Suite of Experiments being defined
- Interactions with Science beginning
- First steps being taken at the 4850L including establishing the Sanford Lab and its EIP

