Scope Definition Input for RFP

4850 Level

Supporting Information and Relevant Graphics

(May 9, 2008)

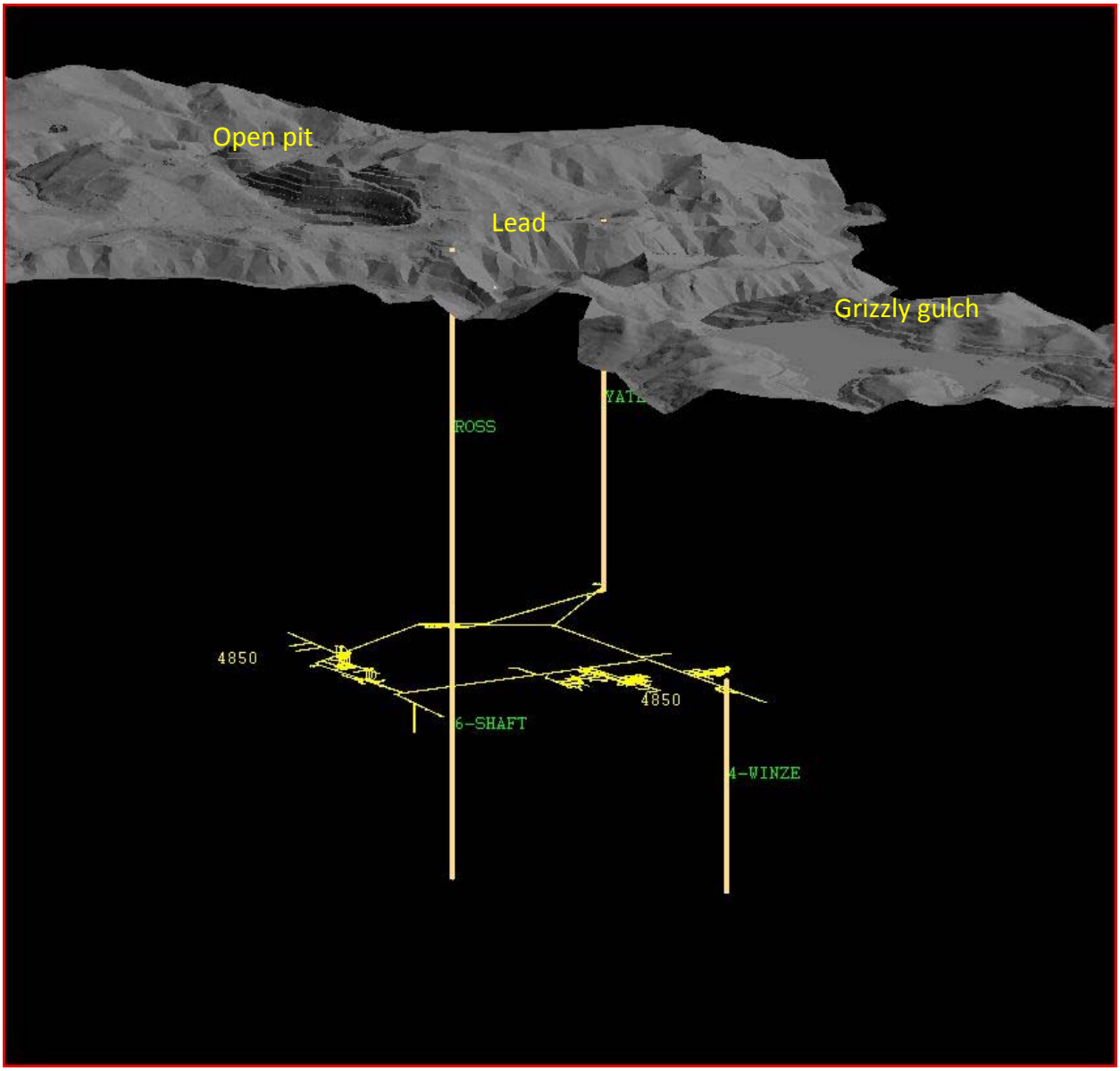

Fig. 1 Homestake Mine – 4850 level in relation to topography and main shafts (Homestake original data base).

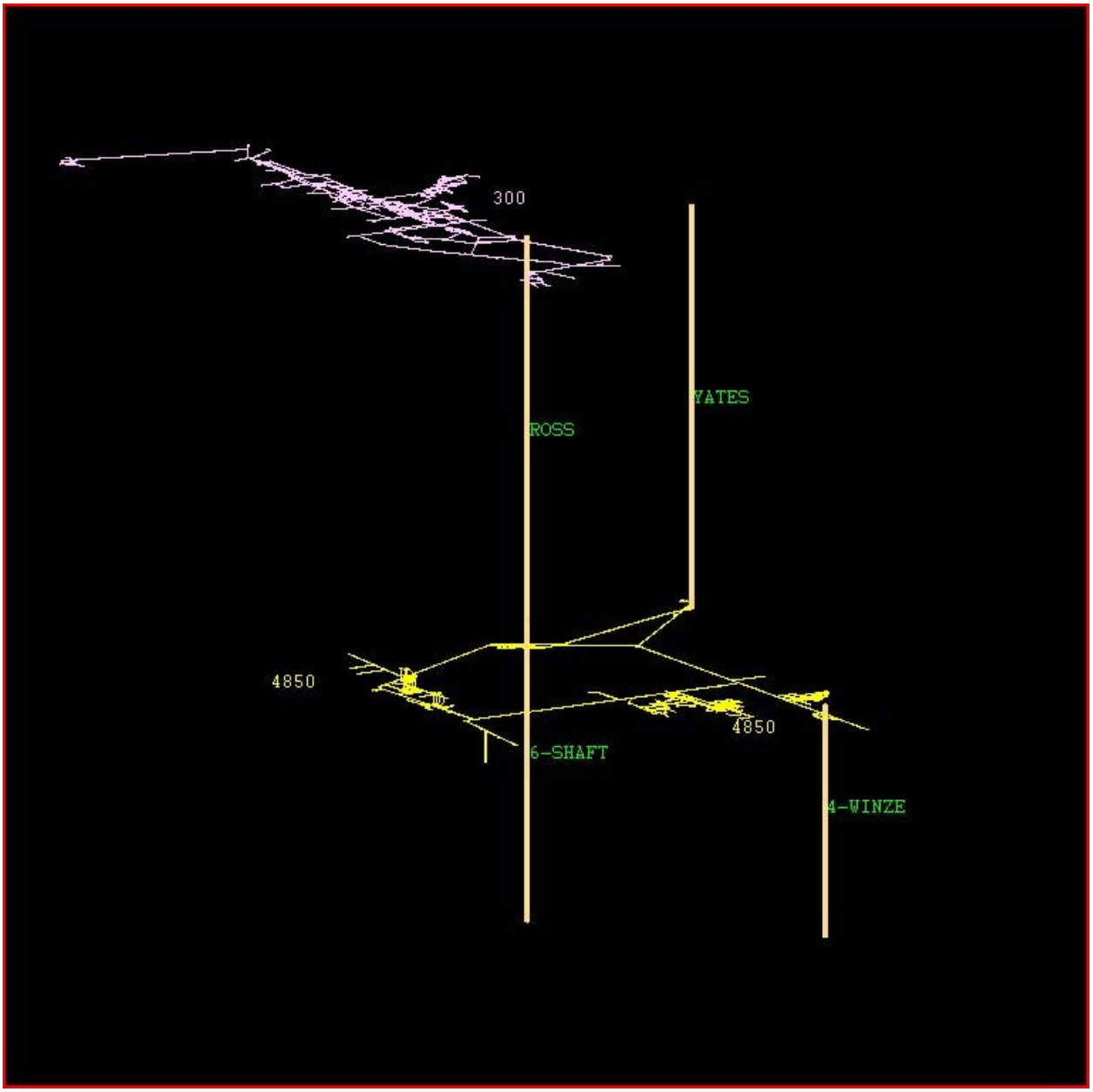

Fig. 2 Homestake Mine – 4850 level in relation to the 300 level (Homestake original data base).

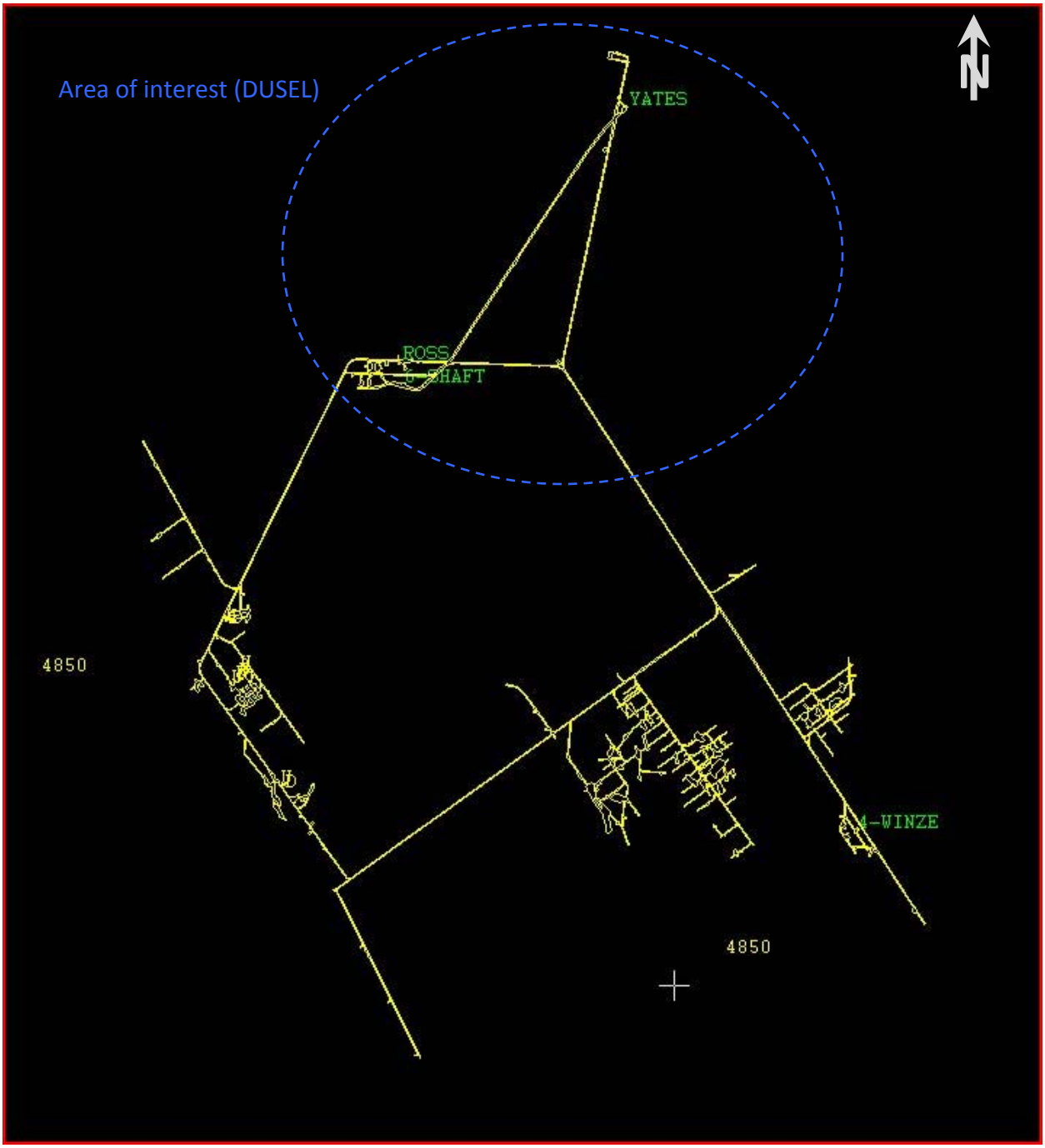

Fig. 3 Homestake Mine – 4850 level in plan view (Homestake original data base).

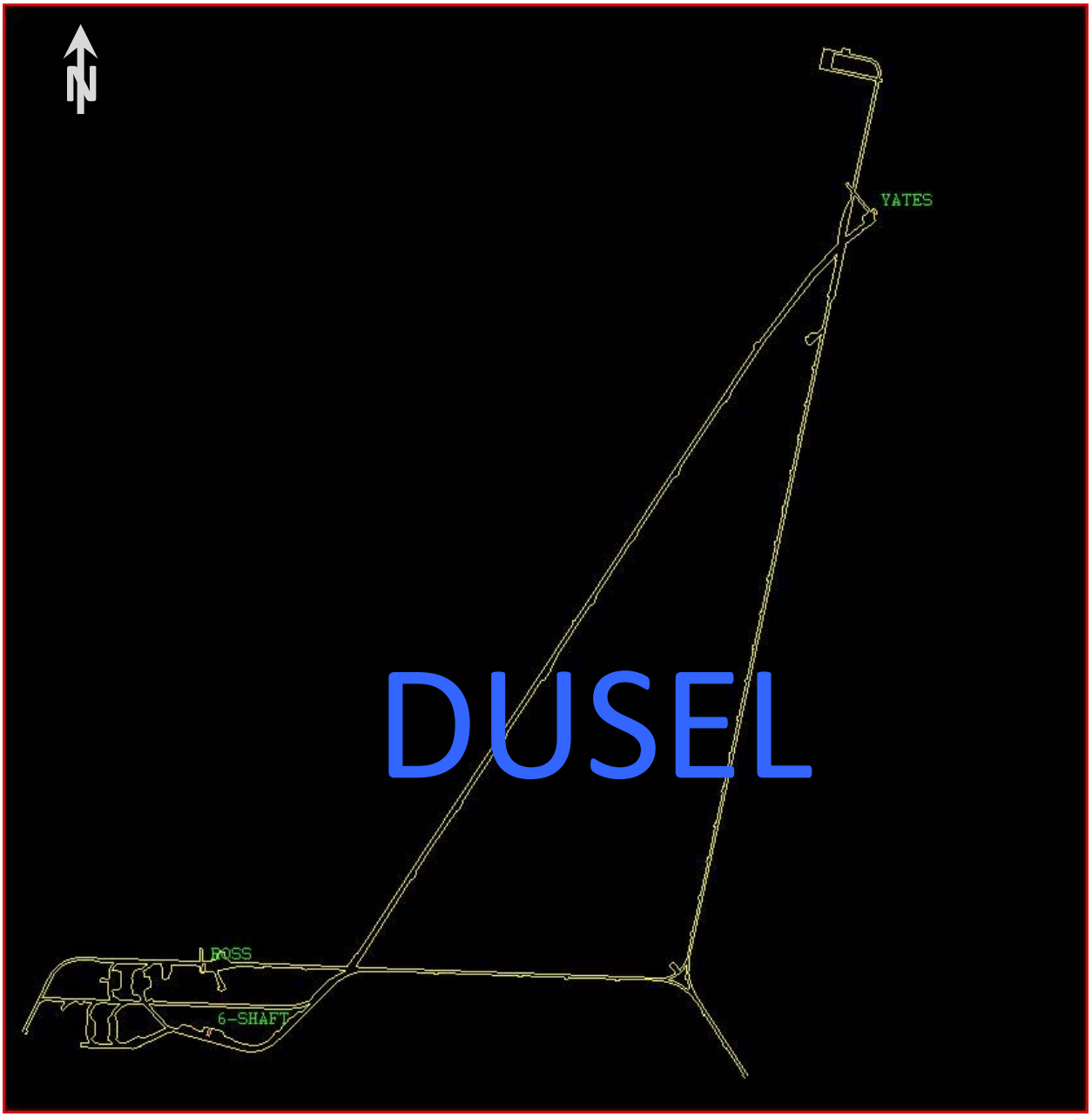

Fig.4 4850 level - area of interest (DUSEL mid level)

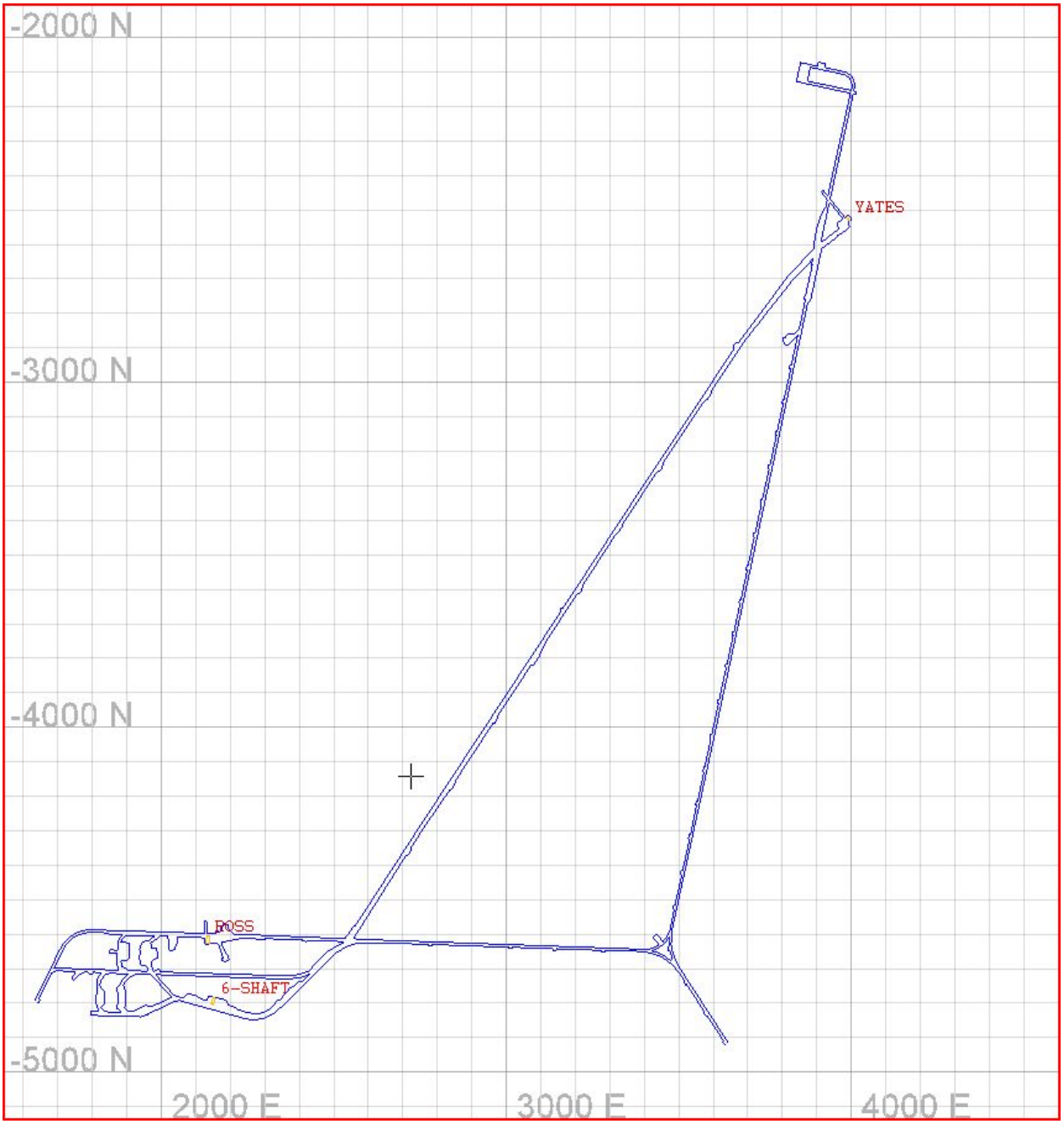

Fig.5 4850 level - area of interest (DUSEL mid level)

Note: Local coordinate system in feet with false orirgin.

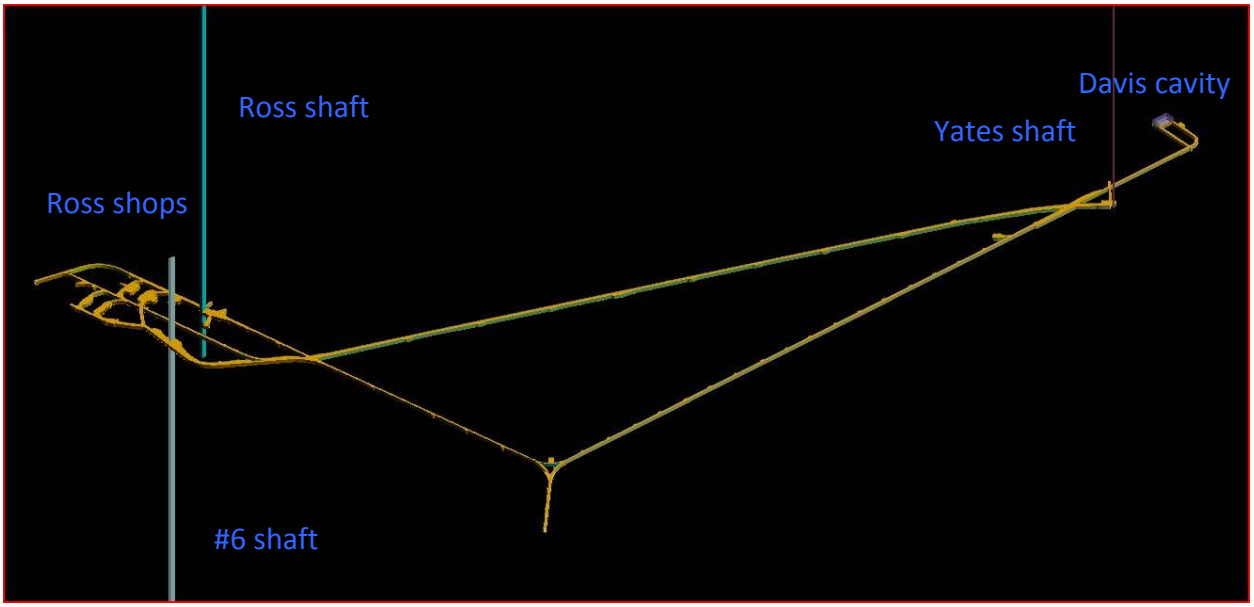

Fig.6 4850 level - area of interest (3D model)

Note: 3D models presented in this document were developed by Zbigniew J. Hladysz (SDSM&T) utilizing Vulcan software (Maptek, Inc.). See the appendix on the modeling accuracy of the Homestake vector data. The existing excavations at Homestake were modeled based on the original (historical) data acquired from the Homestake Mining Company in 2001-2003. All data points and strings used were in vector format (Vulcan data base). No new surveys and measurements have been performed since then.

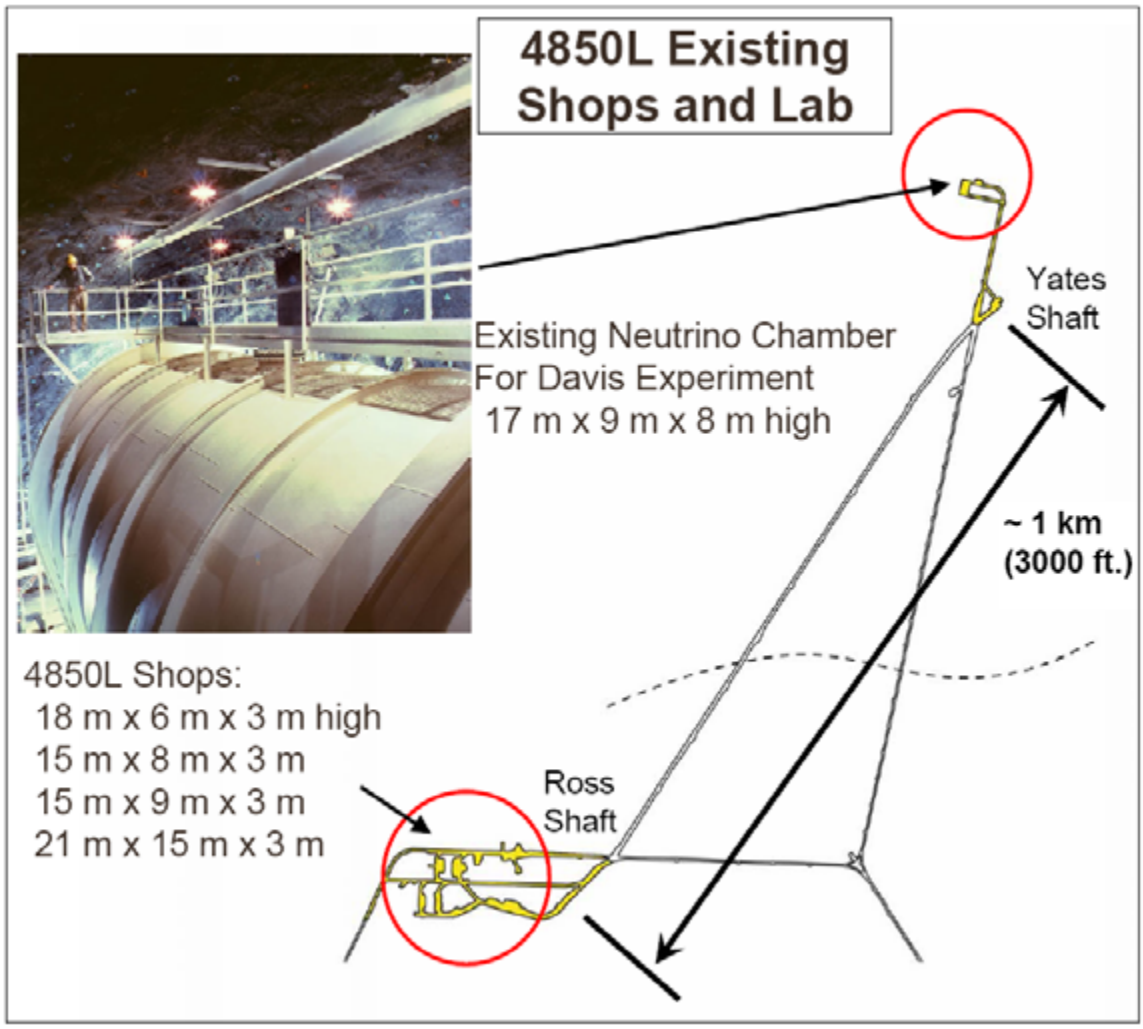

Fig.7 Existing excavations at 4050 – Davis Cavity (CDR 2007)

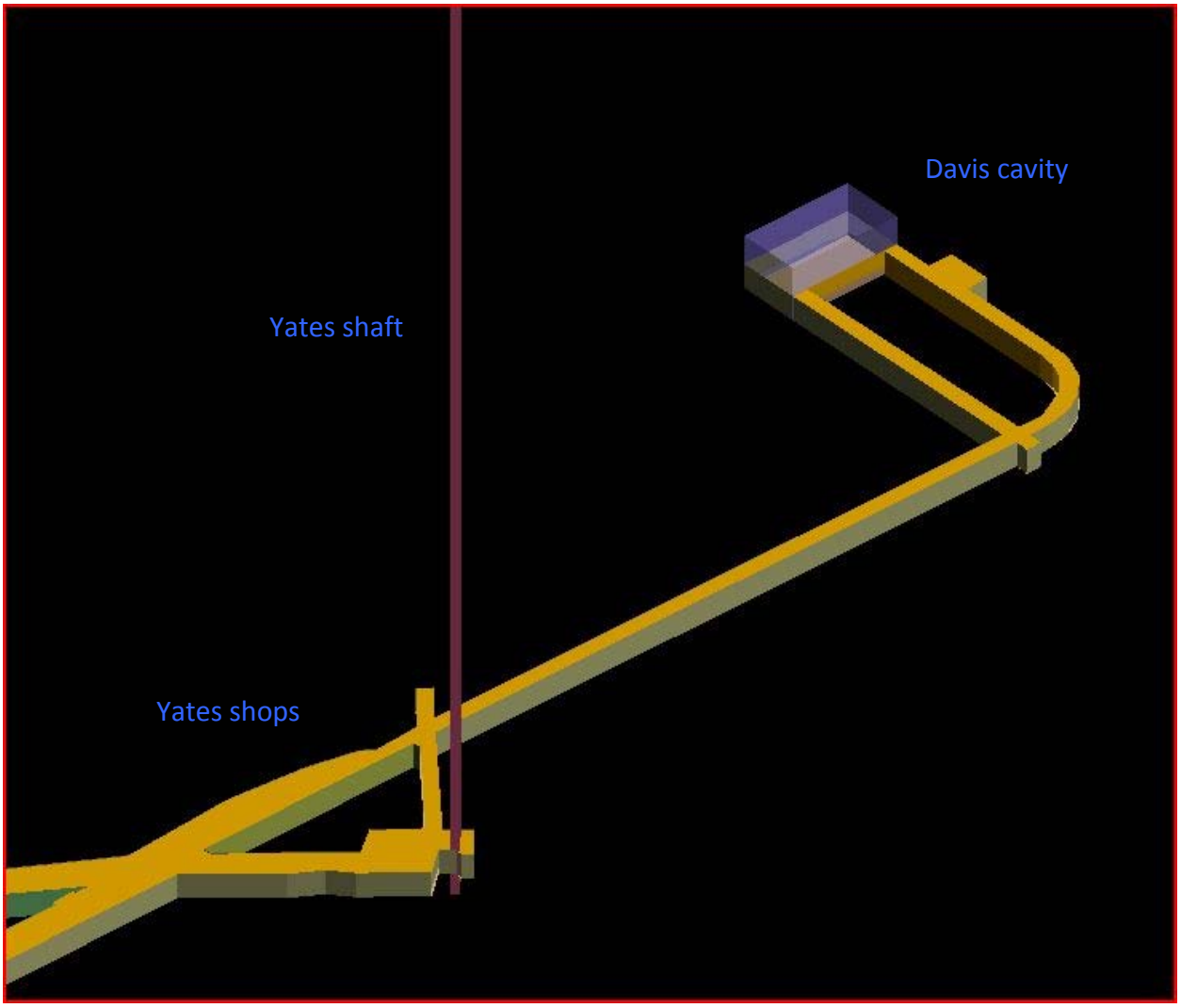

Fig.8 Yates area and Davis cavity - 3D model

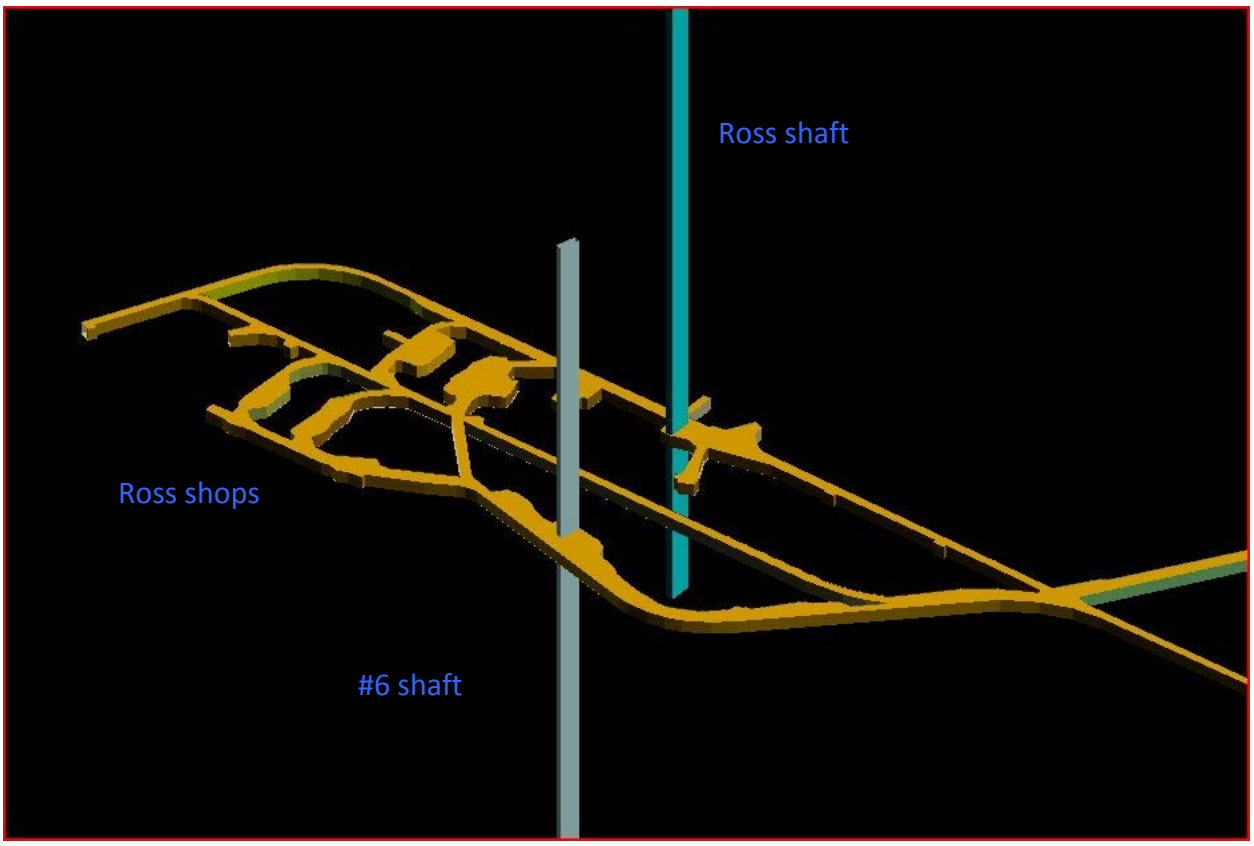

Fig.9 Ross area shops – 3D model

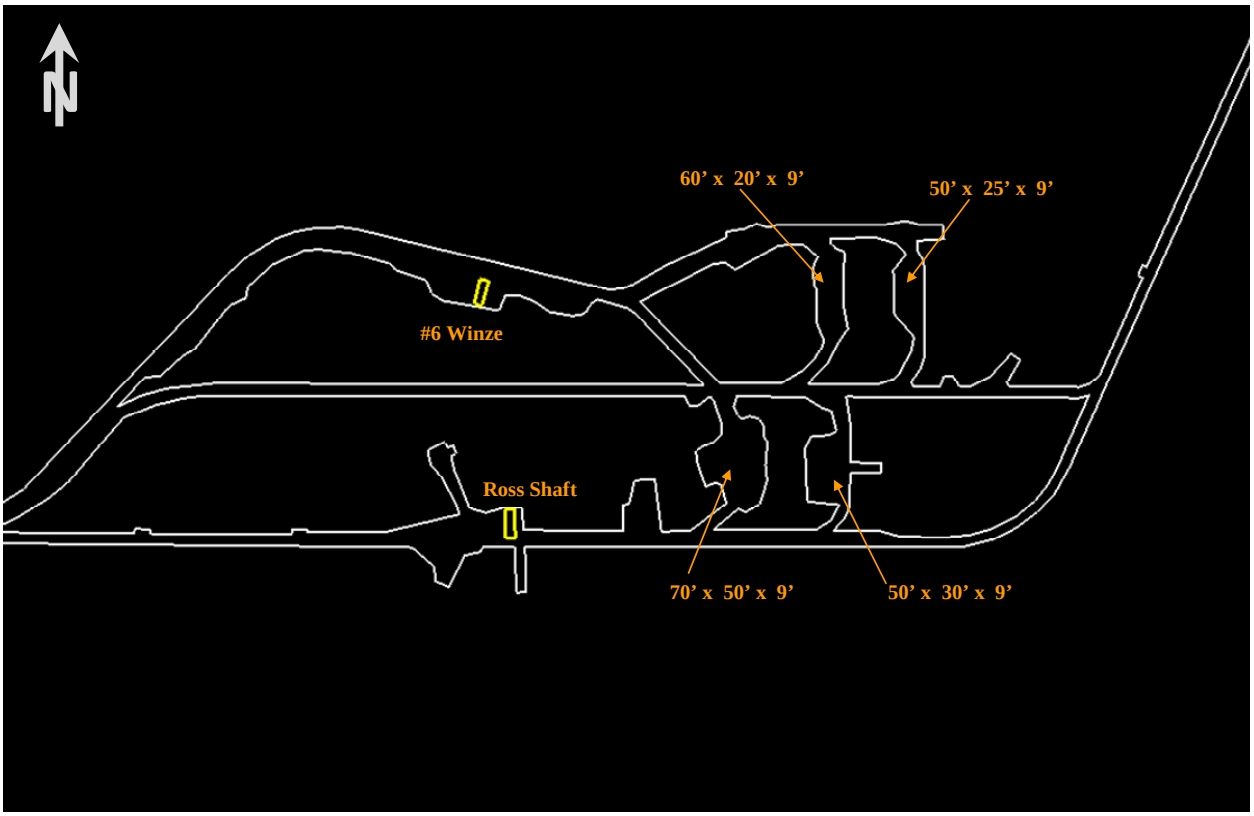

Fig.9 Ross area shops – plan view

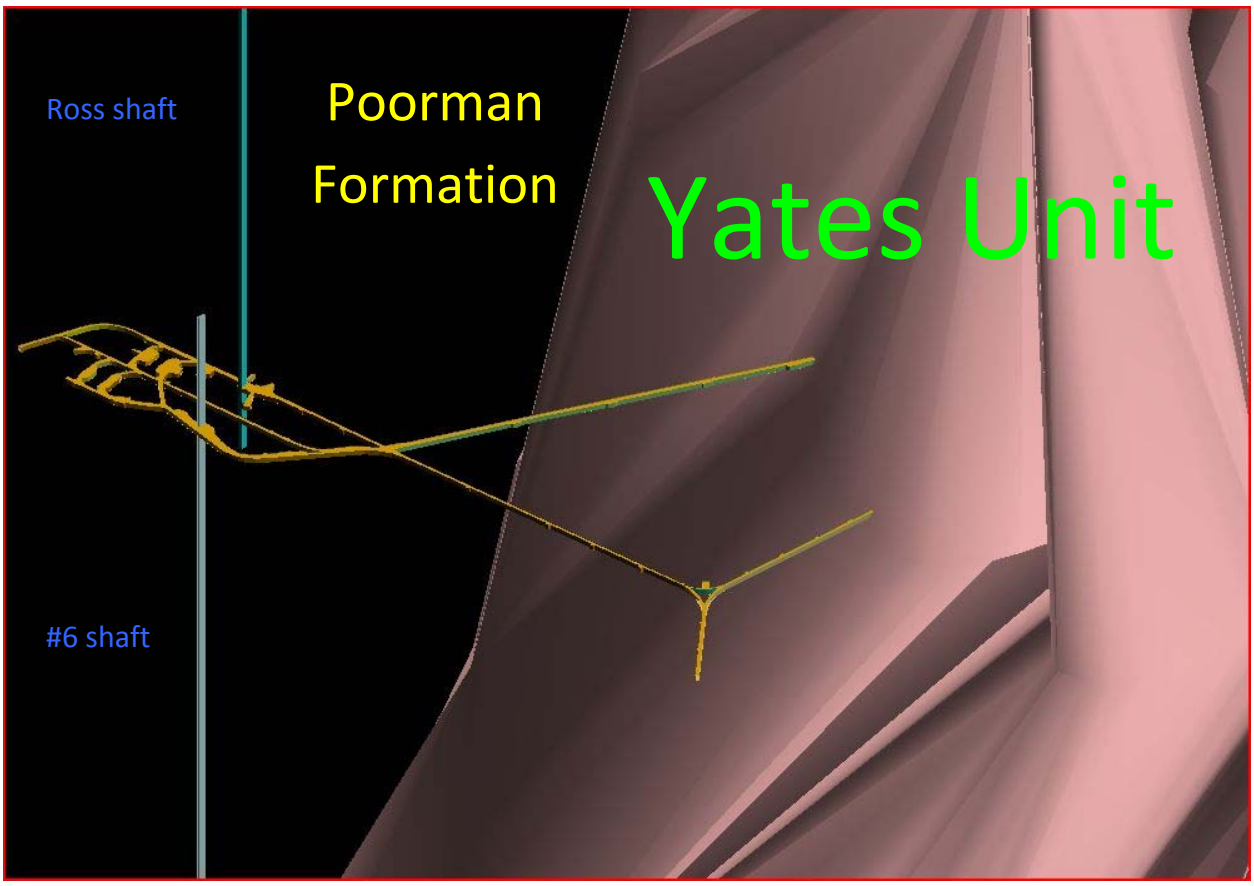

Fig.10 Geology – Yates Unit – 3D model

Note: The Yates unit, underlying the Poorman Formation, is perceived to be the strongest rock in the local stratigraphic column. The new excavations will be located in both the Yates Unit and the Poorman Formation. See more on geology in the appendix.

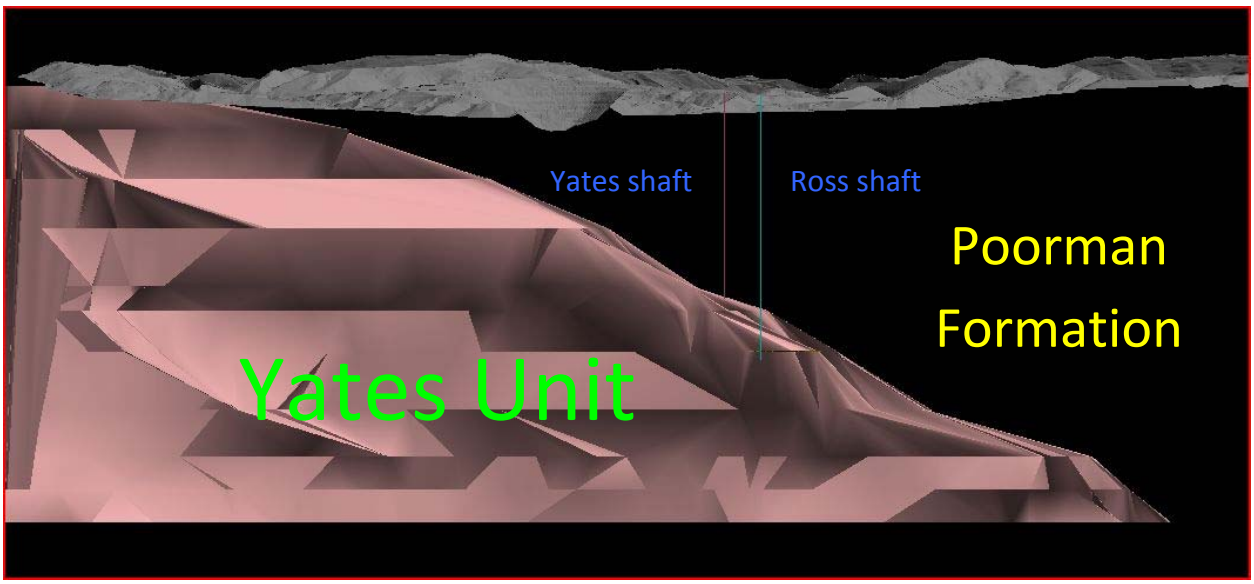

Fig.11 Geology – Yates Unit – 3D model

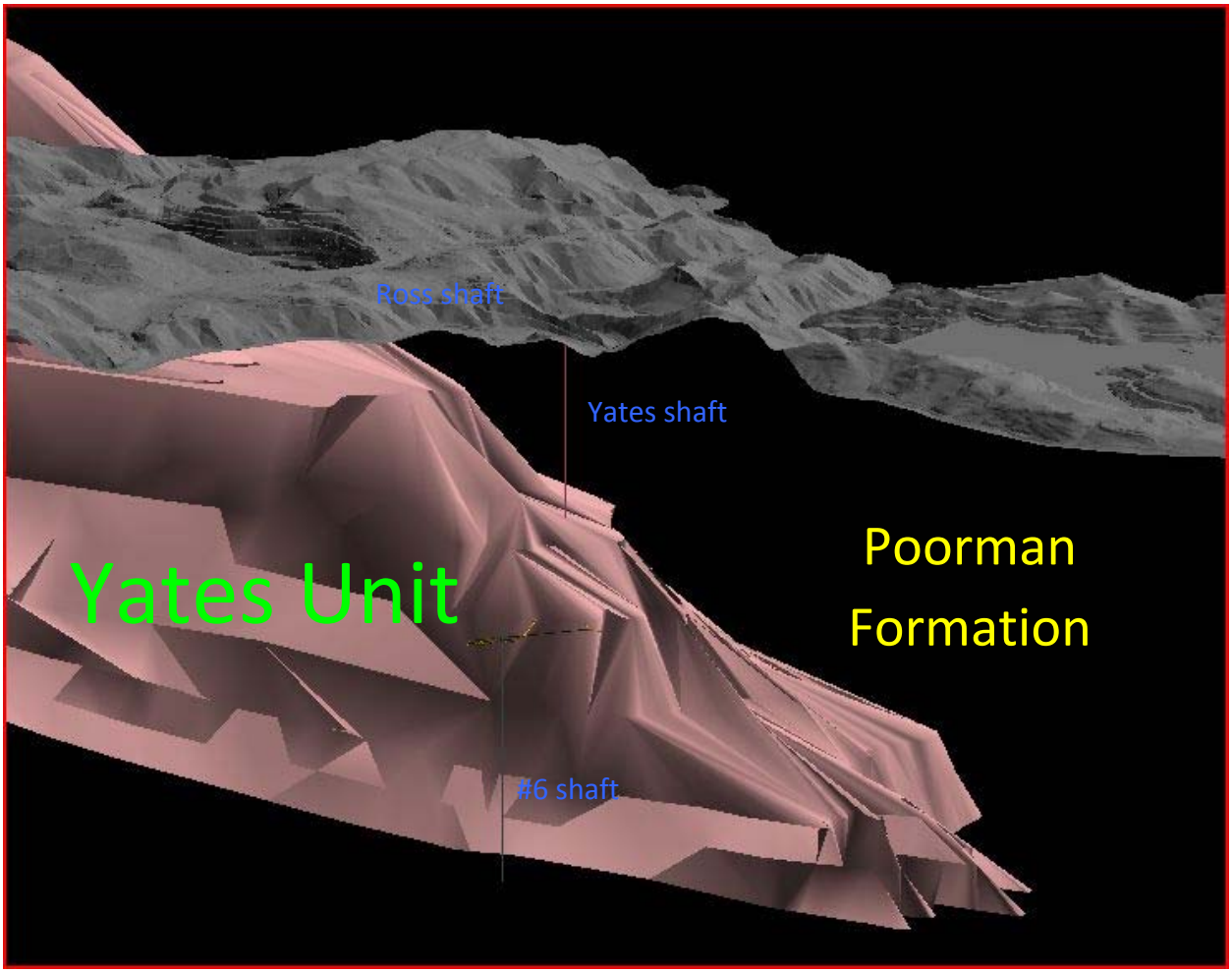

Fig.12 Geology – Yates Unit – 3D model

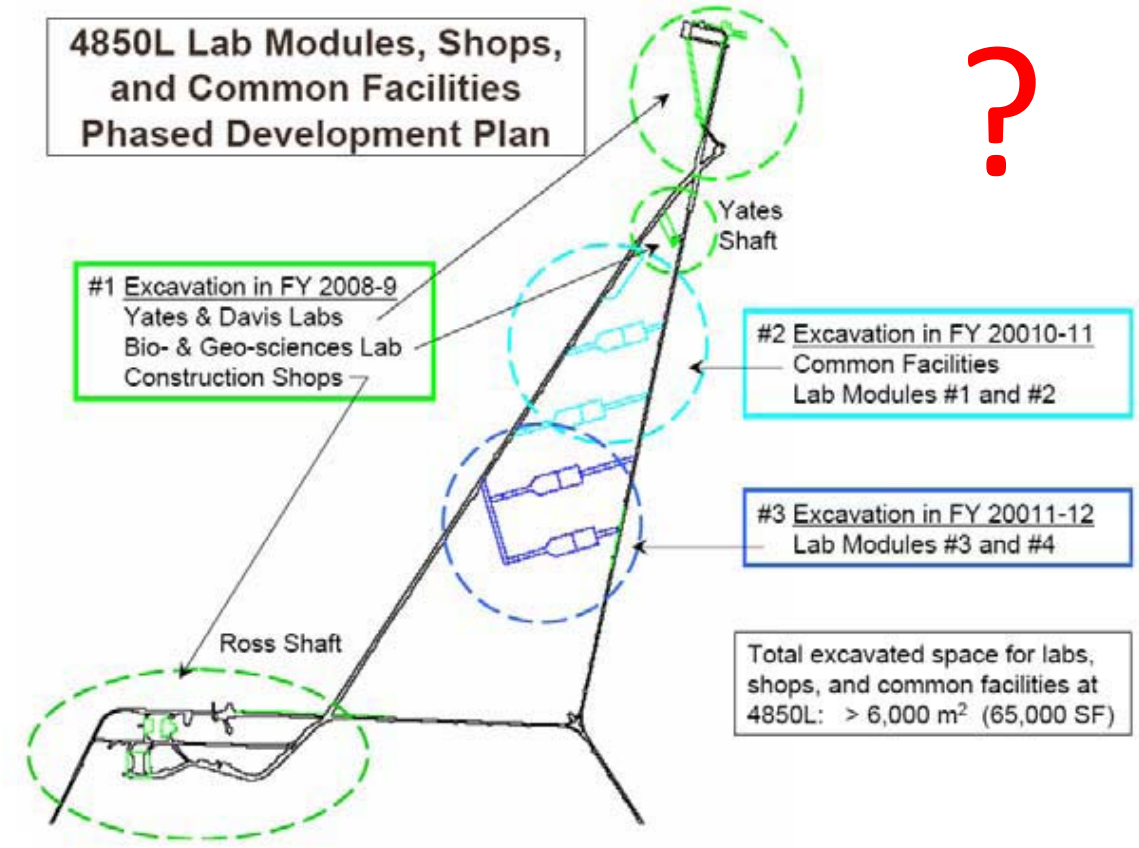

Fig.13 Proposed new excavations at 4850 level - as outlined in CDR – 2007

Note: Size, exact placement and orientation of laboratory modules and new excavation: subject to analysis and study.

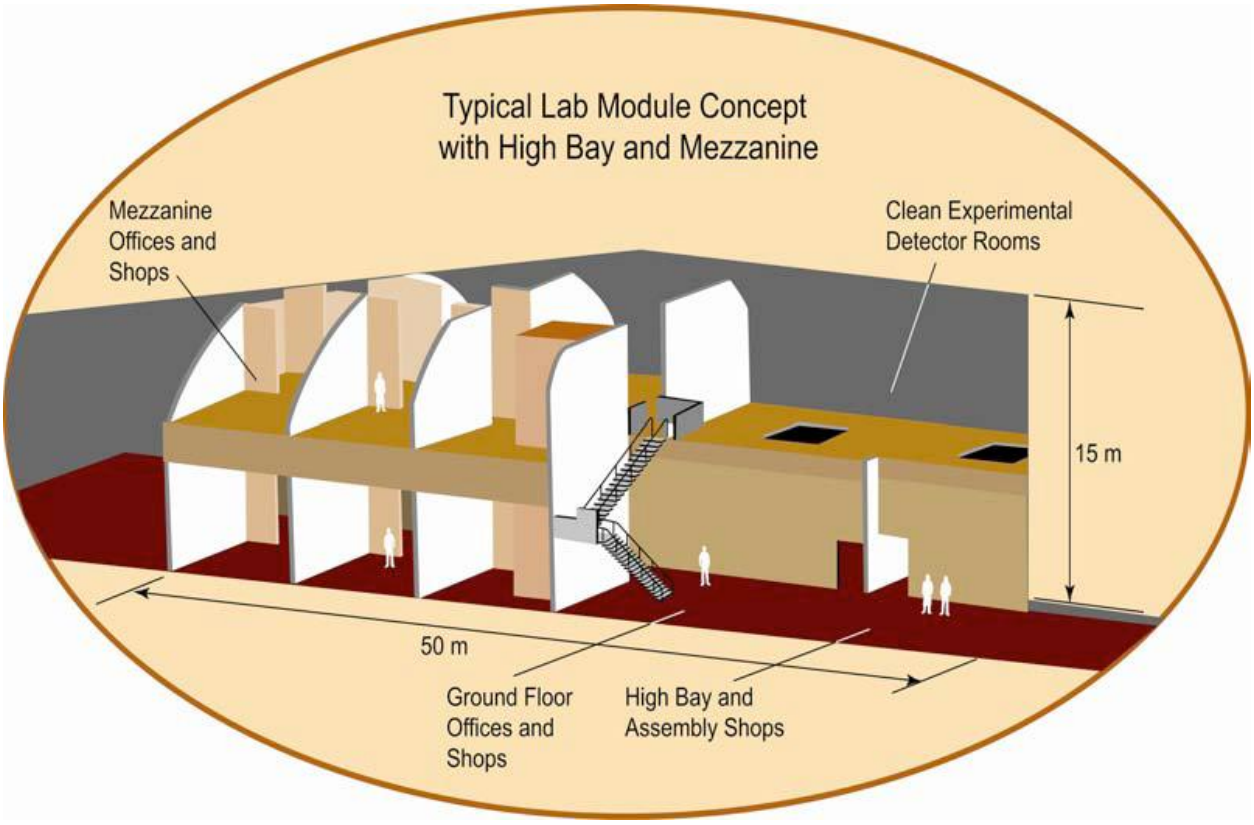

Fig.14 Proposed laboratory module at 4850 level - as outlined in CDR – 2007

Note: Exact excavation profile and shape: subject to analysis and study.

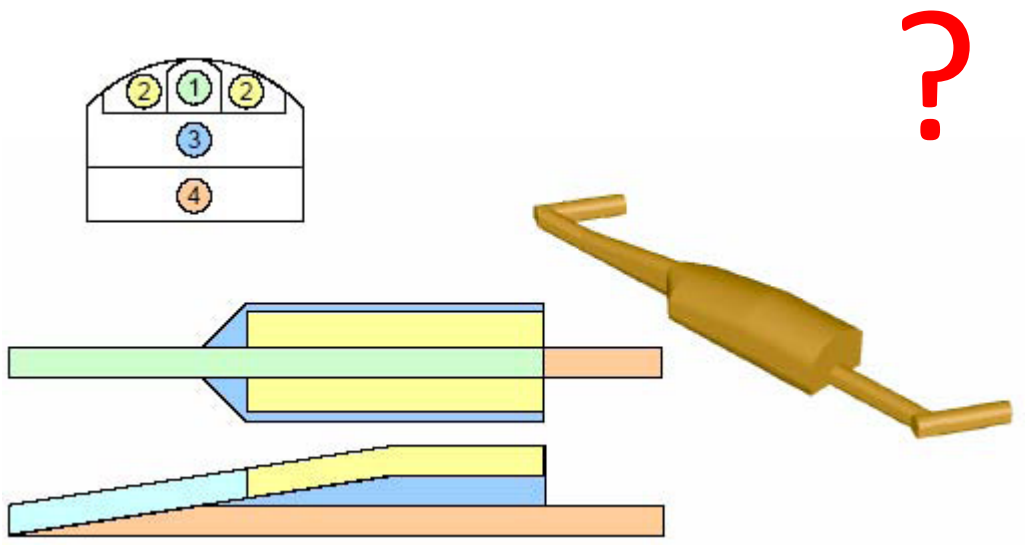

Fig.15 Proposed laboratory module at 4850 level - as outlined in CDR – 2007

Note: excavation sequence, overall 3D profile and connecting drifts. The layout did not include the false floor and emergency sump below the drift levels.

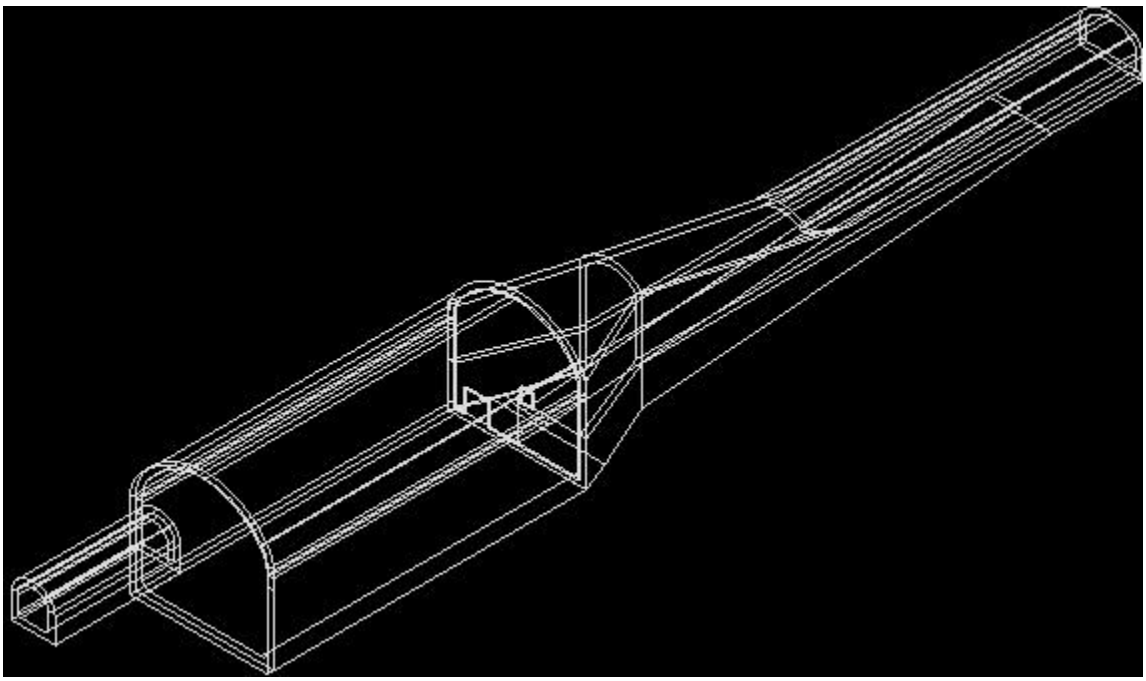

Fig.16 New concept of a laboratory module at 4850 level - developed by David Plate (LBNL)

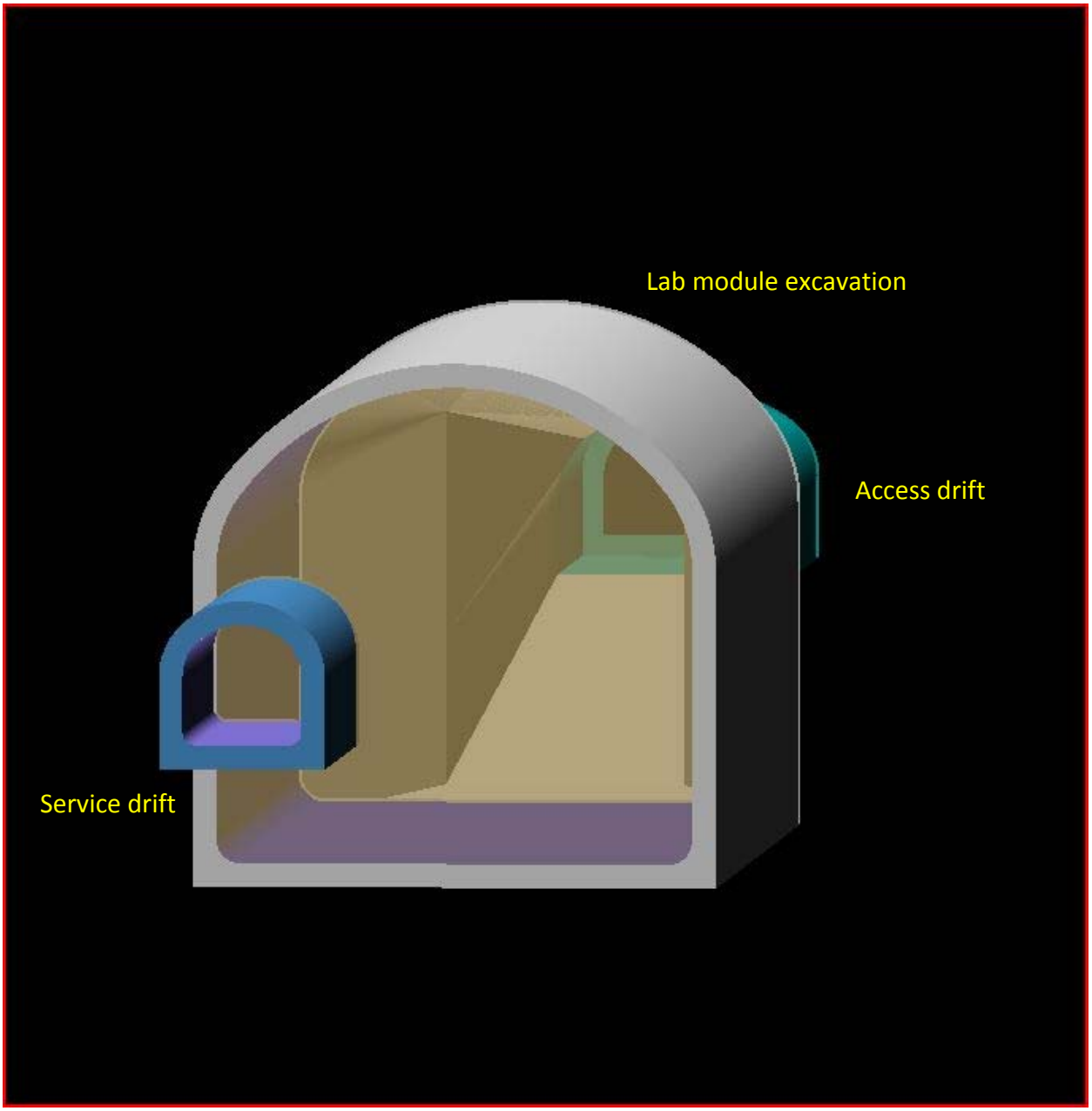

Fig.17 Laboratory module incorporated into Vulcan 3D models (looking from the service drift side) – Vulcan model developed by Zbigniew J. Hladysz.

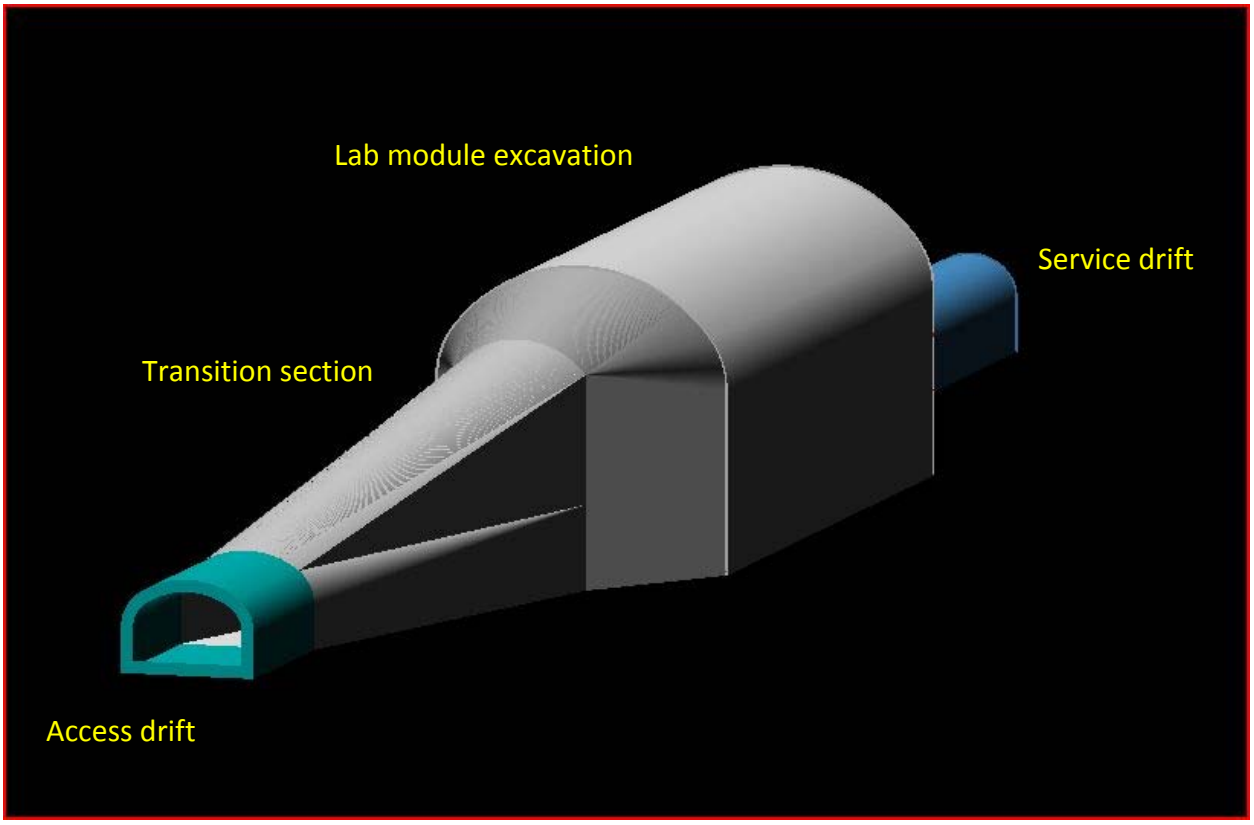

Fig.18 Laboratory module incorporated into Vulcan 3D models (looking from the access drift side).

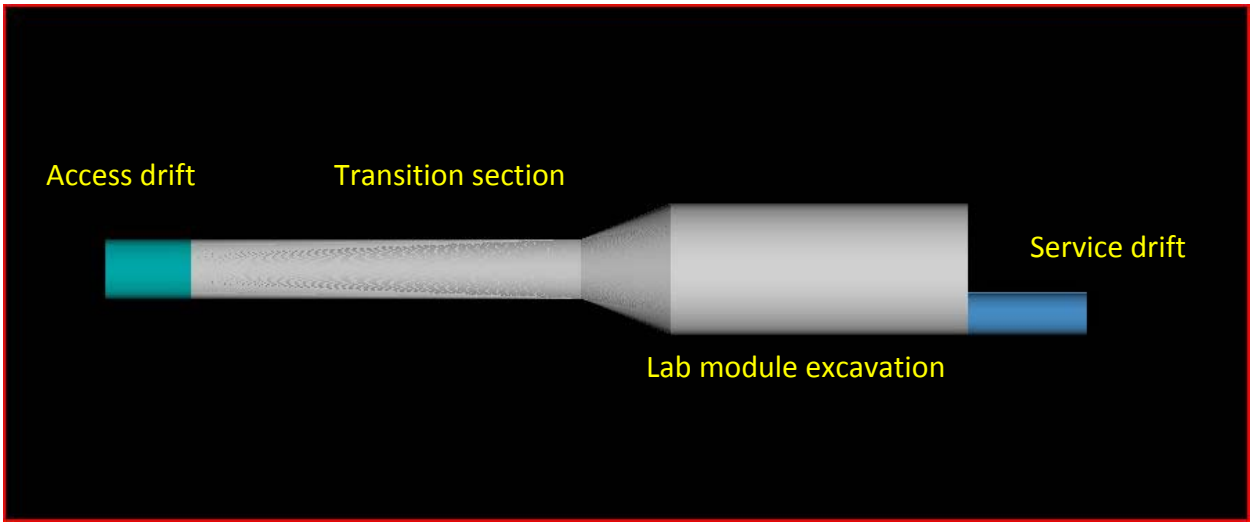

Fig.19 Laboratory module incorporated into Vulcan 3D models – plan view.

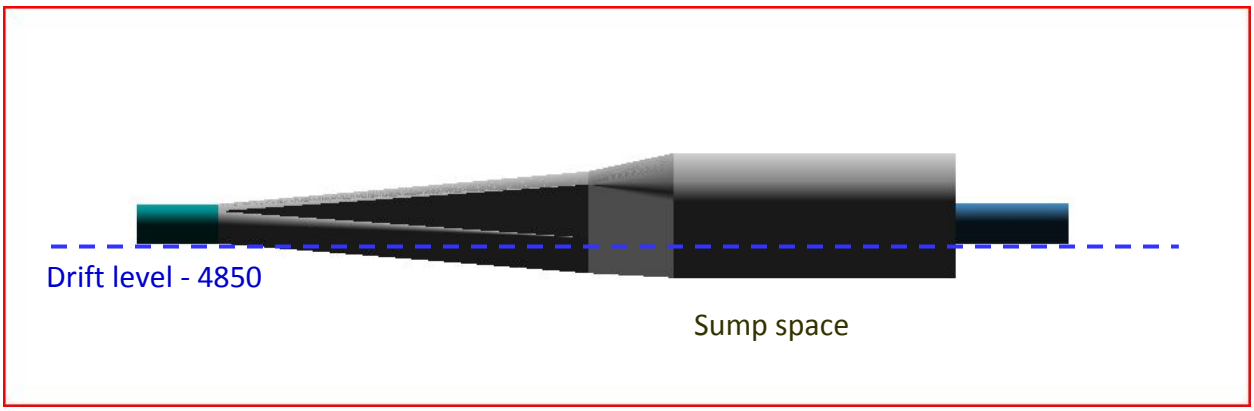

Fig.20 Laboratory module incorporated into Vulcan 3D models – side view.

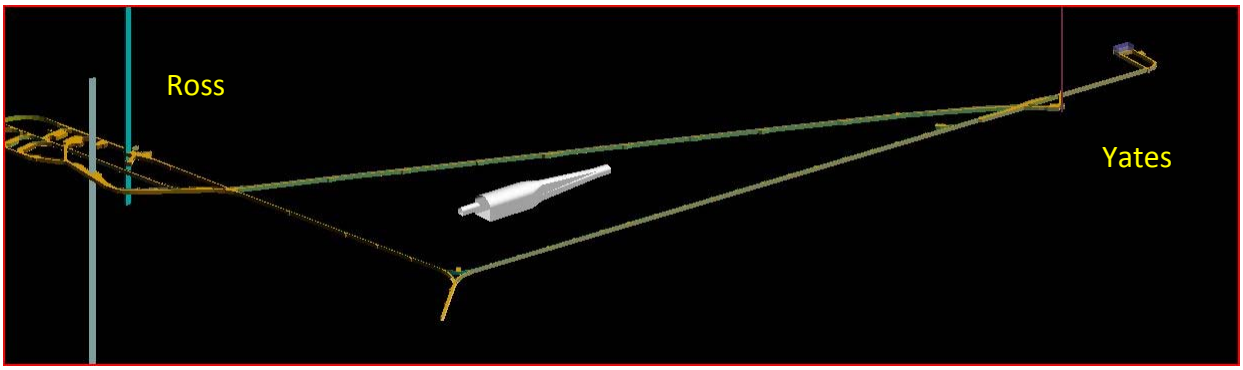

Fig.21 View of the laboratory module size in relation to available space and existing excavations.

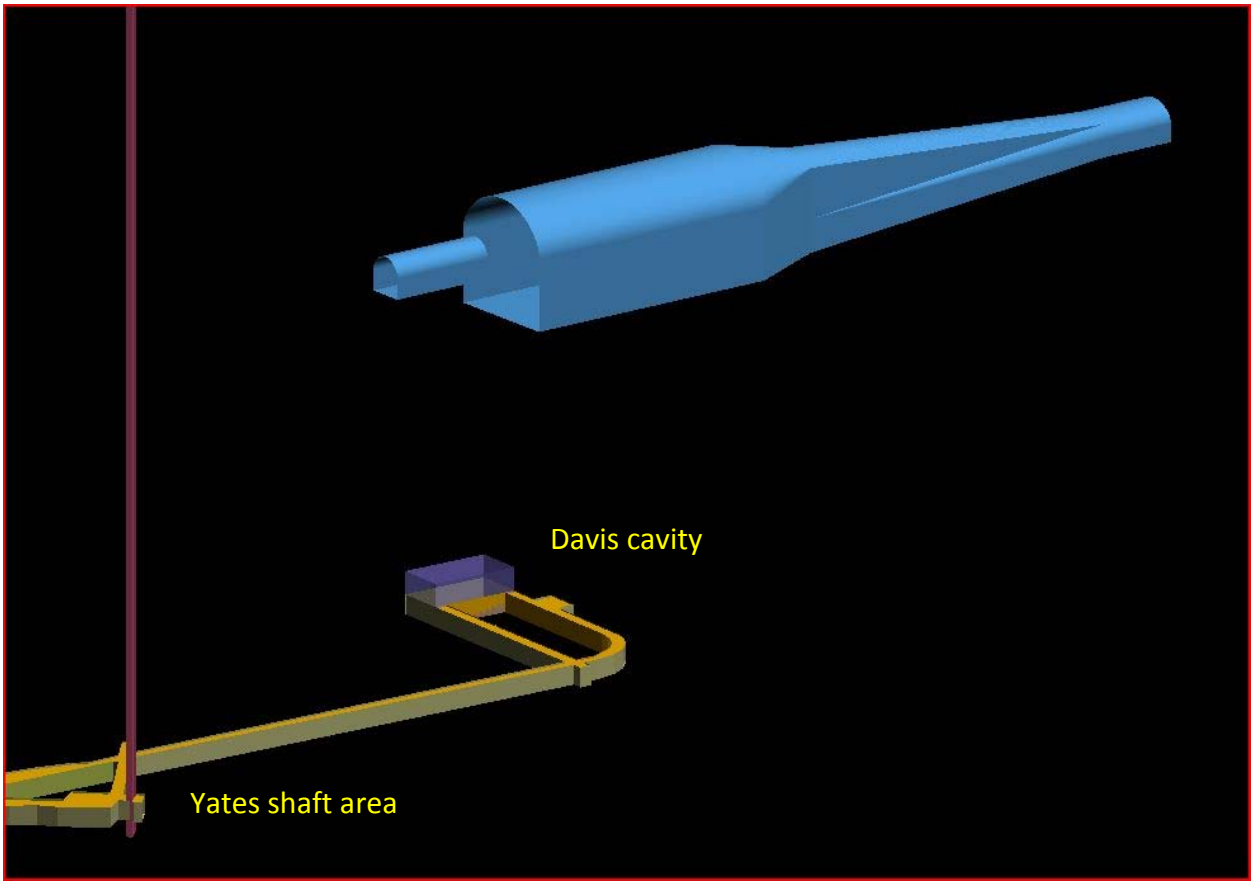

Fig.22 View of the laboratory module size and shape in relation to the existing excavations.

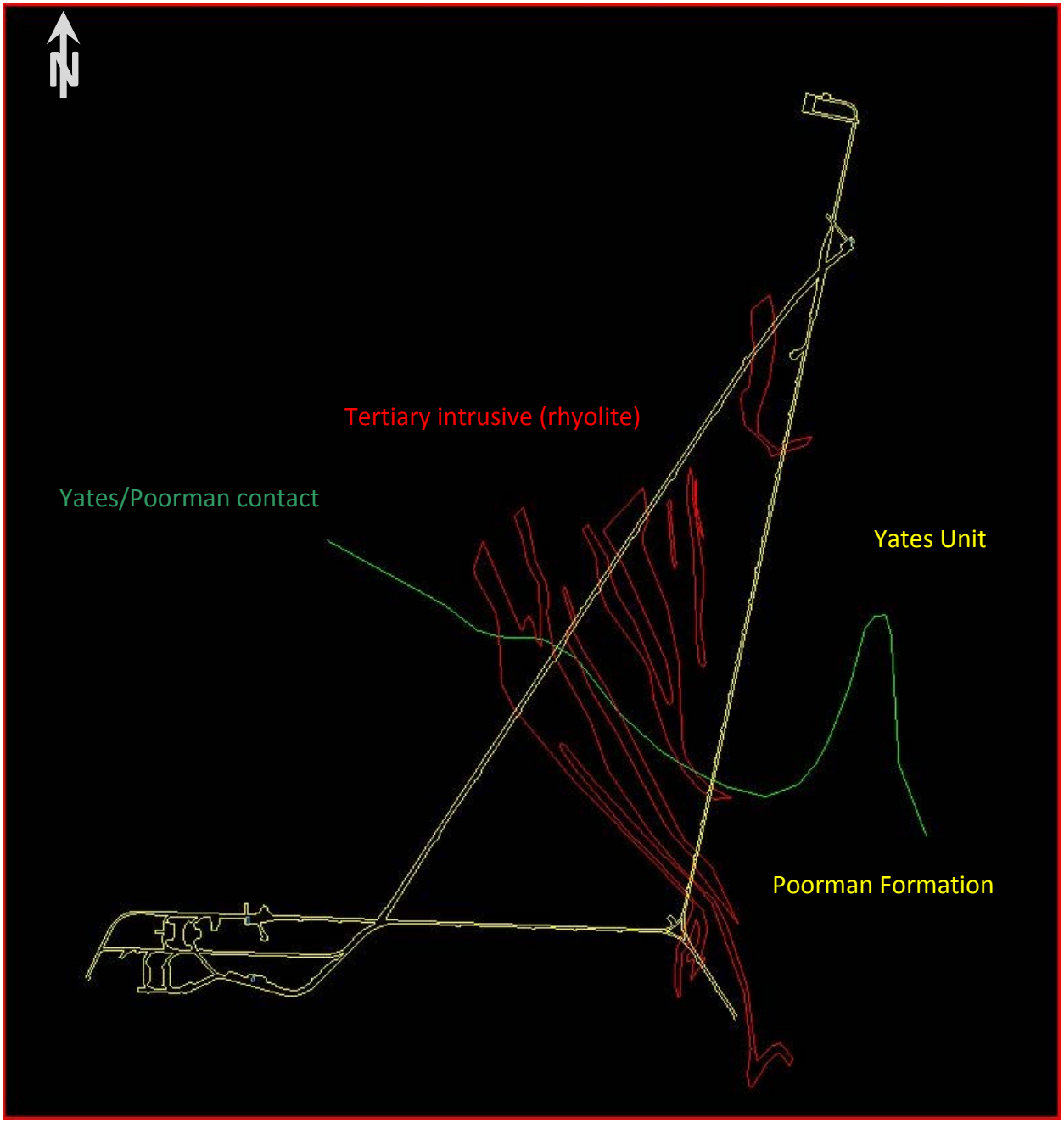

Fig.23 Geology (lithology and rock structure) at 4850 level in the area of interest.

Note: Rock structure (foliation planes and individual discontinuities) vary from place to place and from unit to unit. Some data at specific locations is available in Homestake/Vulcan database. Some information in Homestake/Vulcan database may not be complete.

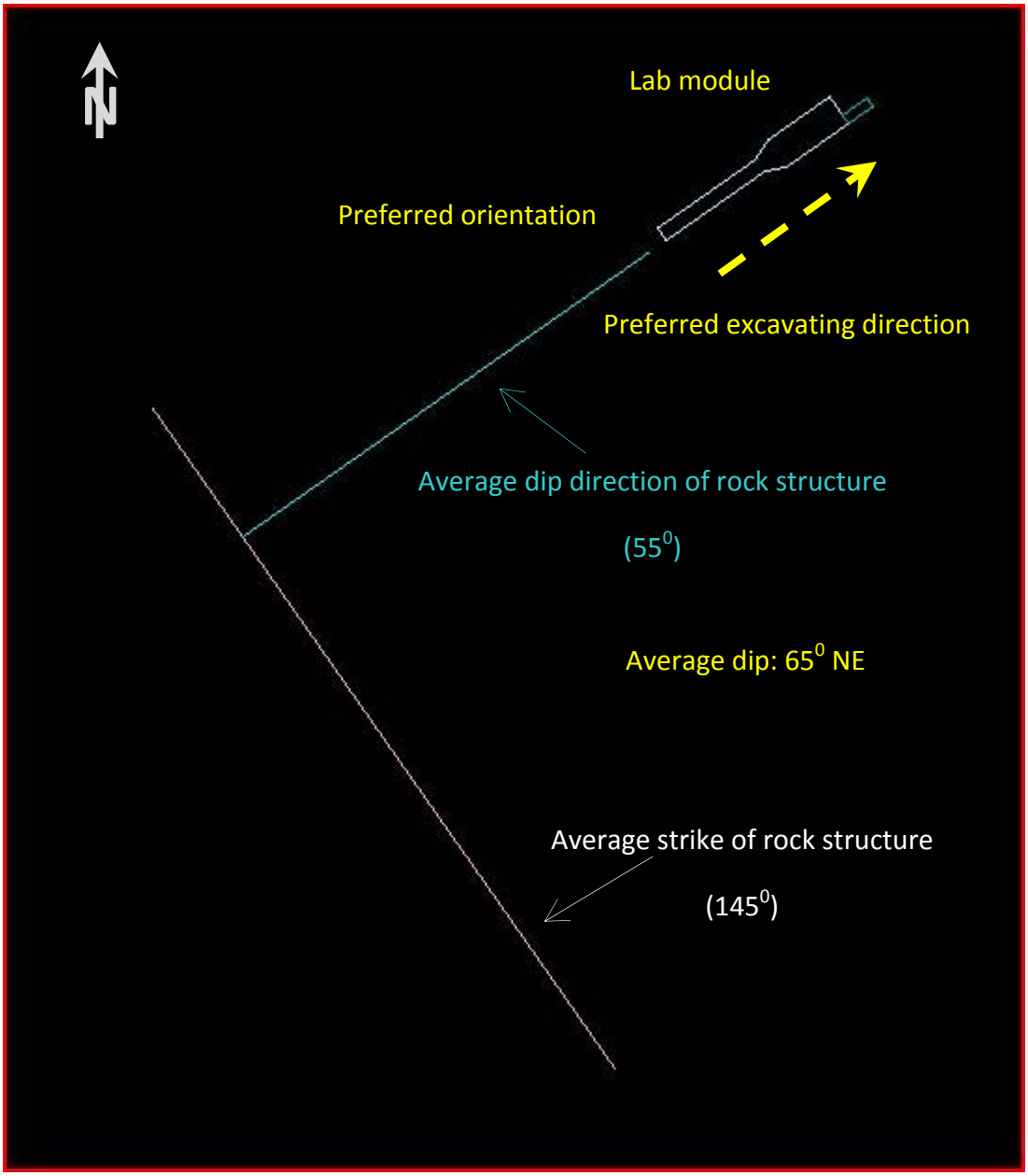

Fig.24 The most favorable orientation of the lab module with reference to rock structure.

Note: The most favorable orientation of an excavation (from the stability standpoint) is when its long axis is perpendicular to rock structure (foliation, discontinuities, etc), with direction of drive: with dip.

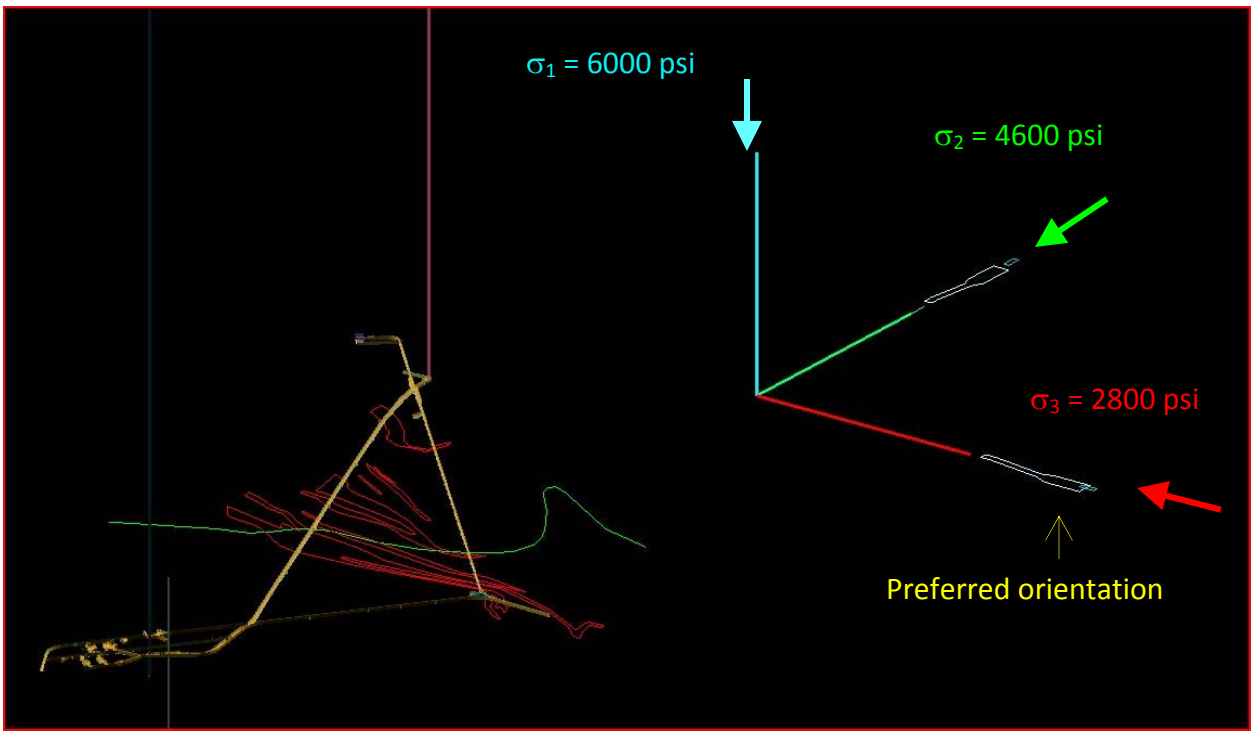

Fig.25 Orientation of the lab module with reference to in-situ stress field.

Note: The most favorable orientation of an excavation (from the stability standpoint) is when its long axis is parallel to the minimum principal stress (compression being positive).

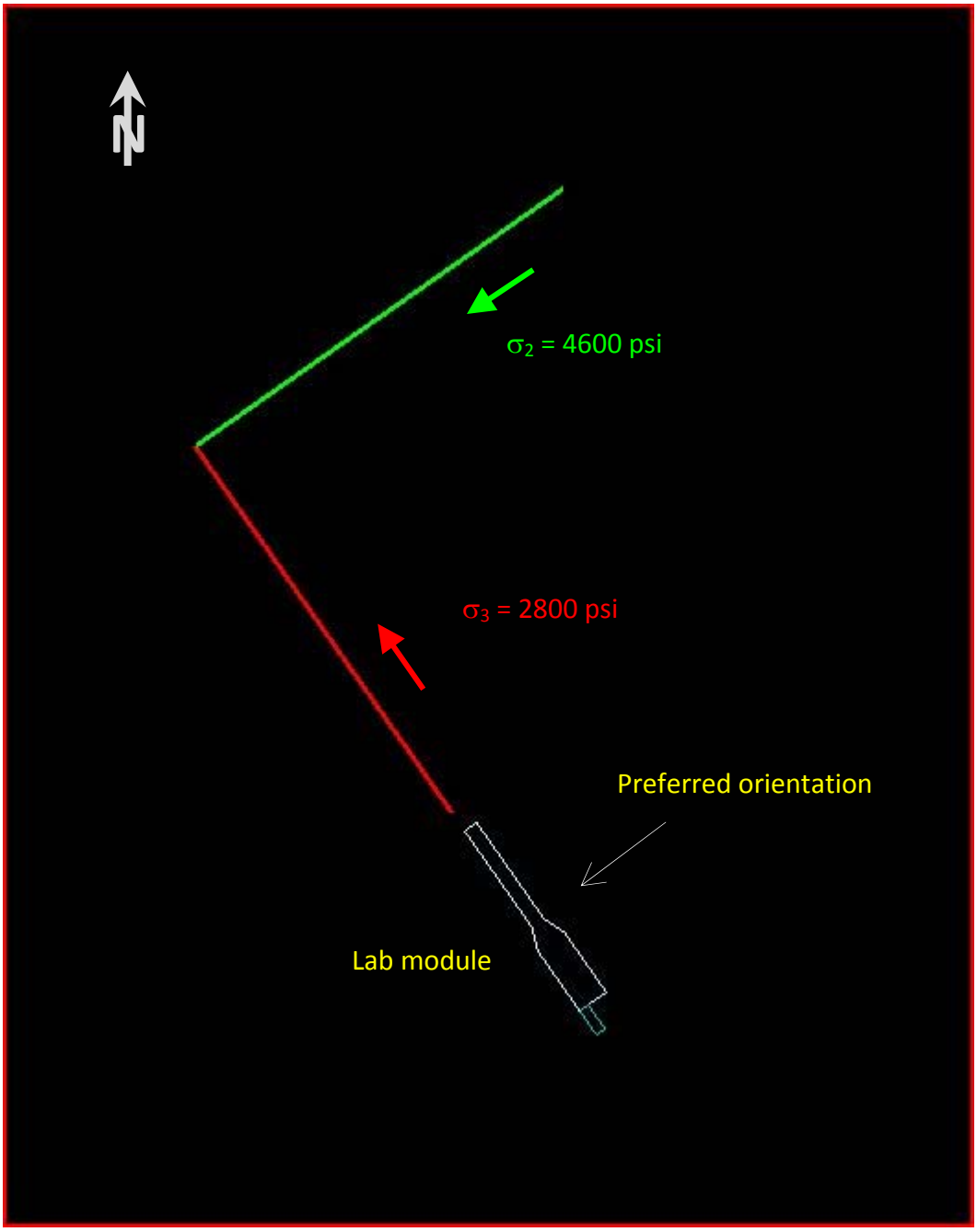

Fig.26 The most favorable orientation of the lab module with reference to in-situ stress field – plan view.

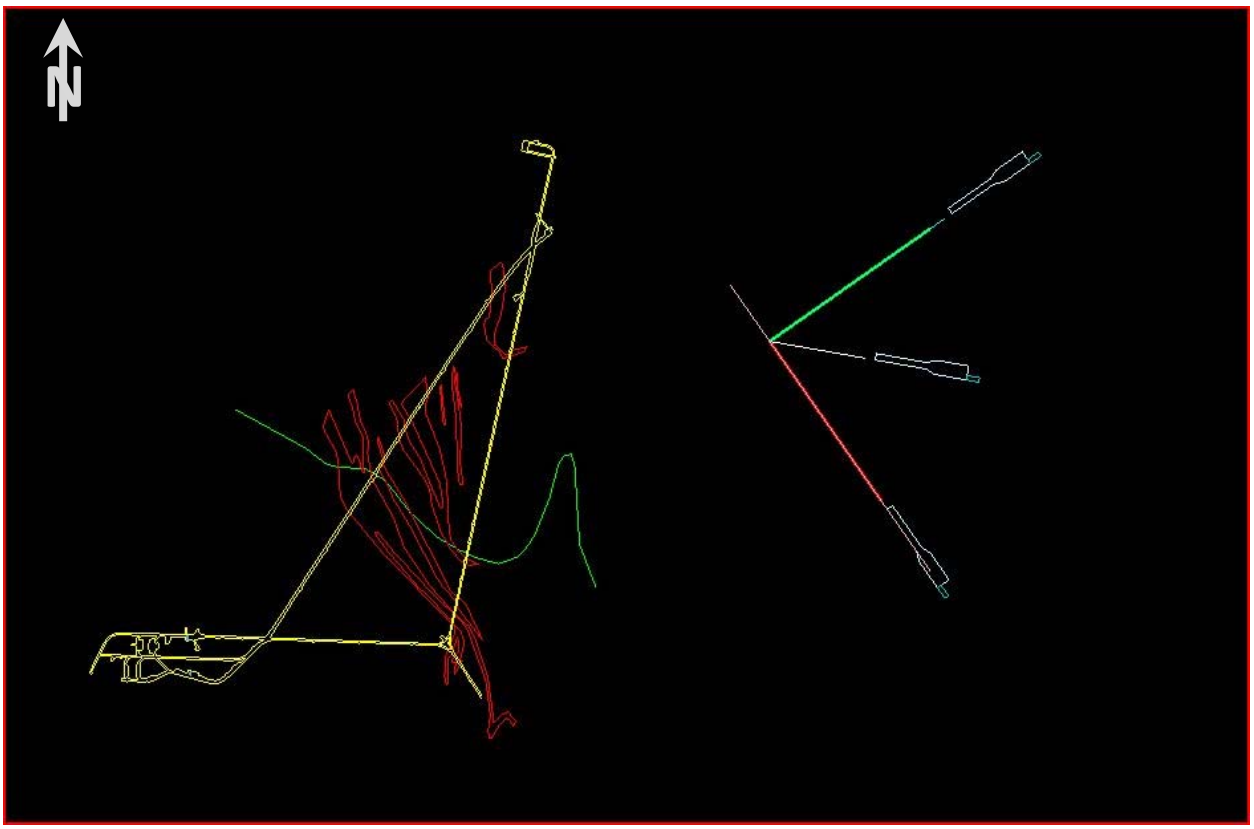

Fig.27 The effects of both the rock structure and the in-situ field stress directions on the orientation of the lab module.

Note: The two preferred orientation are in conflict. An intermediate orientation based on priority assessment, needs to be determined.

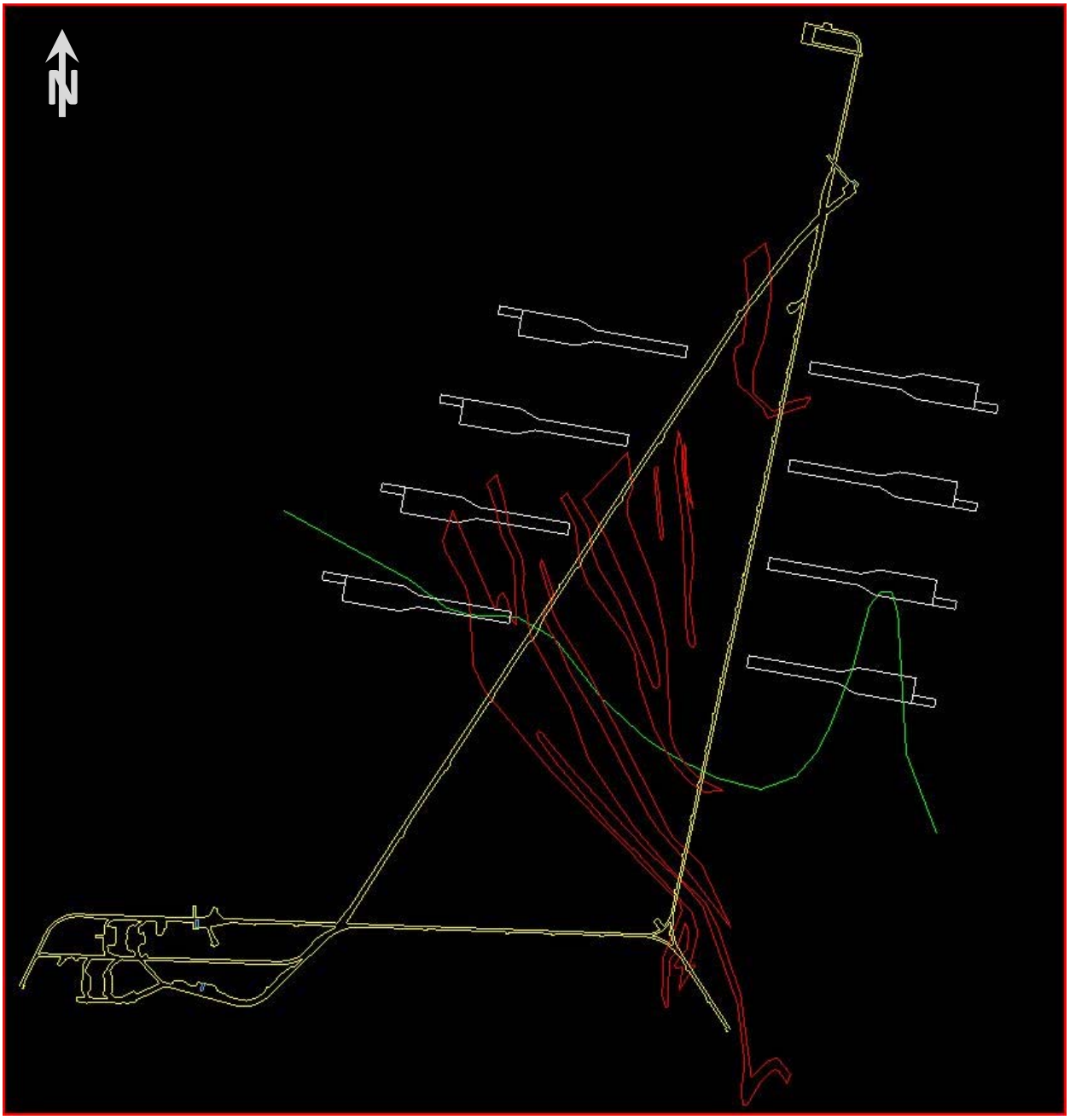

Fig.28 Alternative orientation and location of lab modules.

Note: Perhaps specific lab module orientation would have to be different for different locations, depending on rock formation, rock structure and local stress.

Drilling Program

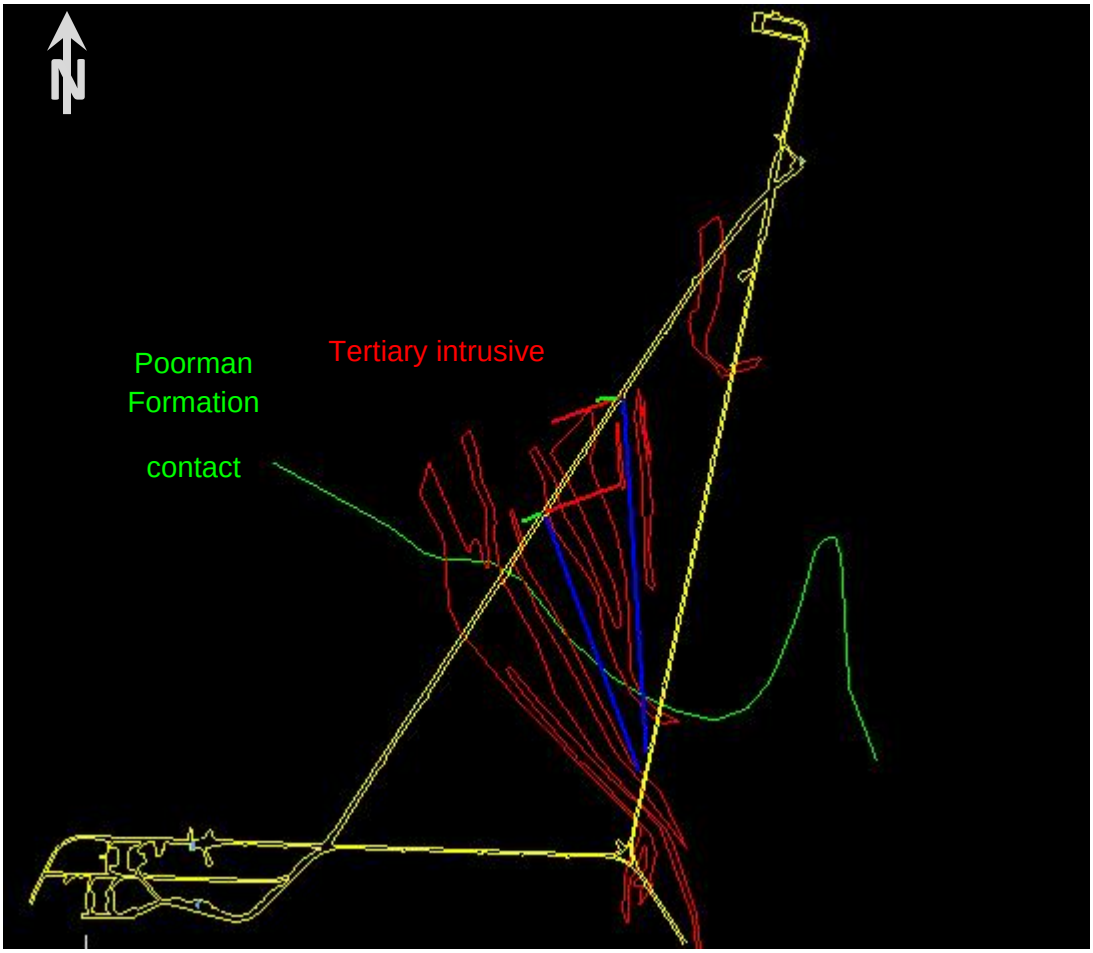

Fig.29 Location and orientation of directional drill holes in DUSEL area with reference to geology.

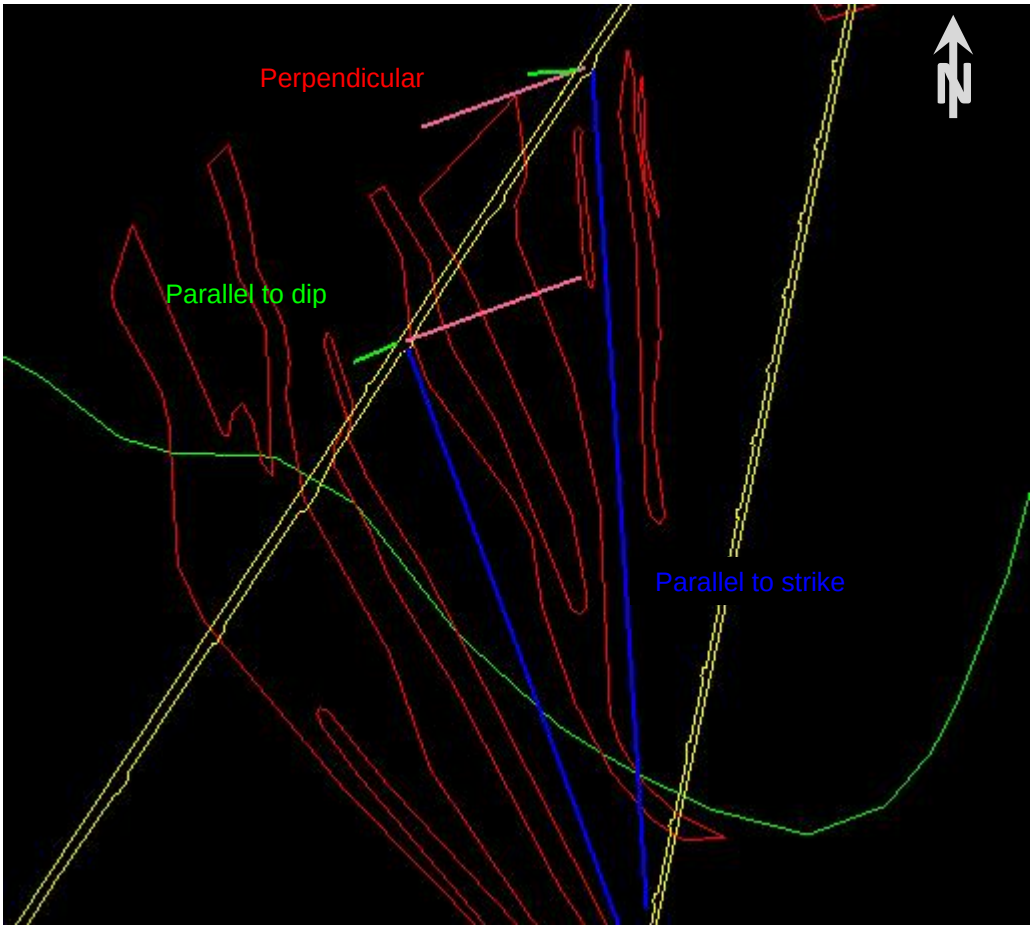

Fig.30 Location and orientation of directional drill holes with reference to rock structure and the existing excavations.

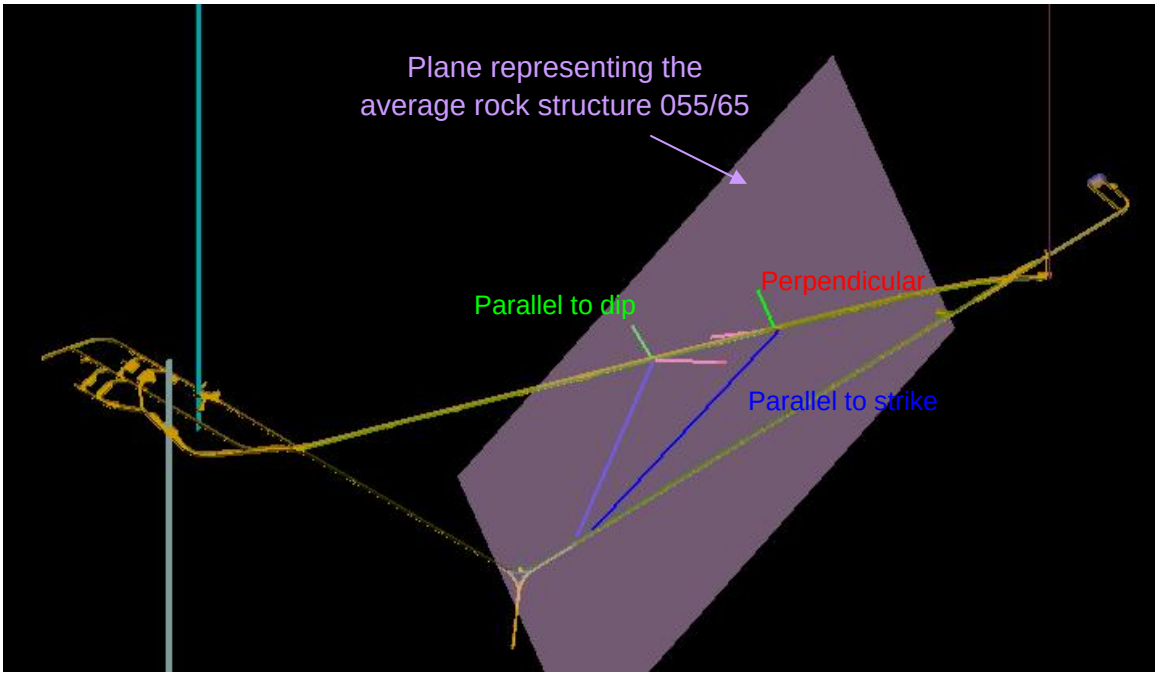

Fig.31 Orientation of drill holes with reference to the average attitudes of rock structure – 3D model.

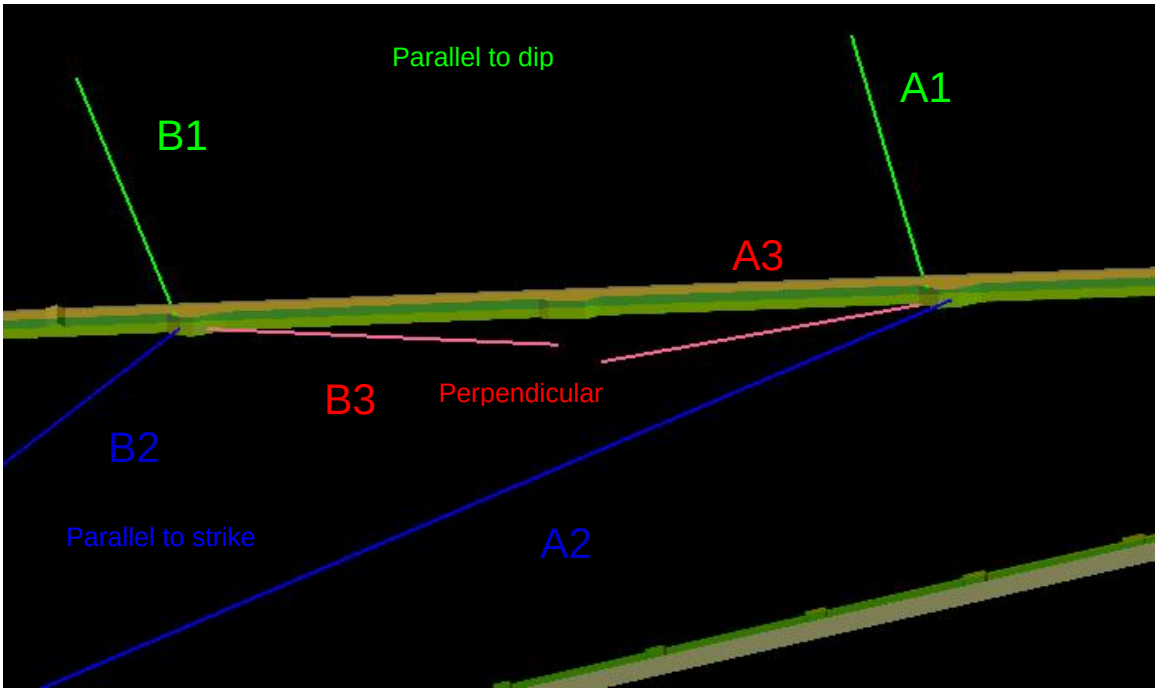

Fig.32 Location and orientation of drill holes – 3D model.

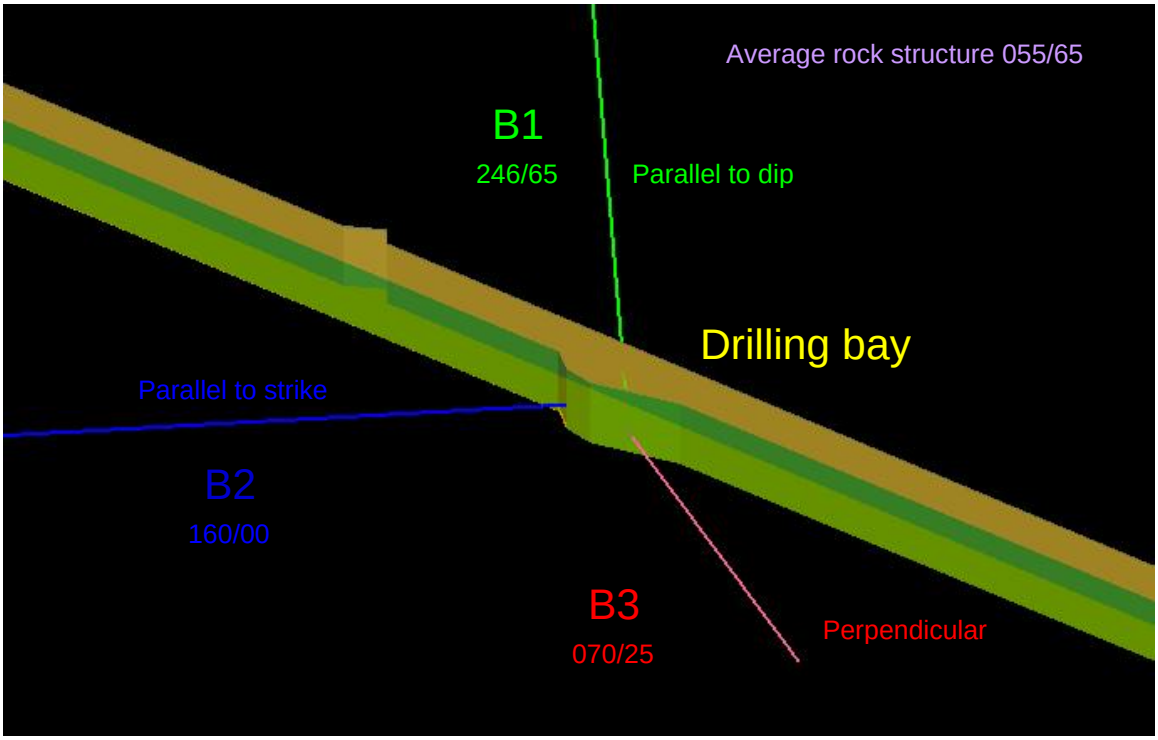

Fig.33 Location and orientation of drill holes in 4850 drift – triple-hole set.

Note: The orientation of the triple set may be repeated, as needed, in other locations; the bearing may be reversed by 180^0 to cover more rock volume.

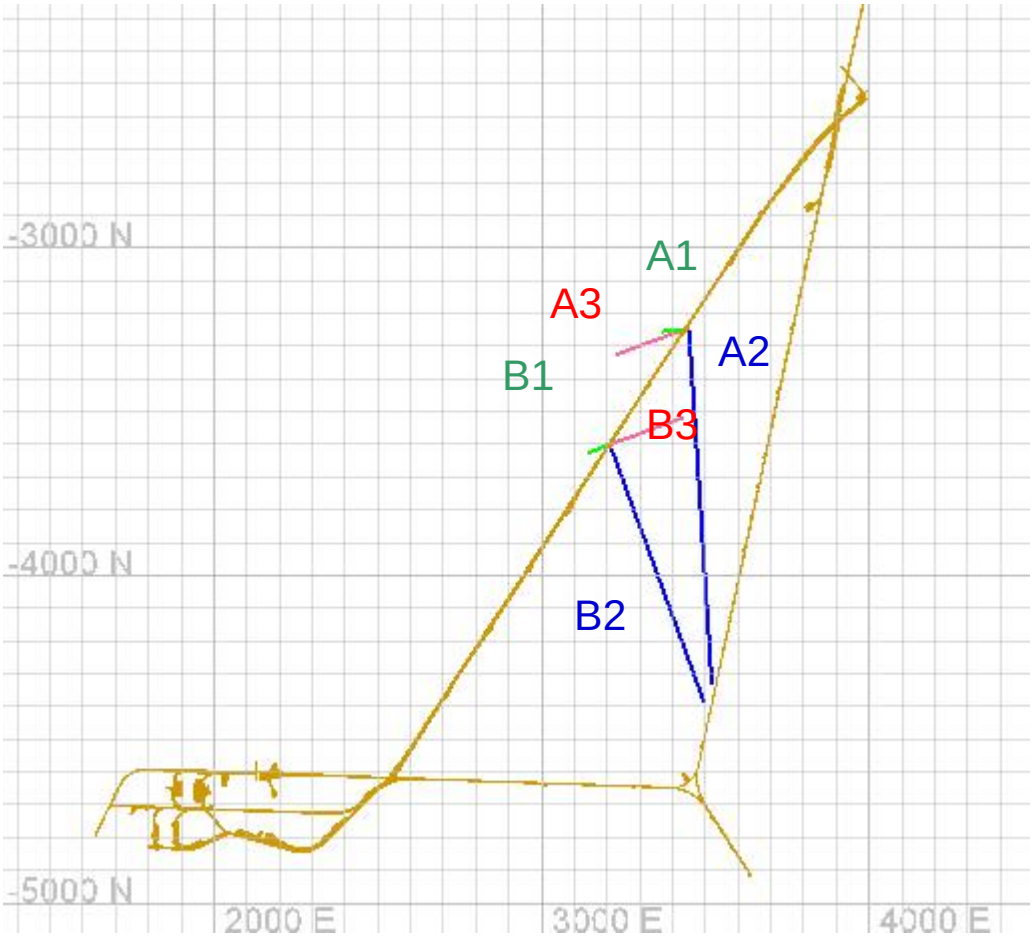

Fig.34 Drill hole location and orientation – plan view; grid in feet.

Hole ID	Bearing, ^{0}	Dip, ^{0}	Length, ft
A1	**266**	**65**	**150**
A2	**176**	**0**	**1,000**
A3	**150**	**25**	**150**
B1	**246**	**65**	**150**
B2	**160**	**0**	**800**
B3	**070**	**25**	**150**
Total length:			**2,400**

Mapping Scope

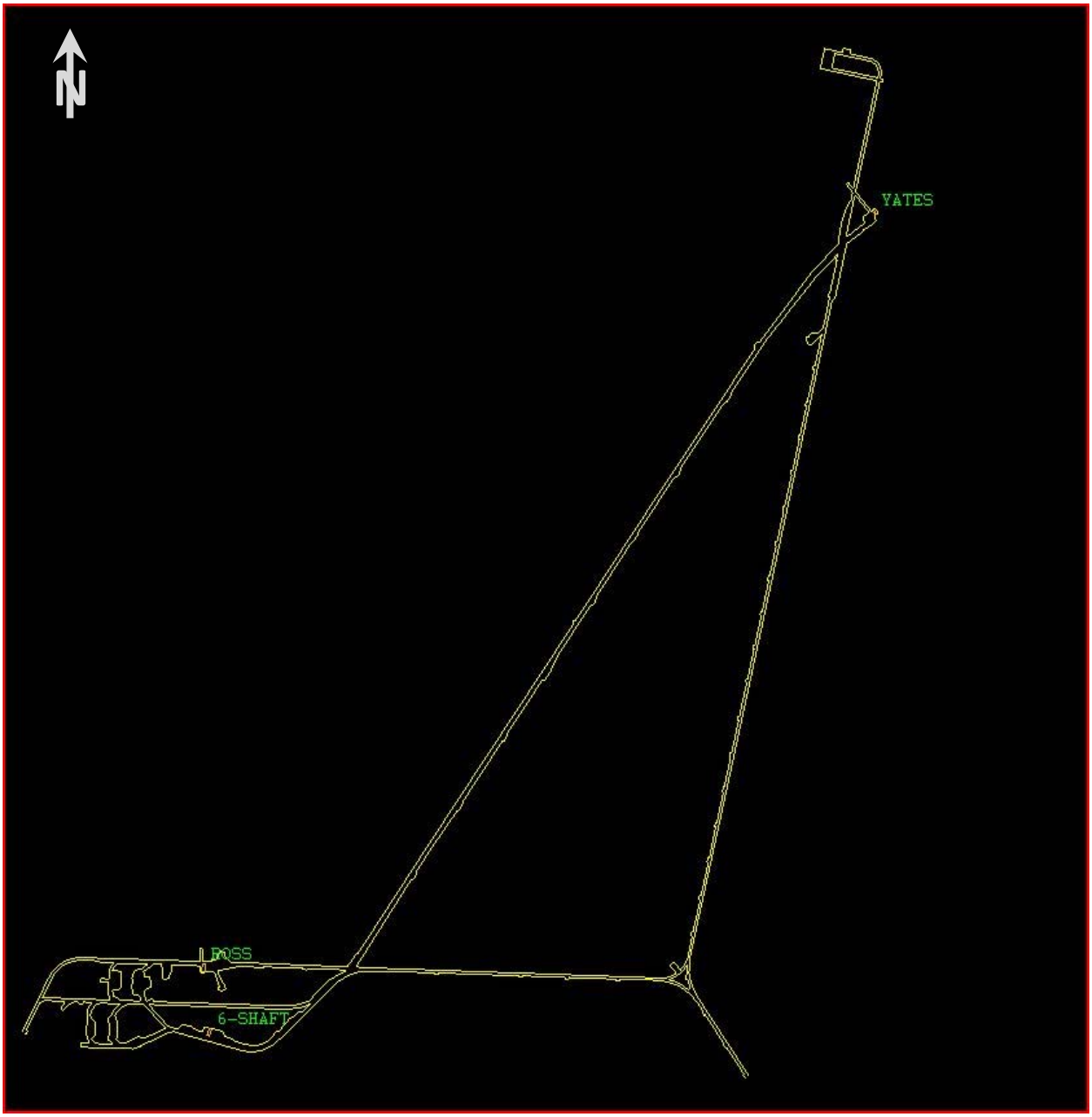

Fig.34 Mapping scope – existing drifts, excavations and areas to be mapped at 4850 level.

APPENDIX

Modeling accuracy of Homestake vector data

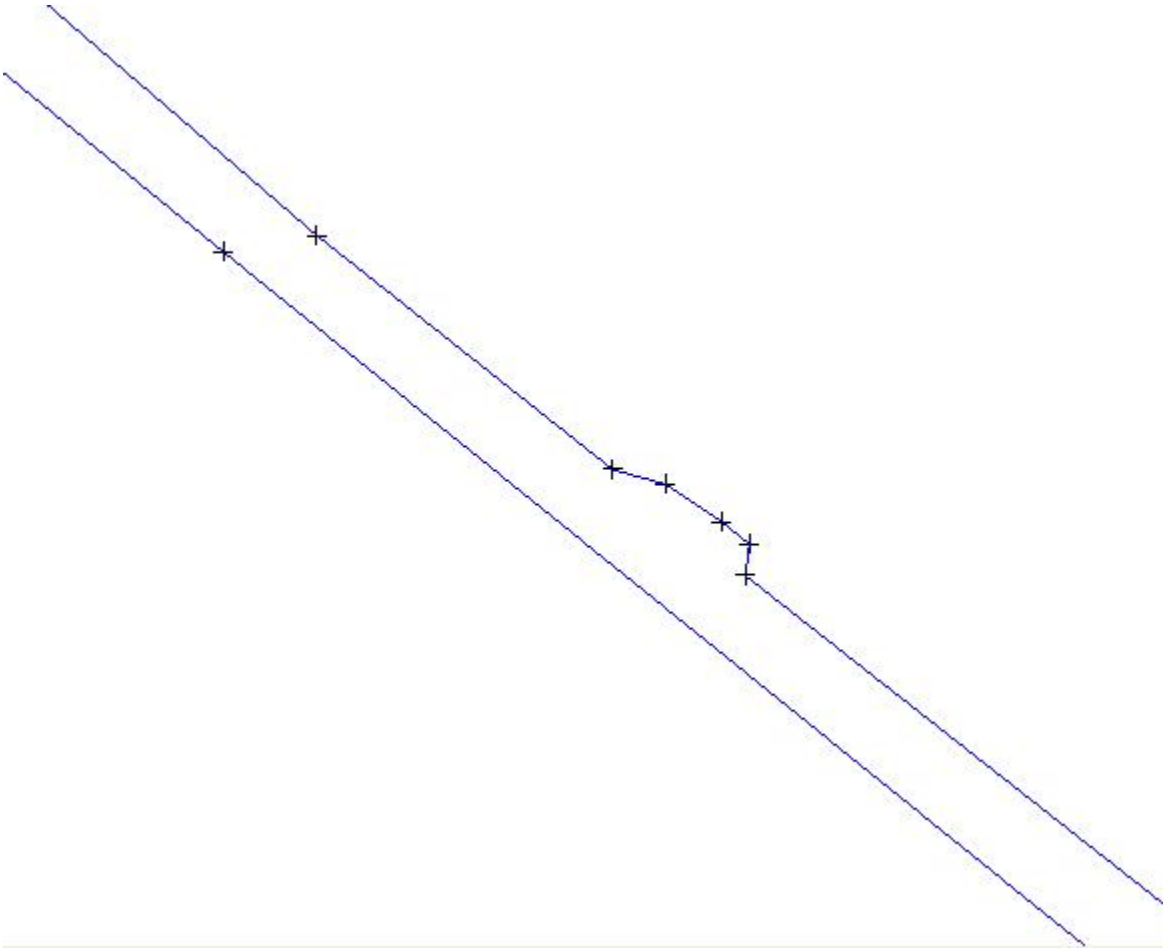

Fig.1 Original string

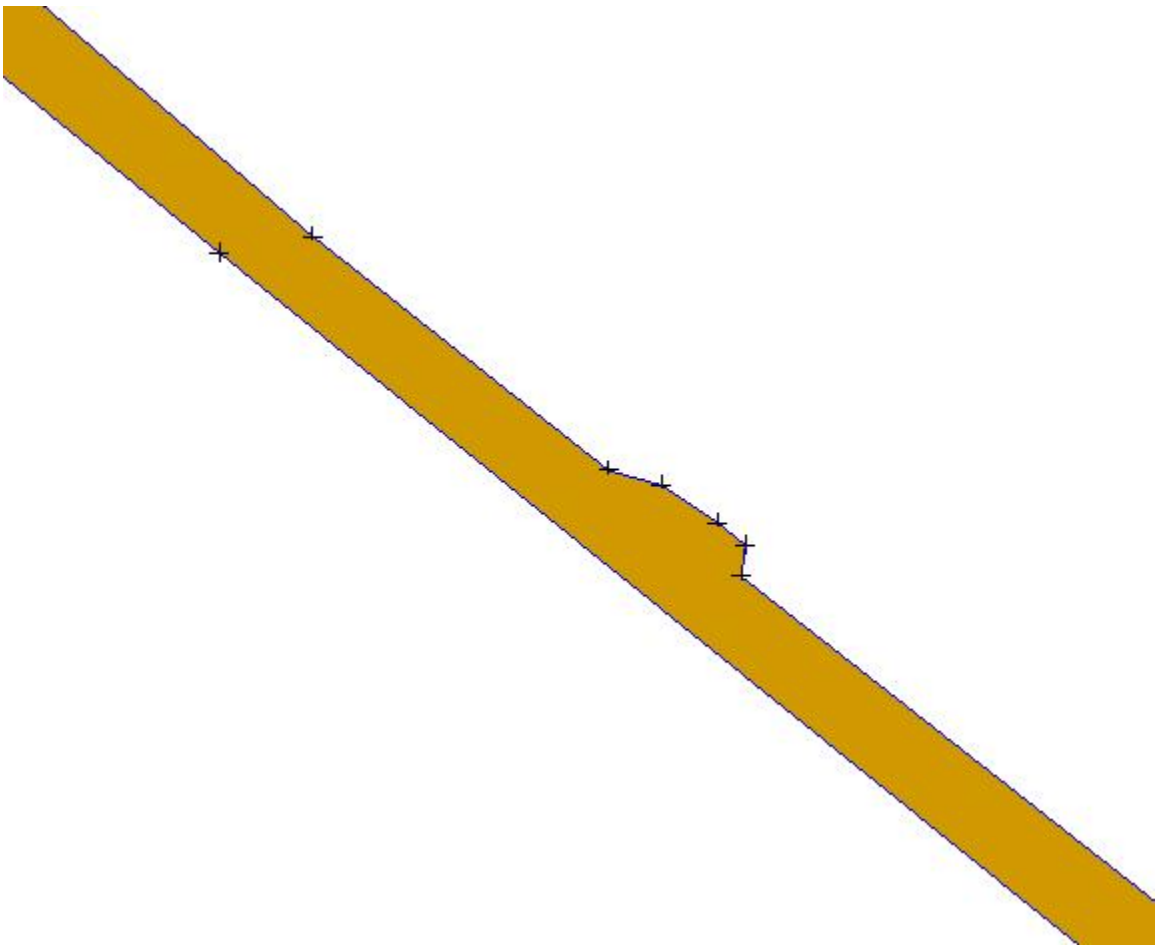

Fig.2 Modeling – step I: surface triangulation of the floor

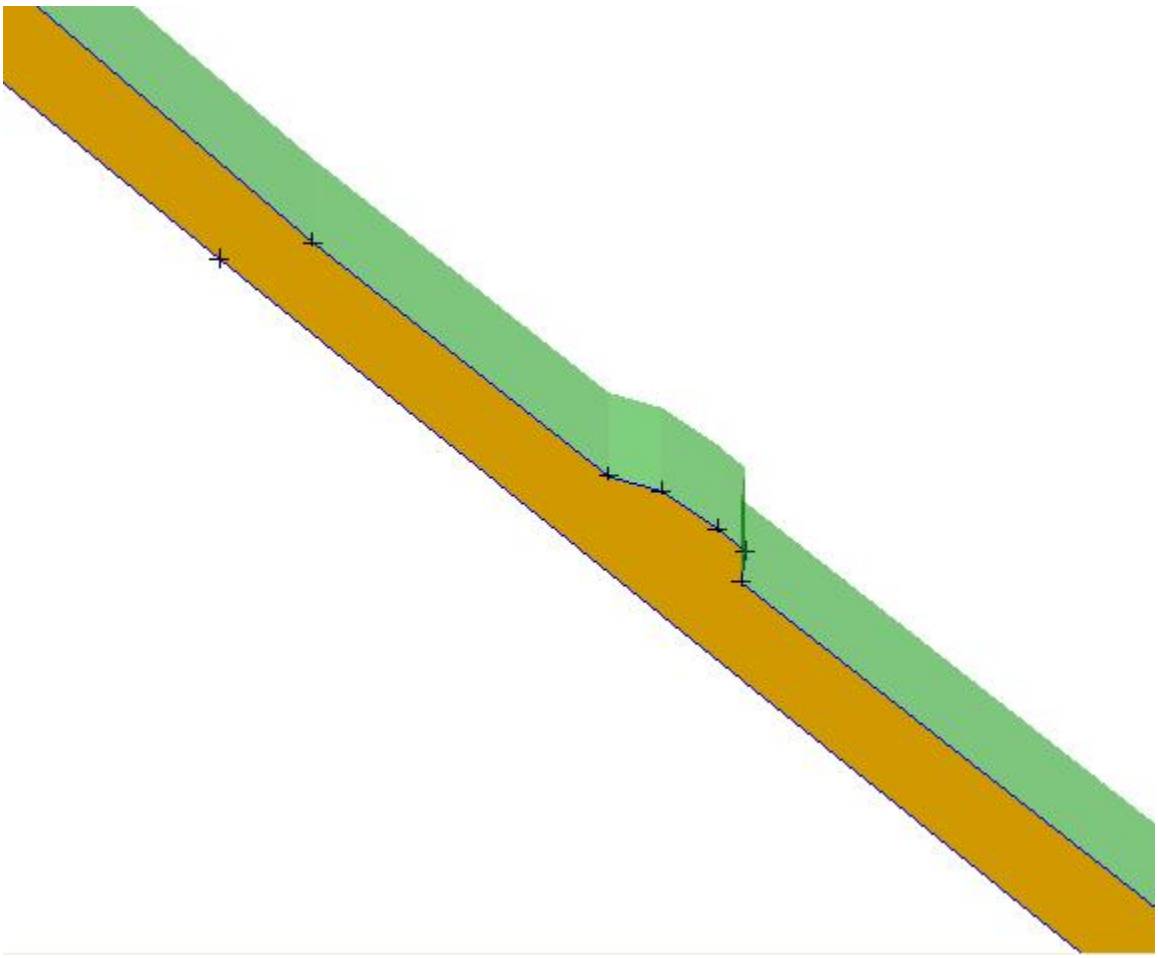

Fig.3 Modeling – step II: surface triangulation of the wall(s)

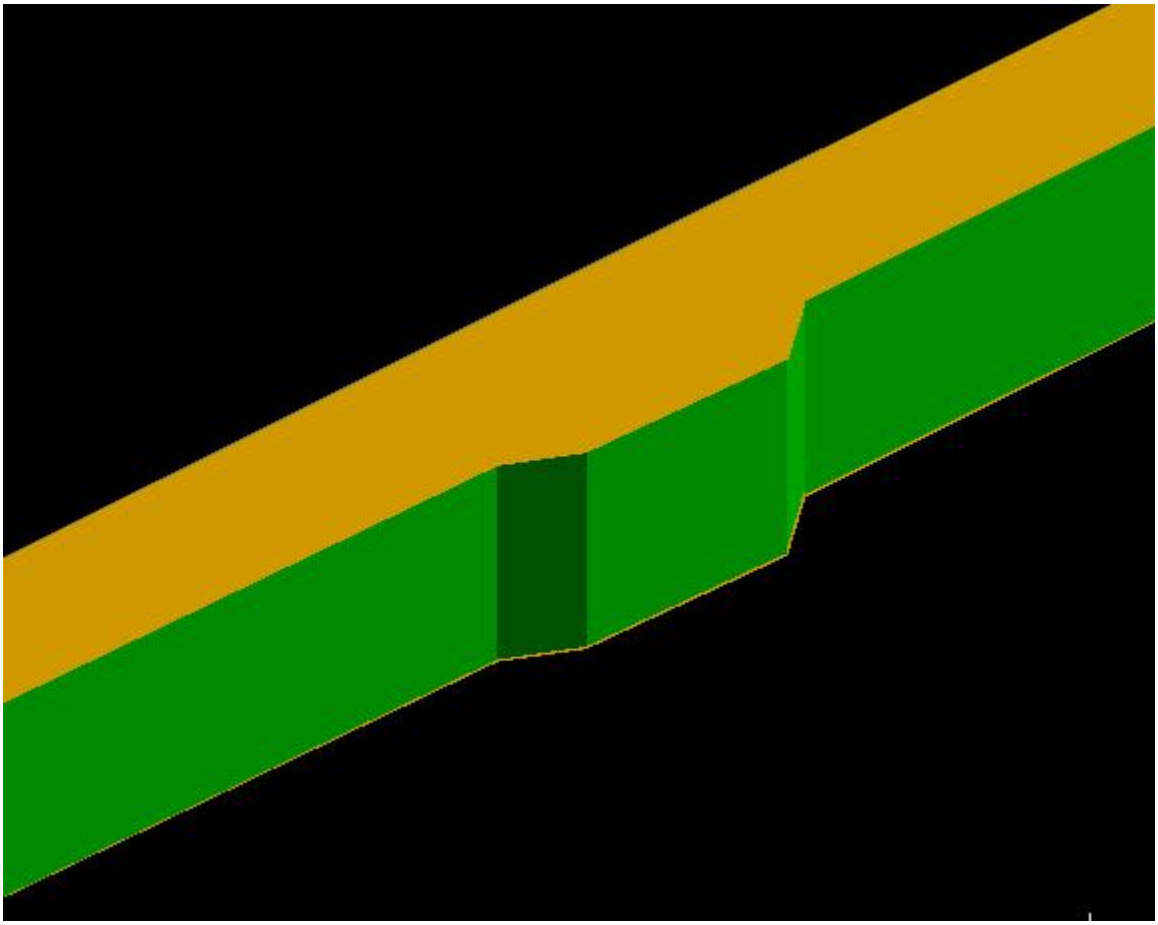

Fig.4 Modeling – step III: surface triangulation of the roof

Step IV: Appending triangulations – creating a complete solid

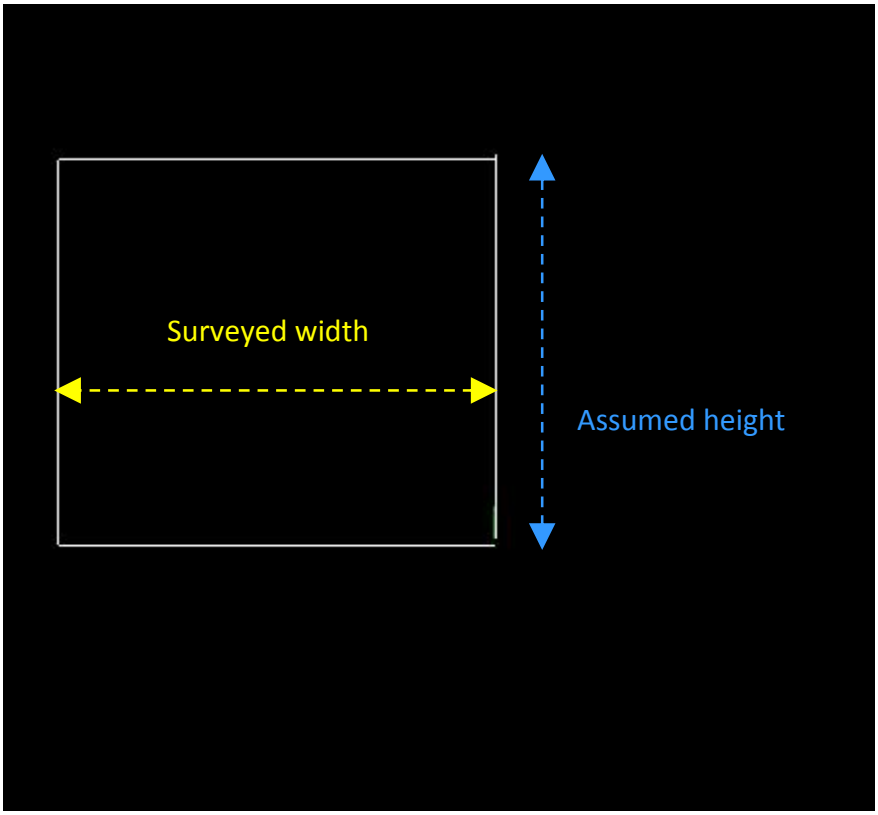

Fig.5 Vertical section through the solid (a rectangle)

Fig.6 Actual drift

Homestake Geology

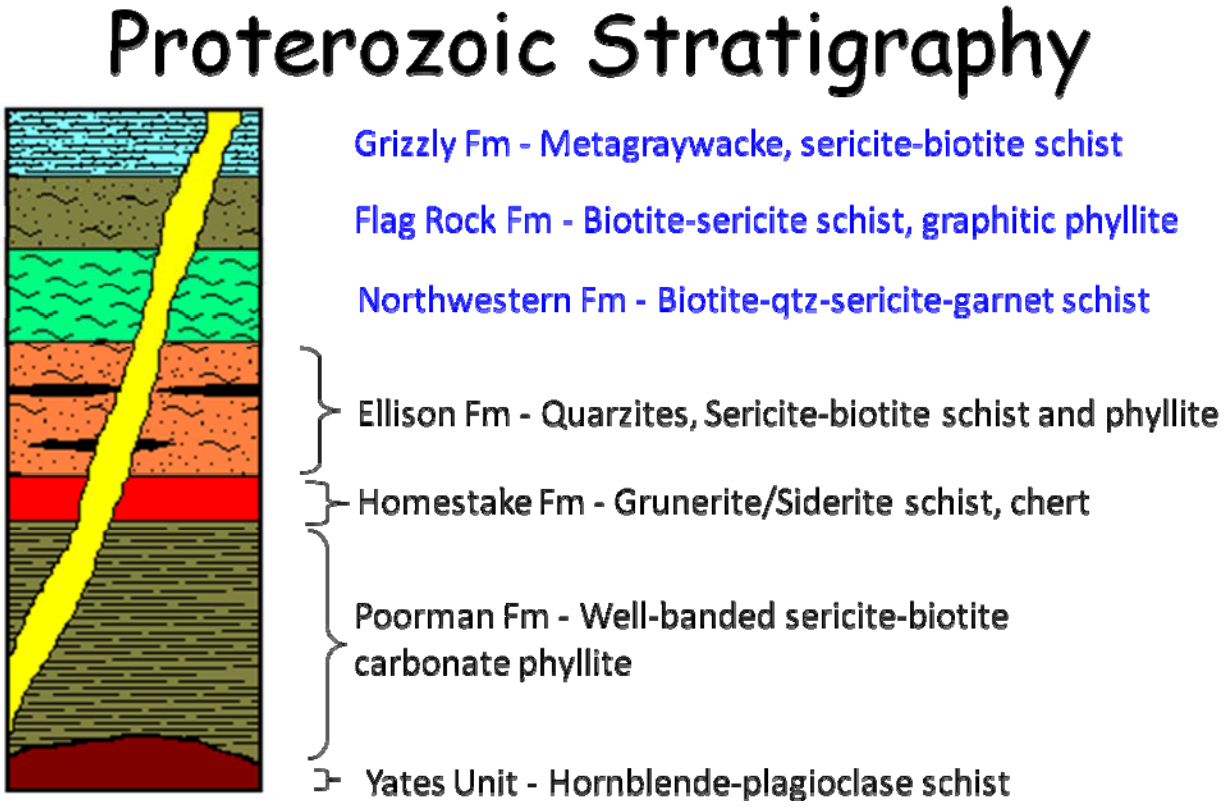

Fig.7 Homestake geology – lithological profile (Homestake Mining Company)

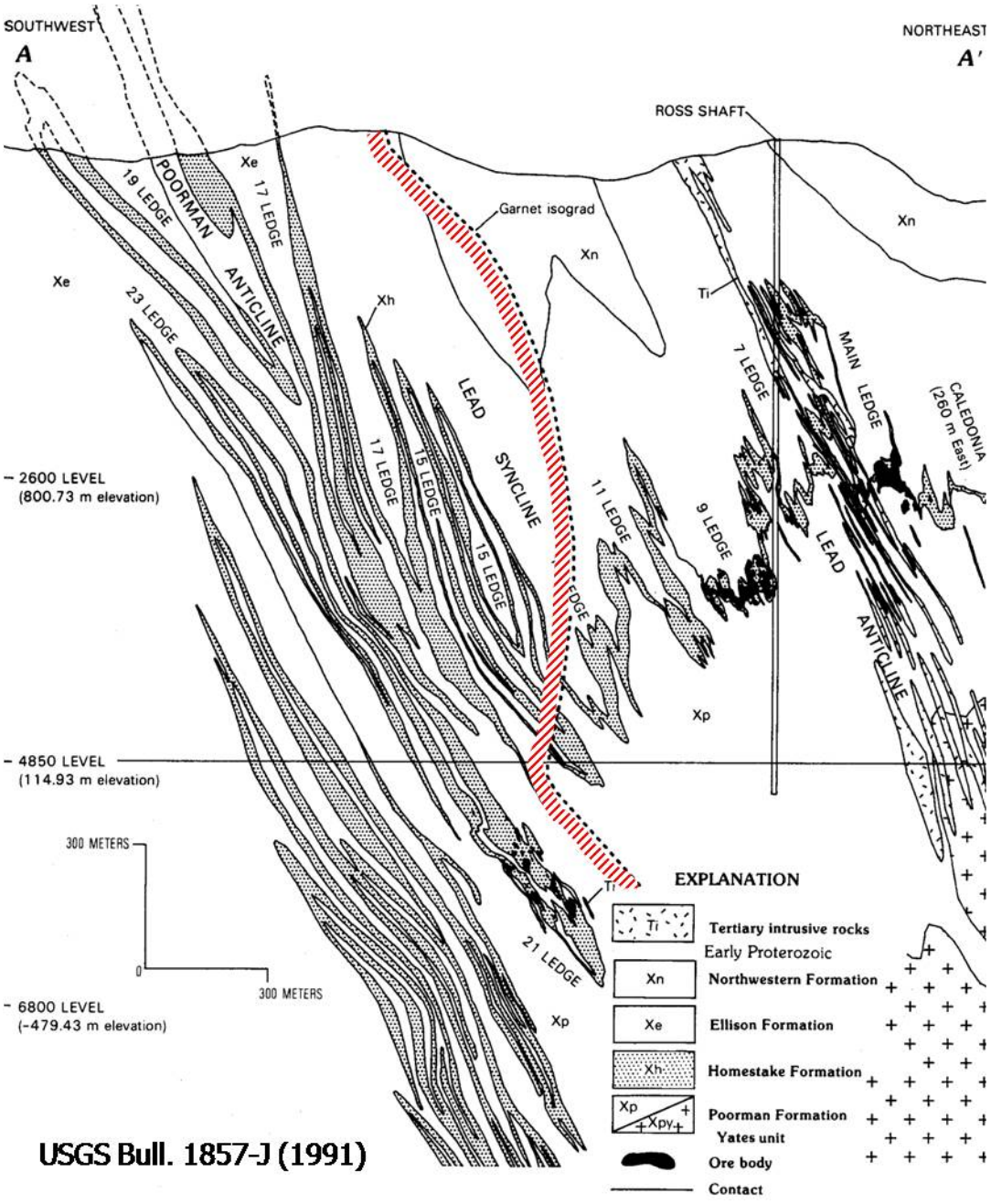

Fig.8 Homestake geology – vertical section (Homestake Mining Company)

Fig.9 Homestake geology – horizontal section at 4850 showing mine excavations and rock contacts (Homestake Mining Company)

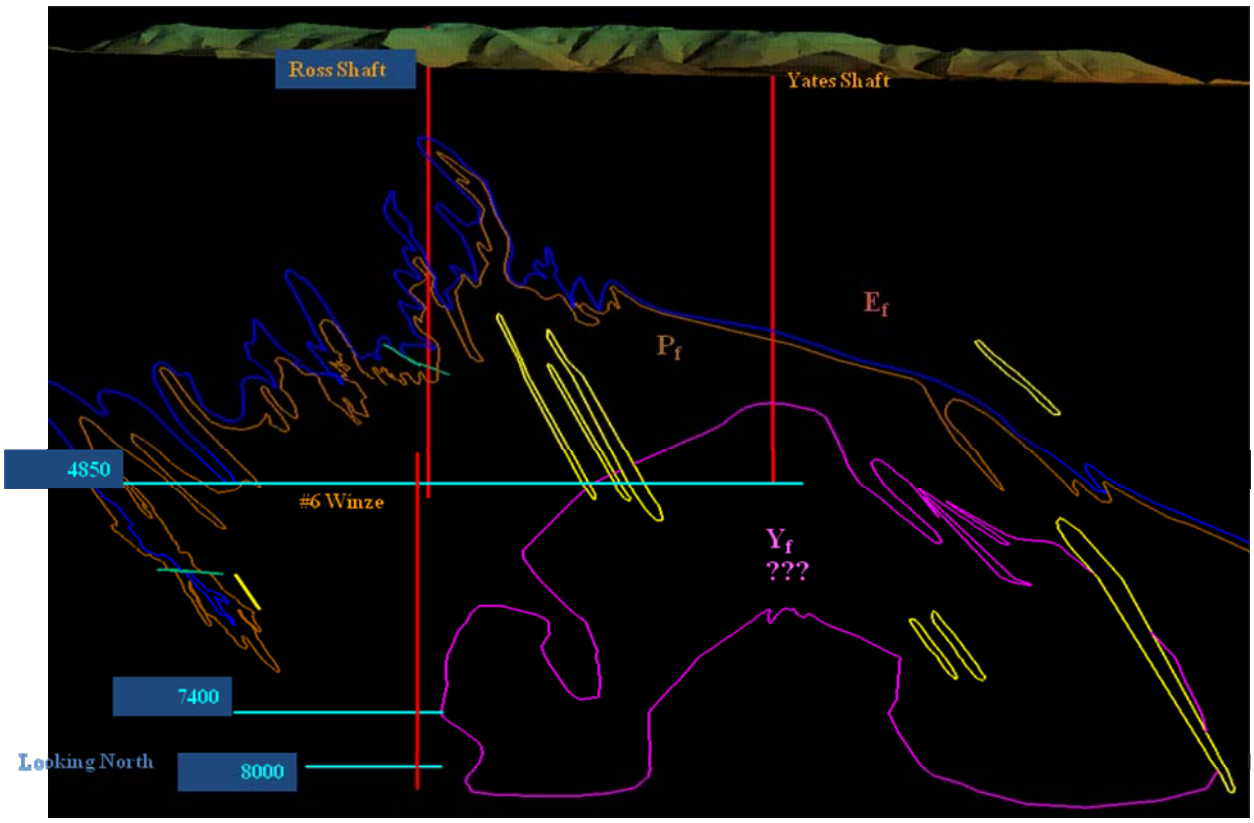

Fig.10 Homestake geology – vertical section showing mine main levels and rock contacts (Homestake Mining Company)

Note: the Yates Unit contacts are uncertain.

Fig.11 Homestake geology – Yates rock at surface outcrop (Homestake Mining Company)

Fig.12 Homestake geology – Yates rock sample from 7400 level (Zbigniew J. Hladysz, SDSM&T)

Fig.13 Homestake geology – Yates rock sample texture (Zbigniew J. Hladysz, SDSM&T)

Fig.14 Homestake geology – Yates rock samples after laboratory tests (Zbigniew J. Hladysz, SDSM&T)

(psi)	Formation					
Property	Homestake	Ellison	Poorman	Yates	Yates contact with Poorman	Rhyolite
C_1	20,150	13,620	11,340	22,000 to 31,000	7,900 to 26,000	14,000 to 34,000
C_2	11,550	10,000	11,410			
C_3	13,270	12,270	8,150			
T_1	1,380	2,990	2,350			1,800 to 3,300
T_2	1,140	820	590			
T_3	1,920	1,910	1,650			
	Notes:	1 and 3 directions are parallel to the schistosity.				
		2 direction is perpendicular to the schistosity.				

Fig.15 Homestake geology – Summary of rock strength data (Zbigniew J. Hladysz, SDSM&T)

Existing Homestake Drill Hole Database

(DUSEL area; 4850 level)

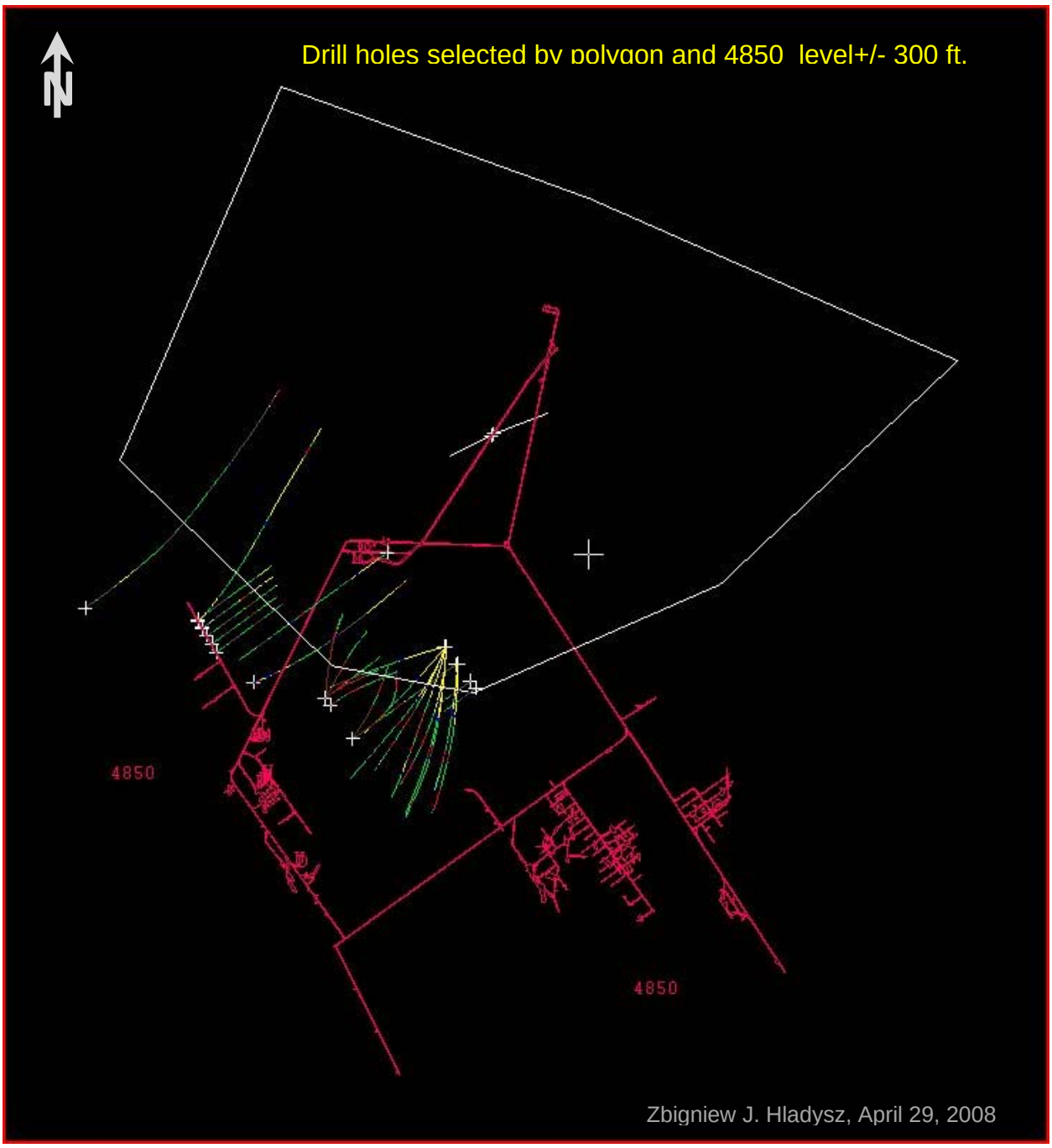

Fig.16 Homestake Drill Hole Data Base – extracted information from Vulcan software

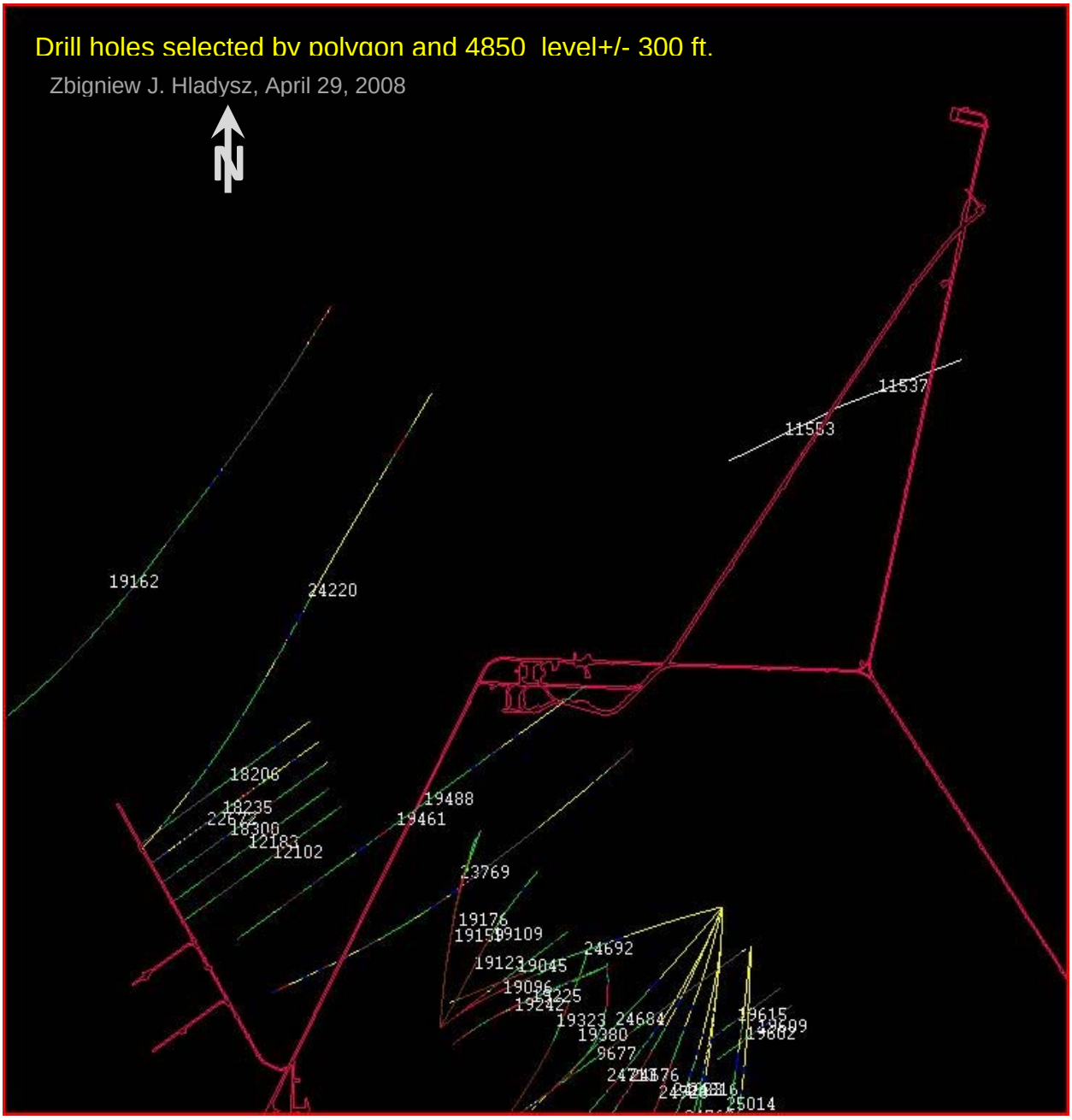

Fig.17 Homestake Drill Hole Data Base – extracted information from Vulcan software

Note: the number indicate drill holes id.

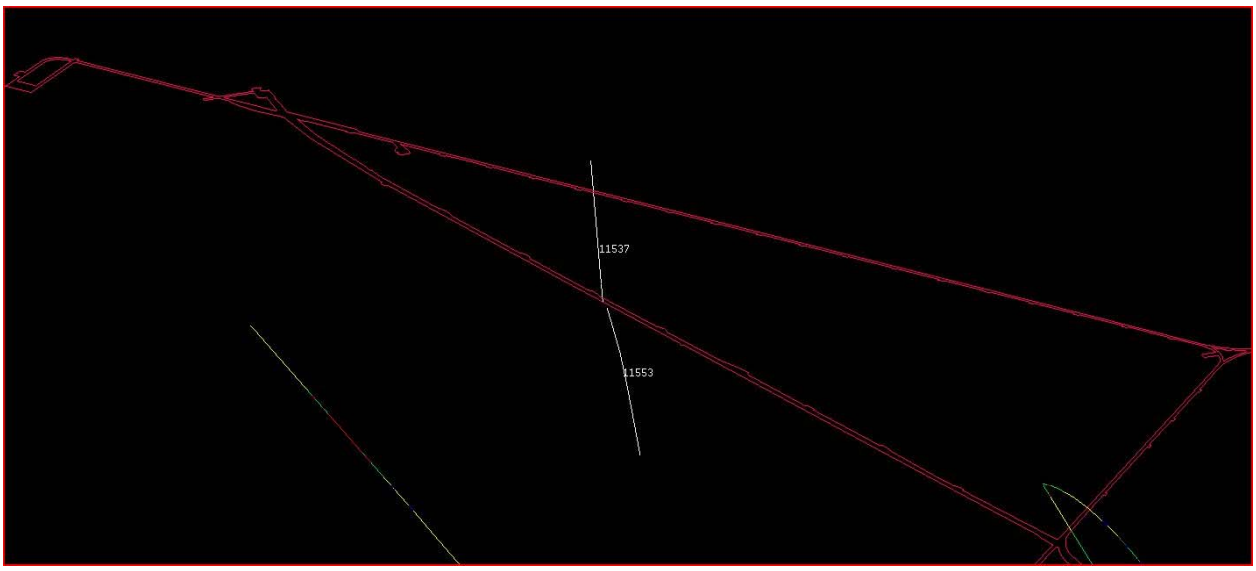

Fig.18 Homestake Drill Hole Data Base – extracted information from Vulcan software