3D-GIS vs Advanced Visualization

Hack H.R.G.K. and Ozmutlu S.

LWI seminar 1998

Delft, The Netherlands

3D-GIS vs Advanced Visualization

Visualization Strategy

At source data level:

visualization of engineering geological, geotechnical site investigation data

•georeferencing (boreholes, maps, plans, samples etc.)

•display of engineering variables, and geological characteristics in various display formats

•support for interactive engineering geological interpretation

•correlation and visual analysis of various data formats in a single canvas

At results level:

Visualization of engineering geological, geotechnical interpretation results

Visualization of ground-structure interactions

Visualization of complex, abstract information in understandable format

Dissemination of results to decision makers and general public

Engineering Geological, Geophysical, and Geotechnical Data sources for 3D Modeling and Visualization of 2nd Heinenoord Tunnel

15 Boreholes with lithological descriptions, total ? Parameters (source NITG-TNO)

10

2

11

13

44 CPT logs 4-9 variables (no lithological description) (source GD)

3 ACAD drawing files (source GD)

2 seismic lines (in ASCII, SEGY and TIFF formats) (source TUD)

METHODOLOGY

Conversion & import of available source data to 3D GIS

- •hole data (boreholes, CPTs, Electrical Soundings)
- •map data (electrical mapping, cross-sections, seismic lines)
- •engineering plans, layouts

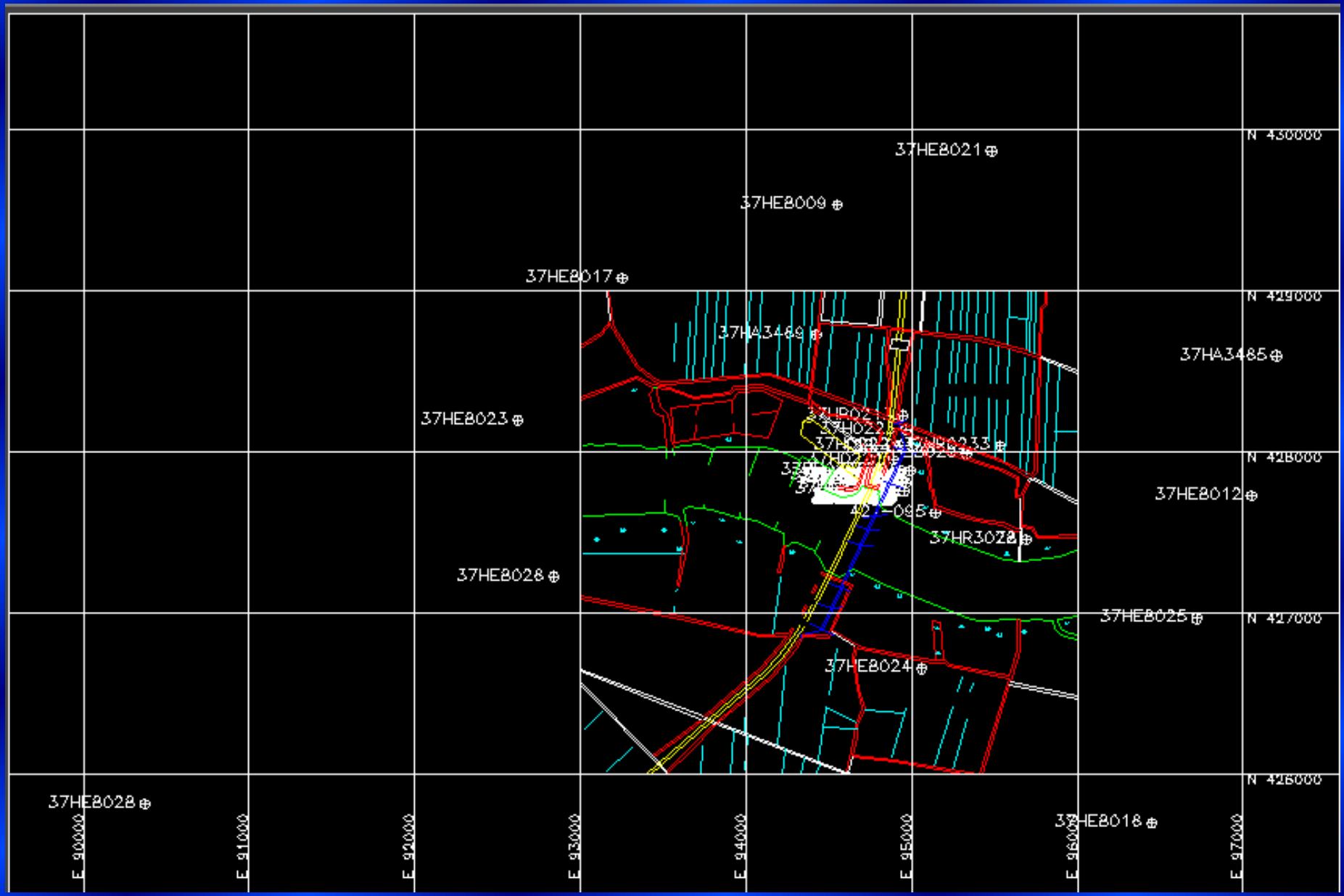
Analysis and interpretation of geotechnical data

- •geostatistical database (analysis and interpolation of geotechnical variables for identifying relationships, trends etc.)
- •volume data (geometry of subsurface geology, tunnel geometry)
- •grid data (continuous distribution of geotechnical, engineering variables)

2-3-4D display and visualization of geo-information and results

Development of simple, friendly user interface

For the visualization control; color effects, making display of objects on or of etc., export of visualization routines to VRML and Video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37HE8018
N 430000
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E 91000
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E 95000
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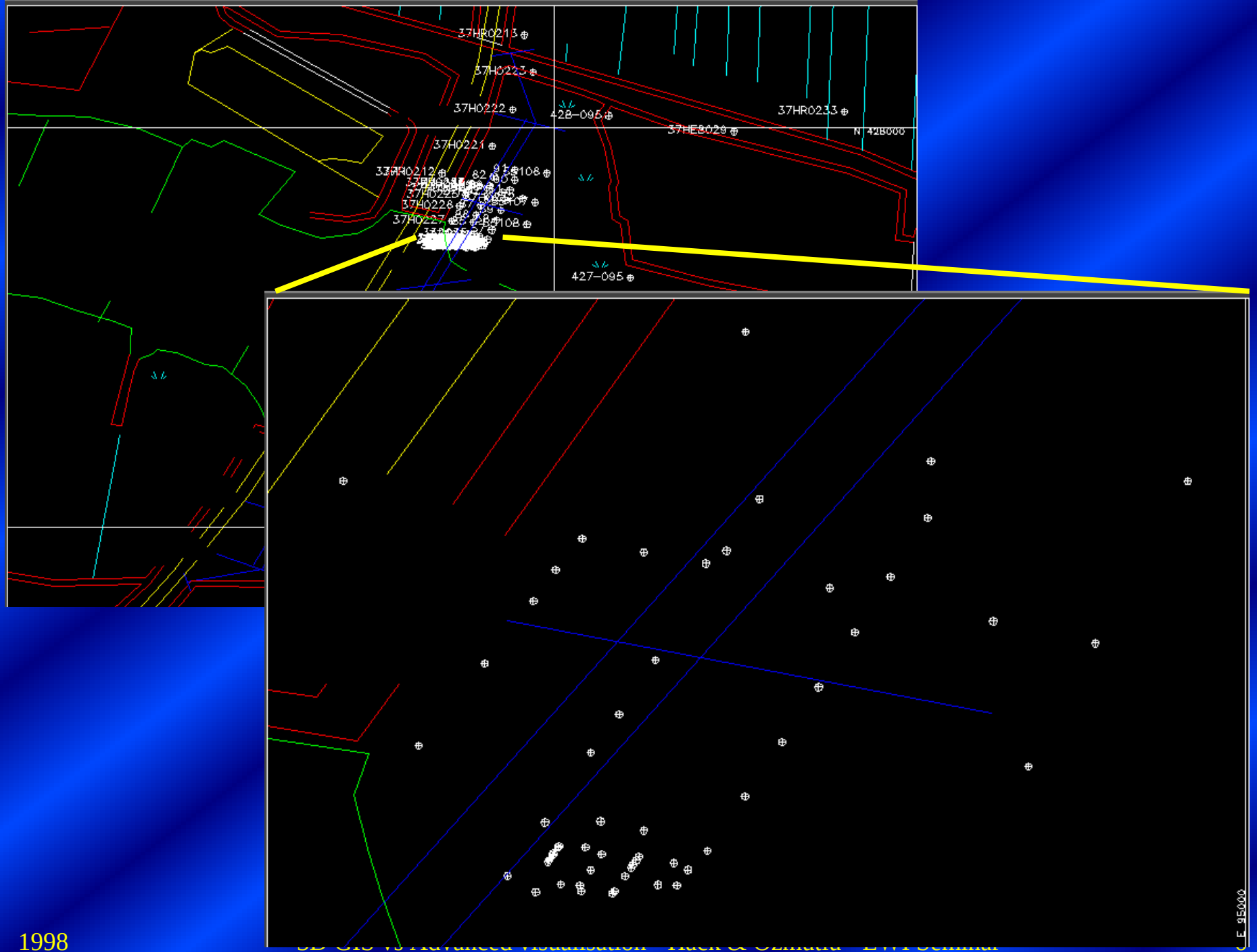
E 97000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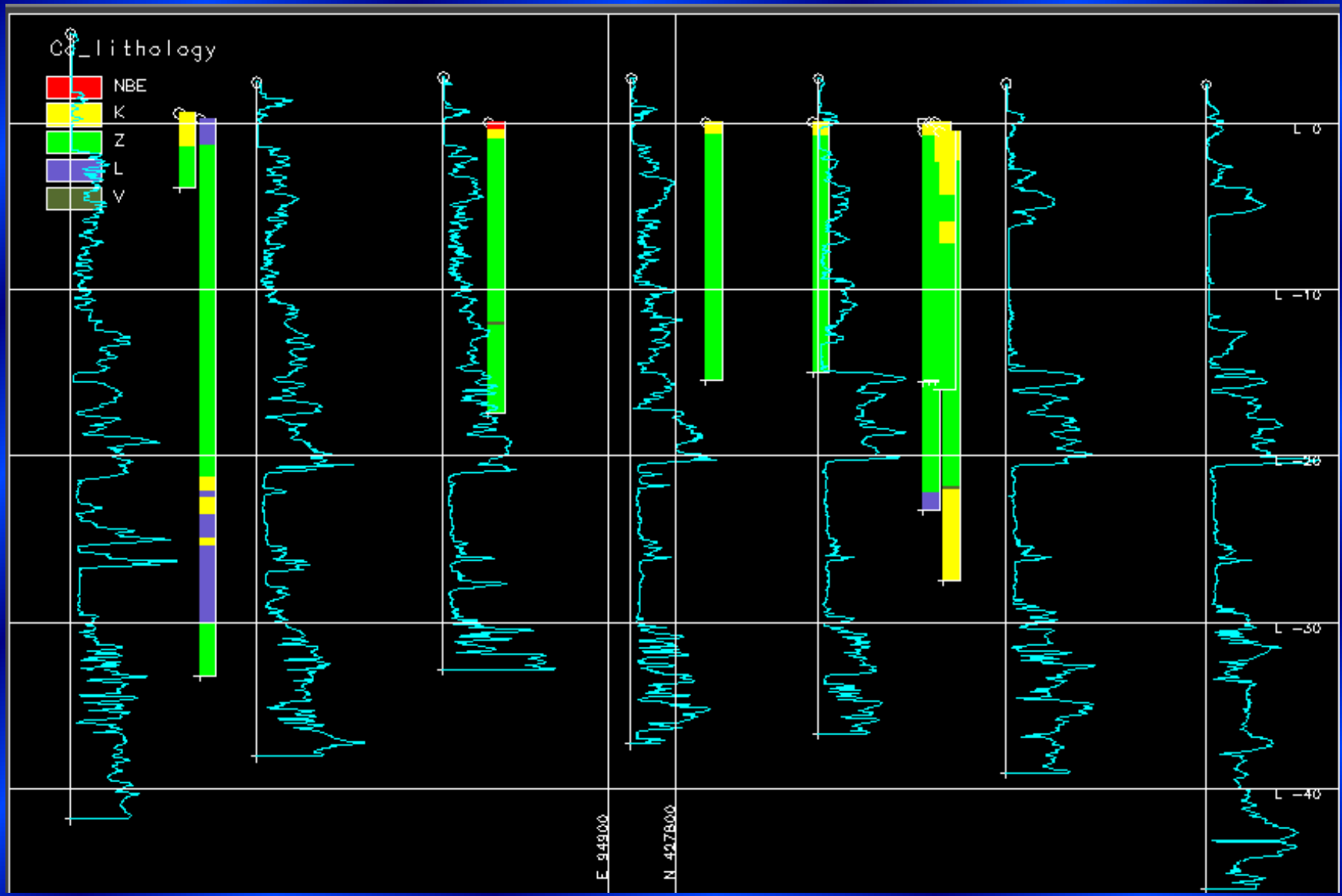
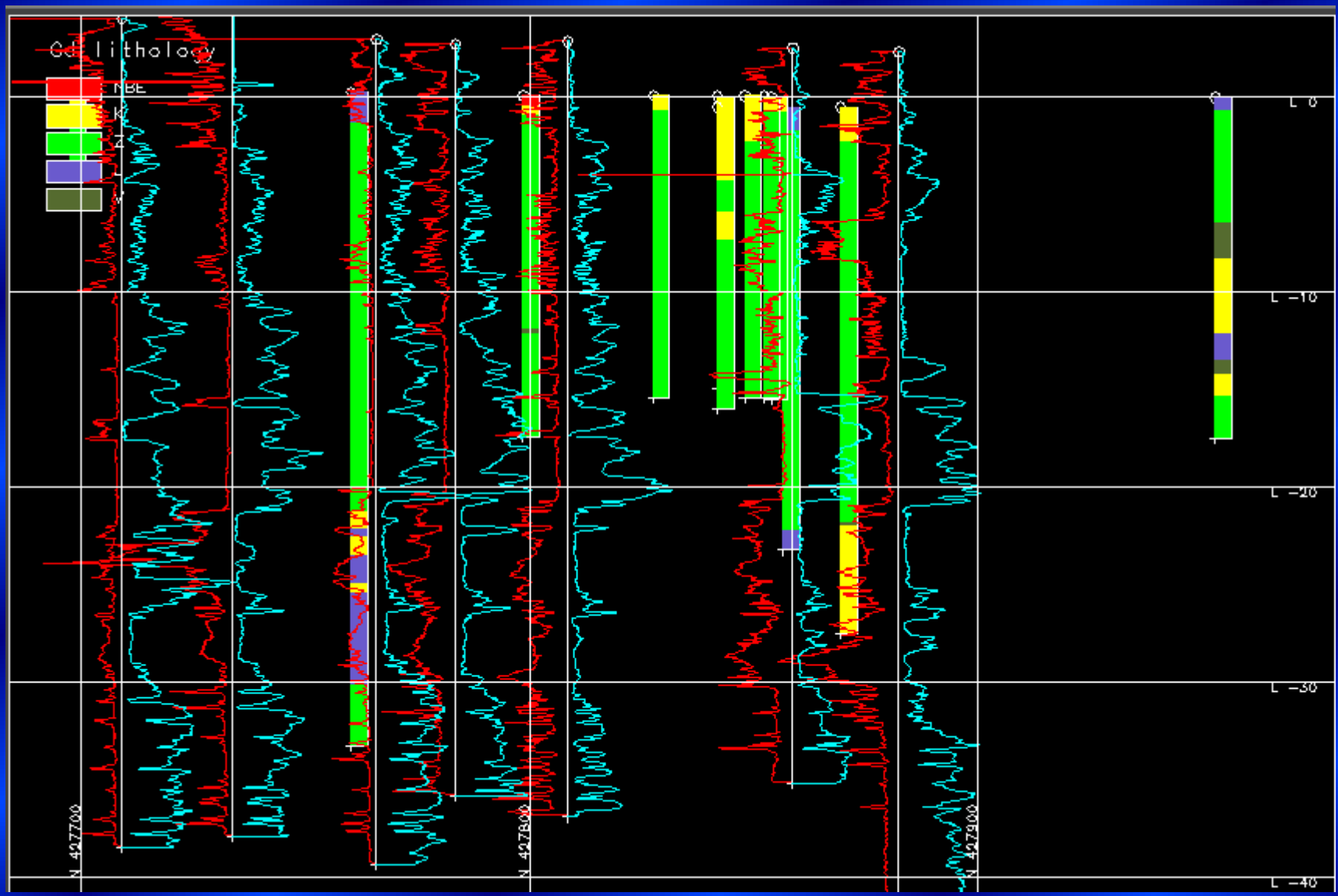
1998


Cd_lithology
NBE
K
Z
L
V
L 0
L -10
L -20
L -30
L -40
E 94900
N 427800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NBE
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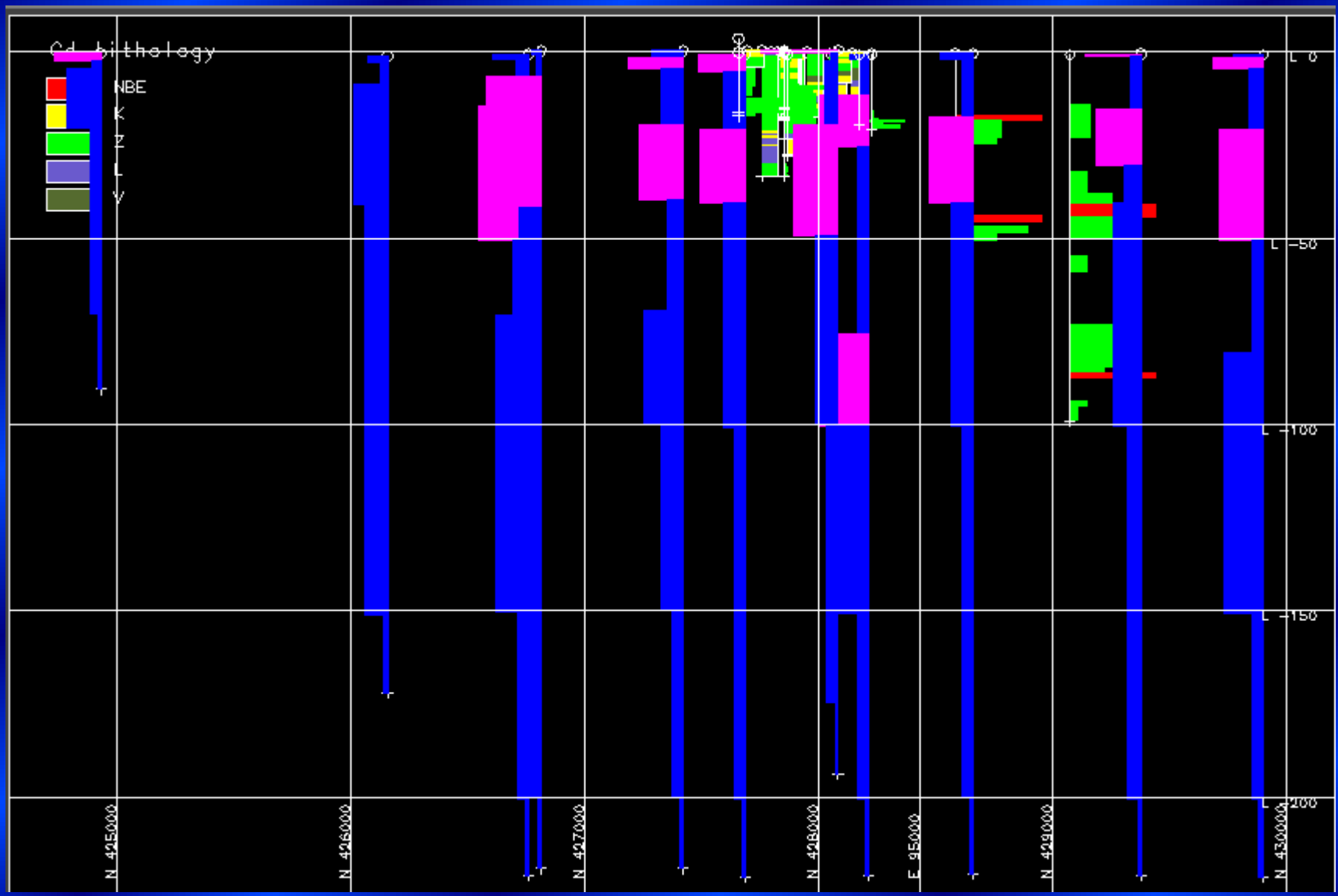
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NBE
K
Z
L
V
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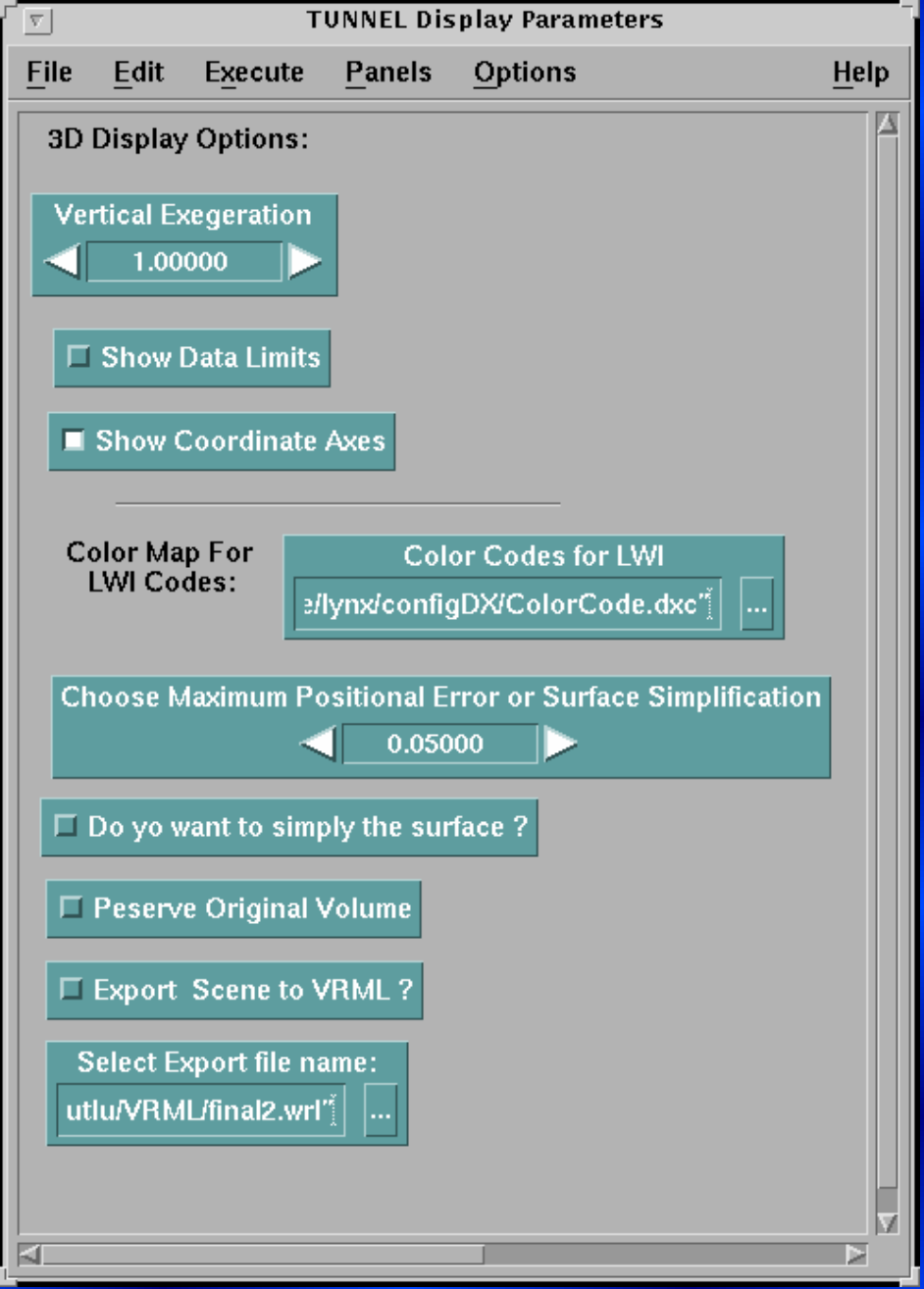
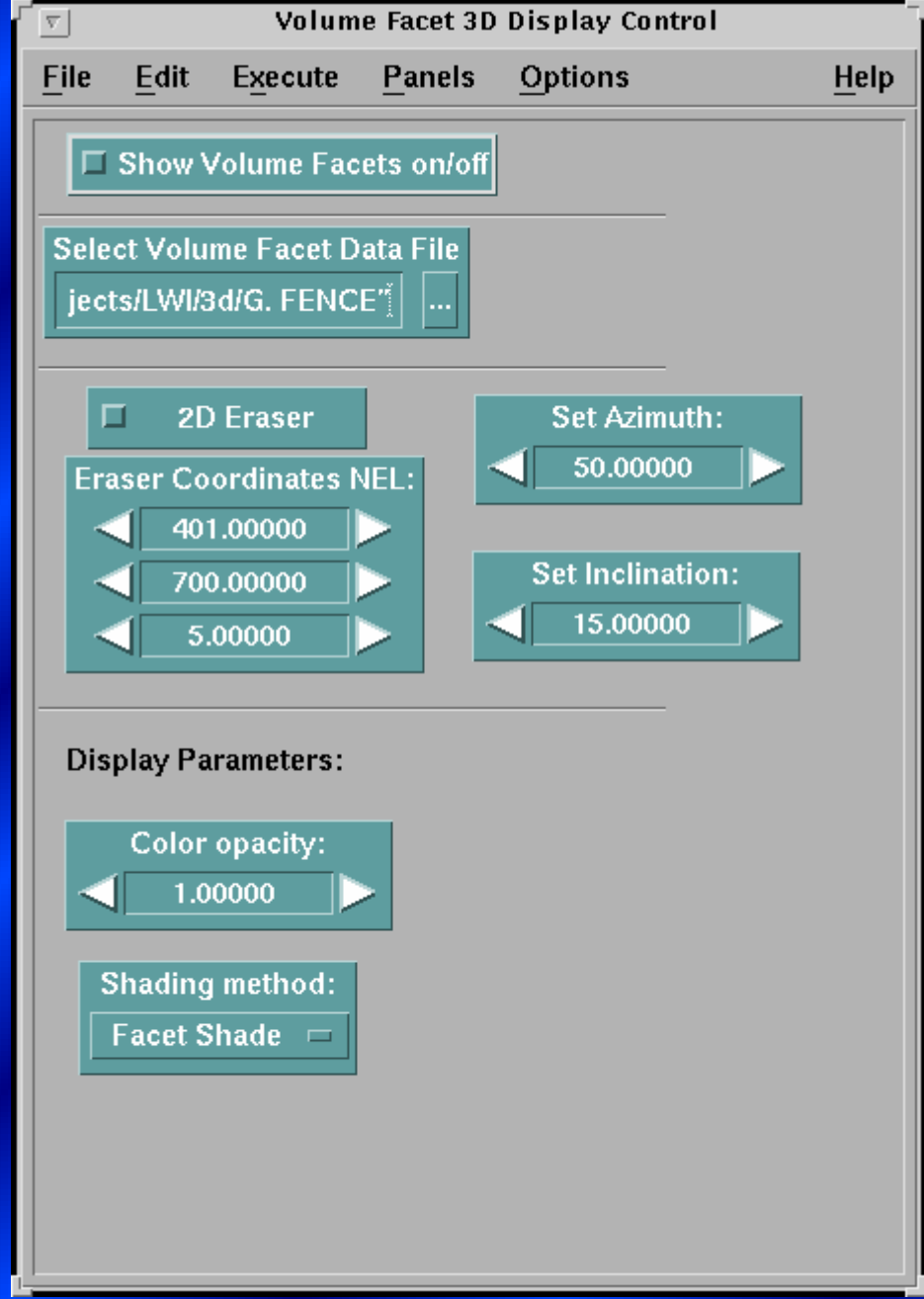
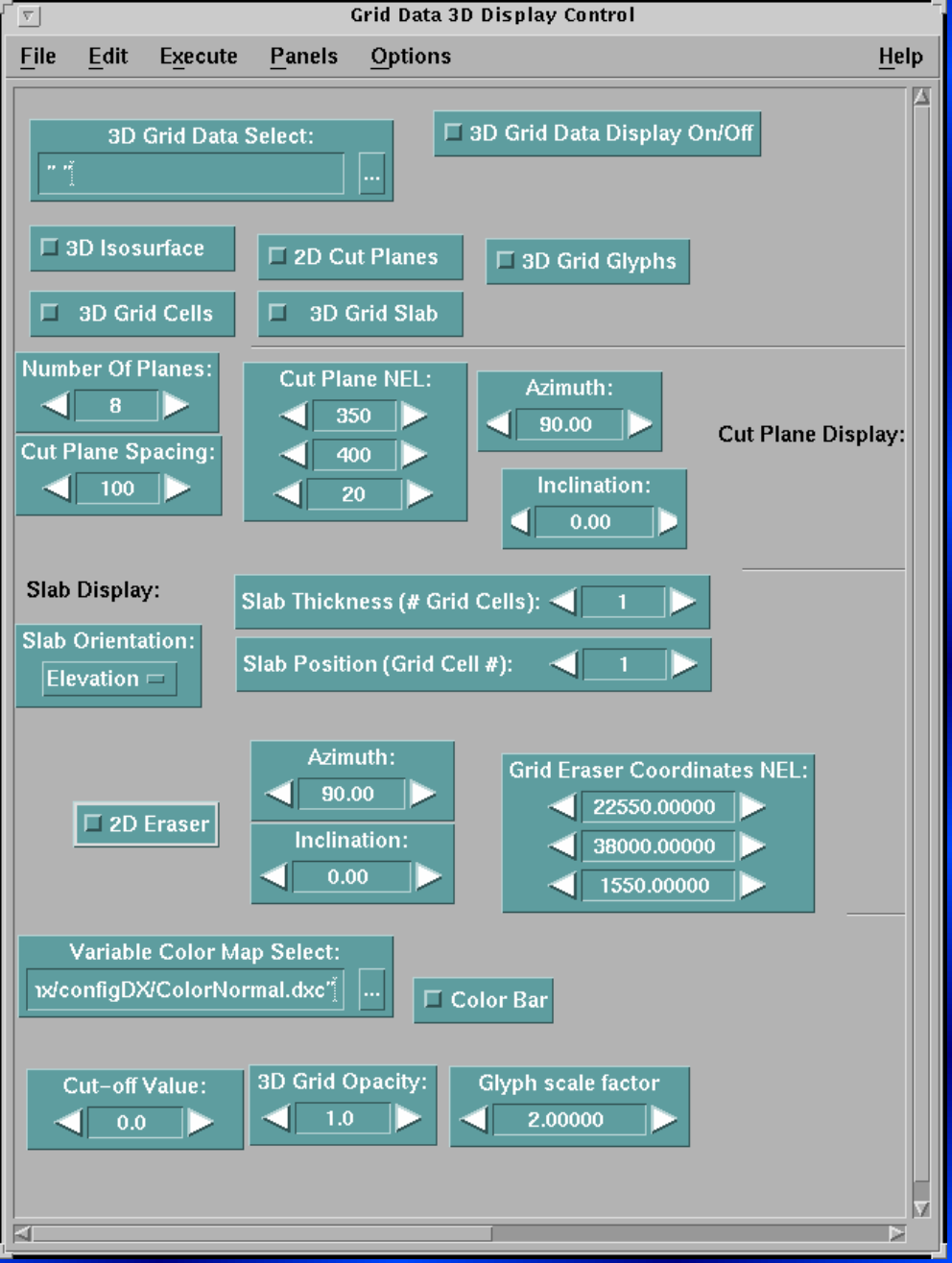
N 428000
E 95000
N 429000
N 430000


TUNNEL Display Parameters
File Edit Execute Panels Options Help
3D Display Options:
Vertical Exegeration
1.00000
Show Data Limits
Show Coordinate Axes
Color Map For LWI Codes:
Color Codes for LWI
e/lynx/configDX/ColorCode.dxc
Choose Maximum Positional Error or Surface Simplification
0.05000
Do yo want to simply the surface ?
Peserve Original Volume
Export Scene to VRML ?
Select Export file name:
utlu/VRML/final2.wrl


Volume Facet 3D Display Control
File Edit Execute Panels Options Help
Show Volume Facets on/off
Select Volume Facet Data File
jects/LWI/3d/G. FENCE
2D Eraser
Eraser Coordinates NEL:
401.00000
700.00000
5.00000
Set Azimuth:
50.00000
Set Inclination:
15.00000
Display Parameters:
Color opacity:
1.00000
Shading method:
Facet Shade


Grid Data 3D Display Control
File
Edit
Execute
Panels
Options
Help
3D Grid Data Select:
3D Grid Data Display On/Off
3D Isosurface
2D Cut Planes
3D Grid Glyphs
3D Grid Cells
3D Grid Slab
Number Of Planes:
8
Cut Plane Spacing:
100
Cut Plane NEL:
350
400
20
Azimuth:
90.00
Inclination:
0.00
Cut Plane Display:
Slab Display:
Slab Thickness (# Grid Cells):
1
Slab Orientation:
Elevation
Slab Position (Grid Cell #):
1
2D Eraser
Azimuth:
90.00
Inclination:
0.00
Grid Eraser Coordinates NEL:
22550.00000
38000.00000
1550.00000
Variable Color Map Select:
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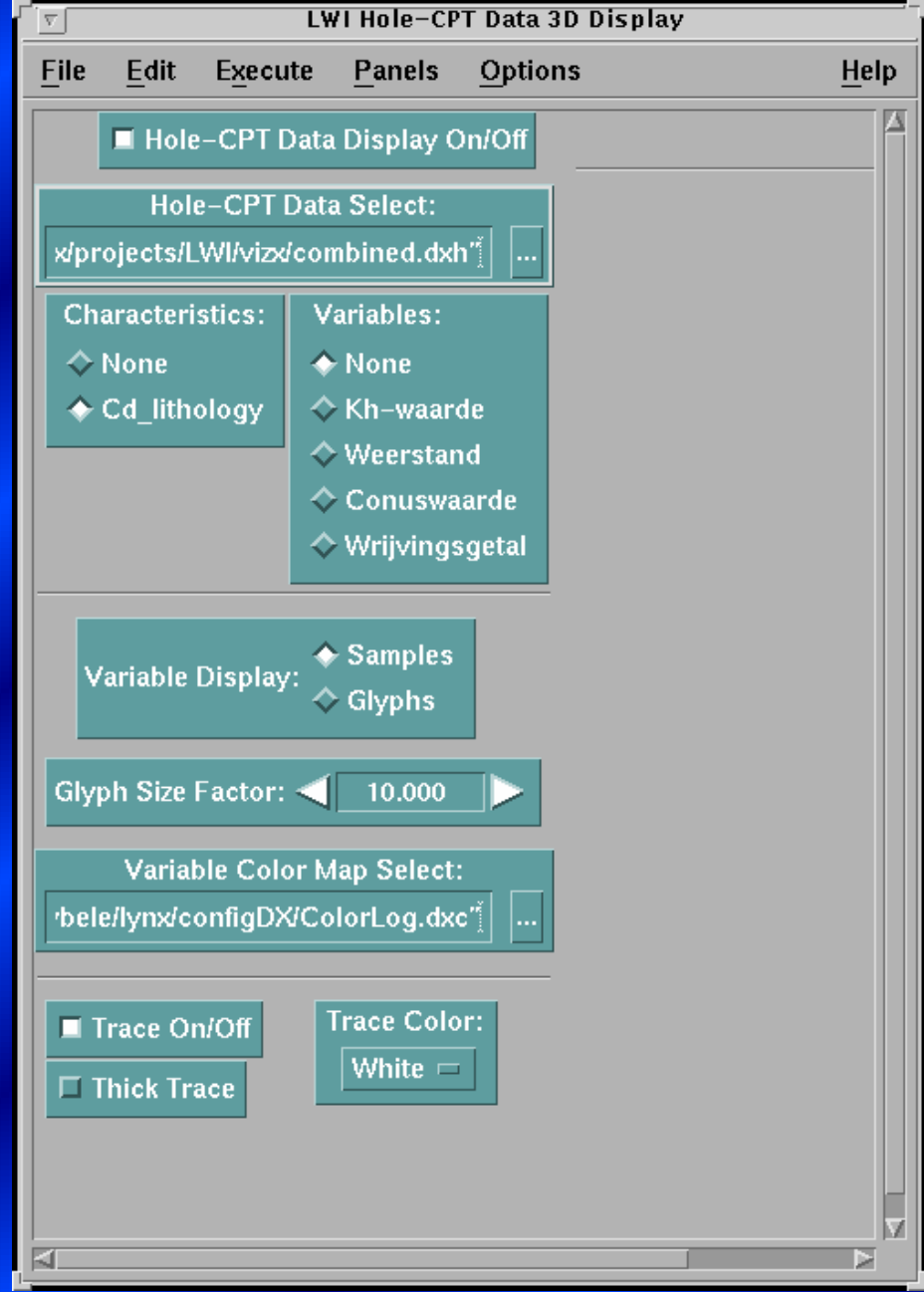
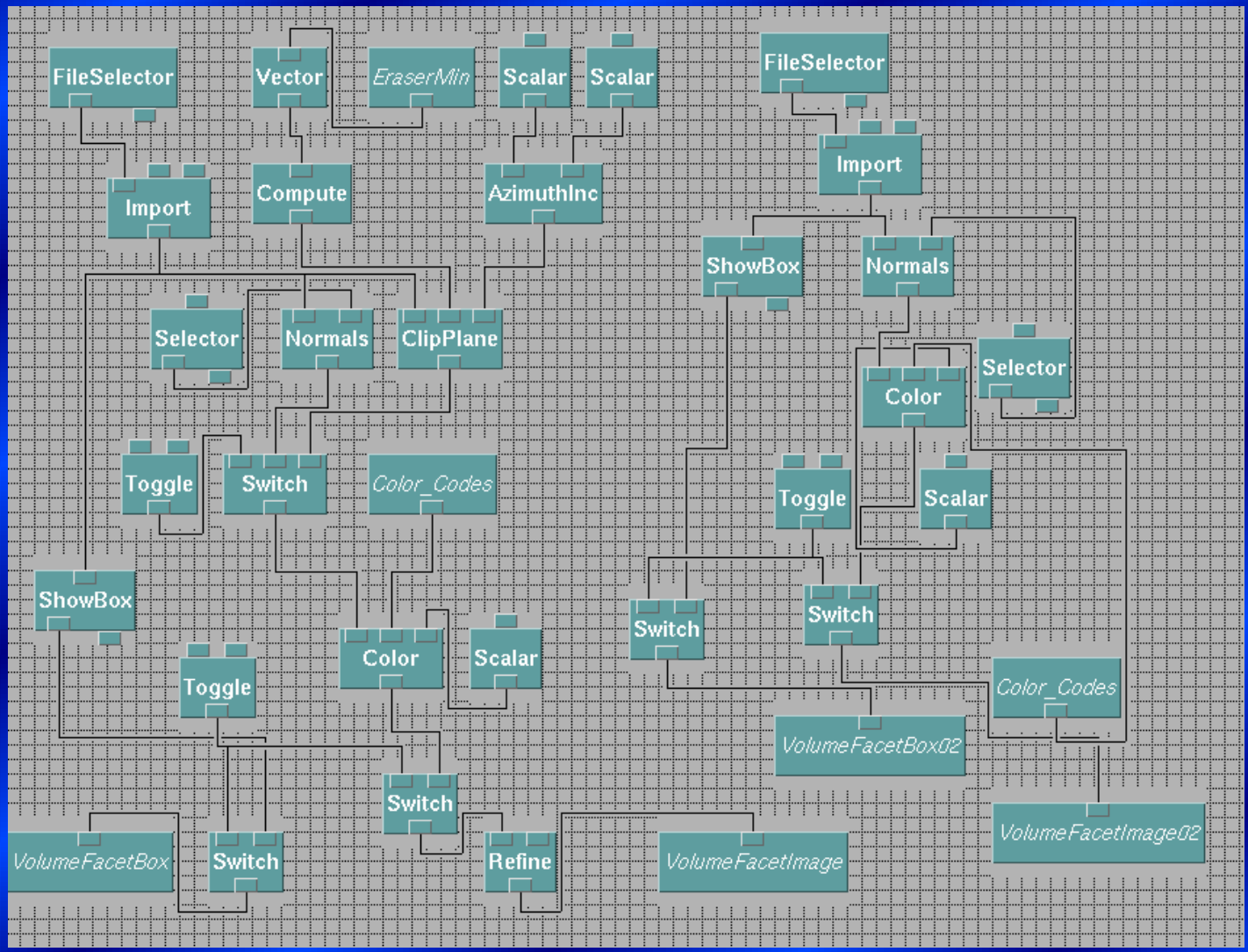
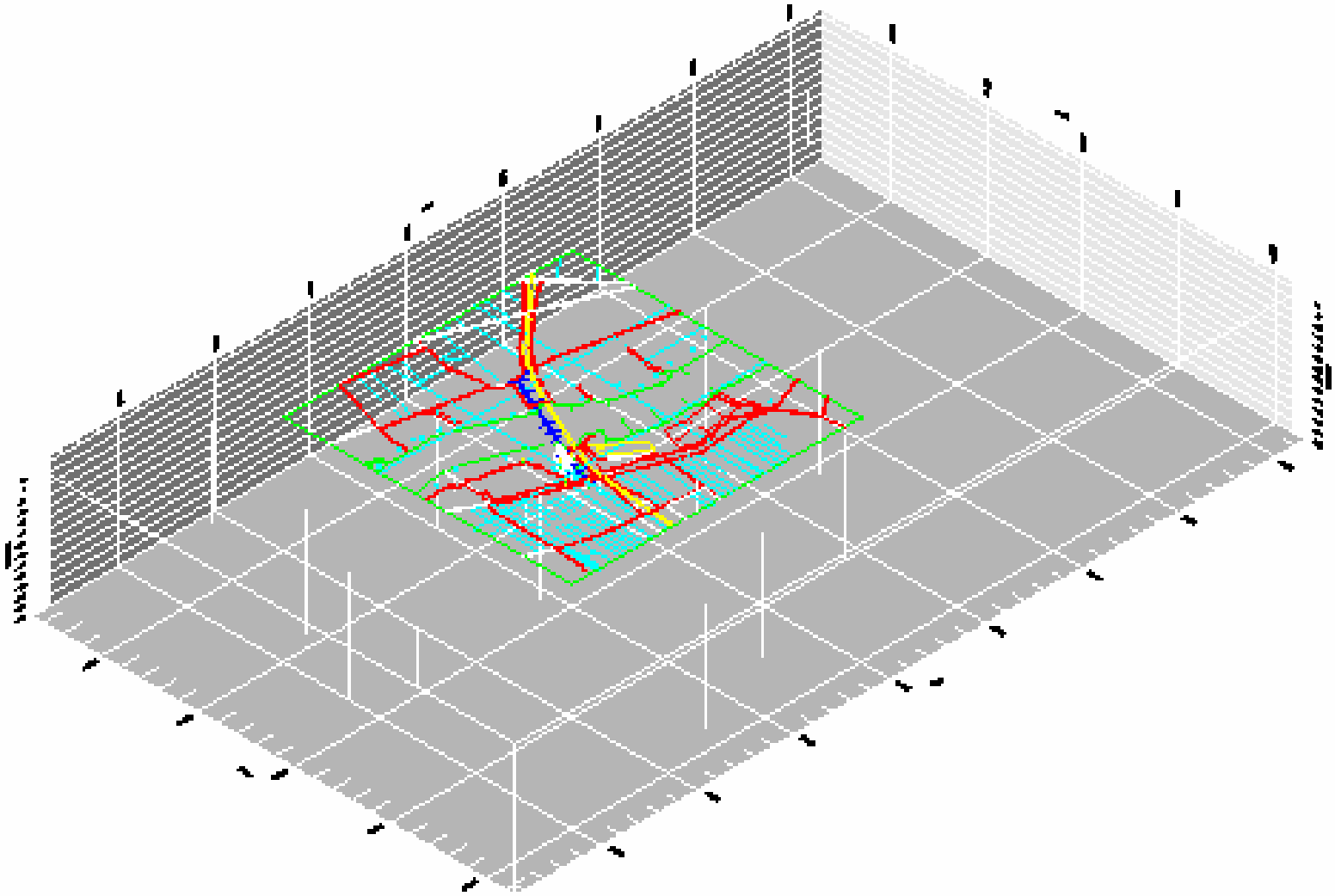
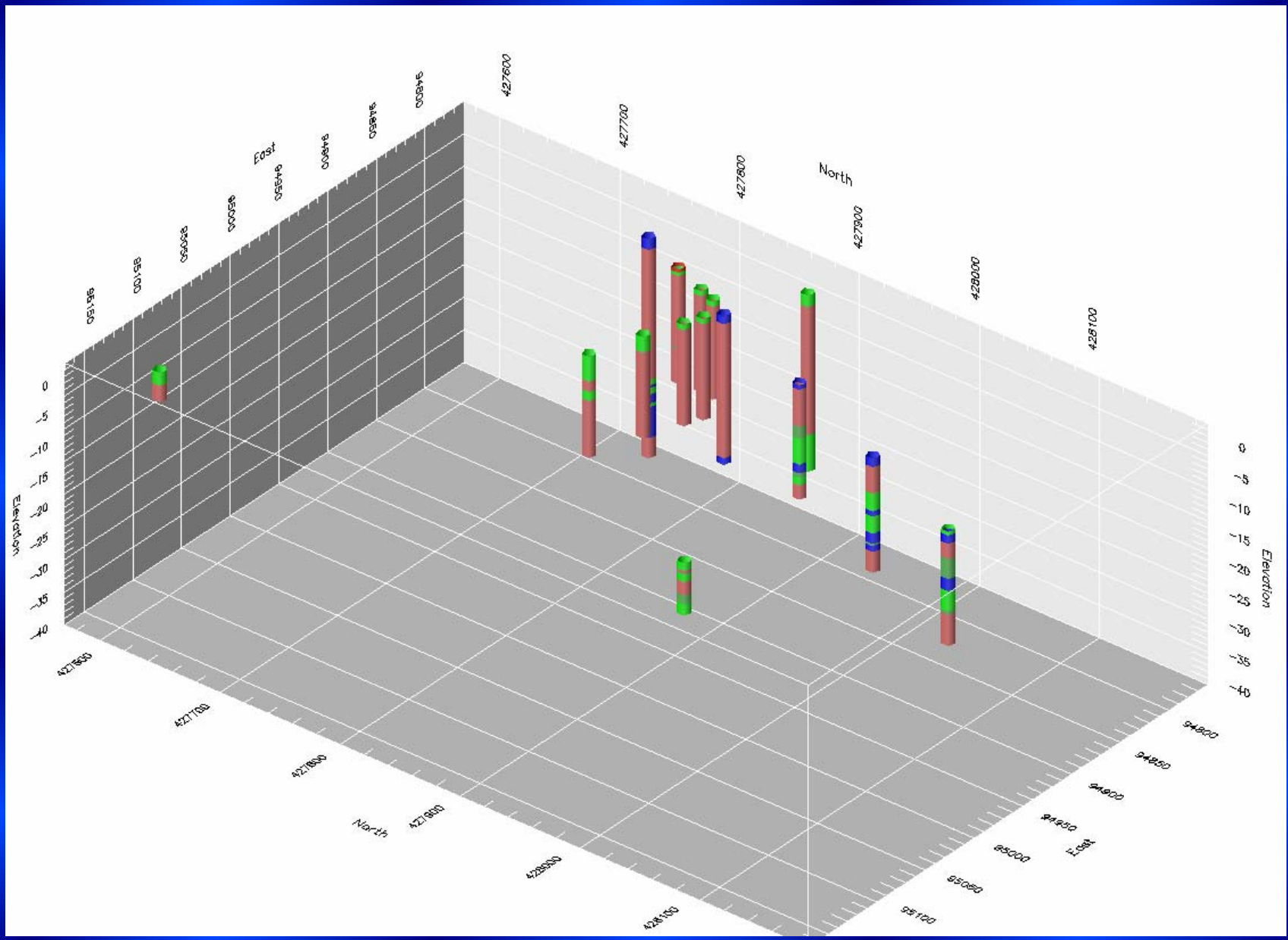
Color Bar
Cut-off Value:
0.0
3D Grid Opacity:
1.0
Glyph scale factor
2.00000


LWI Hole-CPT Data 3D Display
File
Edit
Execute
Panels
Options
Help
Hole-CPT Data Display On/Off
Hole-CPT Data Select:
x/projects/LWI/vizx/combined.dxh
Characteristics:
None
Cd_lithology
Variables:
None
Kh-waarde
Weerstand
Conuswaarde
Wrijvingsgetal
Variable Display:
Samples
Glyphs
Glyph Size Factor:
10.000
Variable Color Map Select:
bele/lynx/configDX/ColorLog.dxc
Trace On/Off
Thick Trace
Trace Color:
White


FileSelector
Vector
EraserMin
Scalar
Scalar
FileSelector
Import
Compute
AzimuthInc
Import
ShowBox
Normals
Selector
Normals
ClipPlane
Selector
Color
Toggle
Switch
Color_Codes
Toggle
Scalar
ShowBox
Switch
Switch
Color
Scalar
Toggle
Color_Codes
VolumeFacetBox02
Switch
VolumeFacetImage02
VolumeFacetBox
Switch
Refine
VolumeFacetImage




East
North
Elevation
0
-5
-10
-15
-20
-25
-30
-35
-40
427600
427700
427800
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94850
94900
94950
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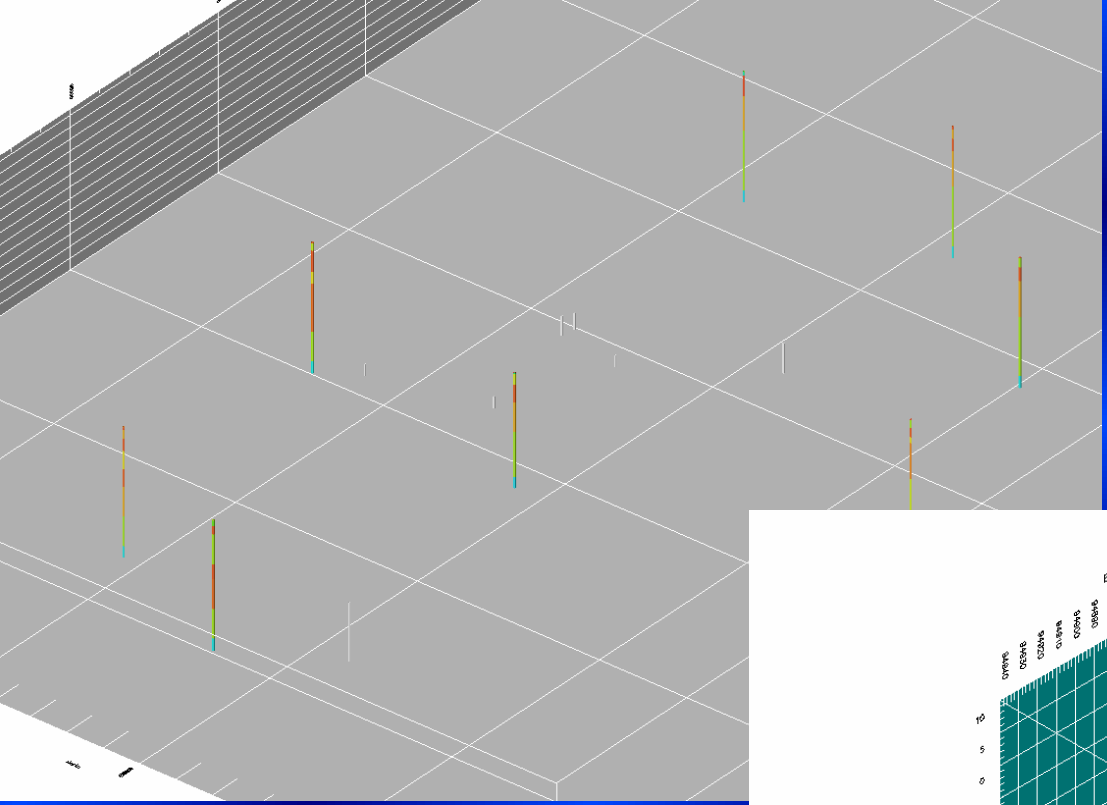
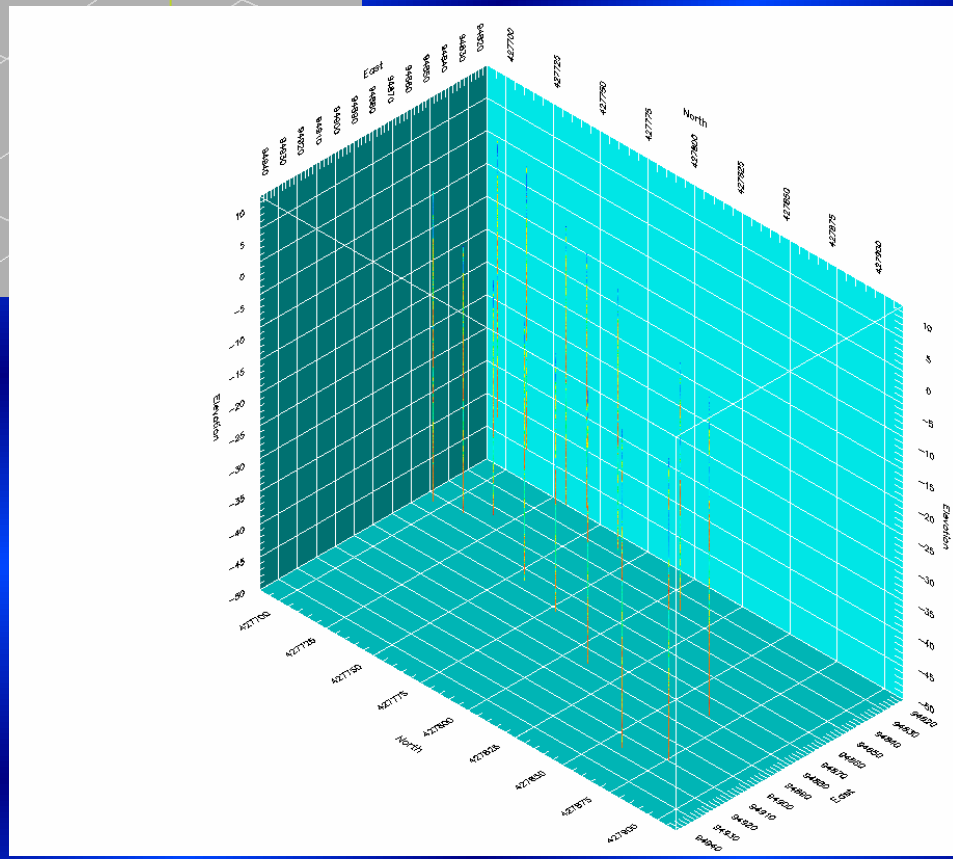
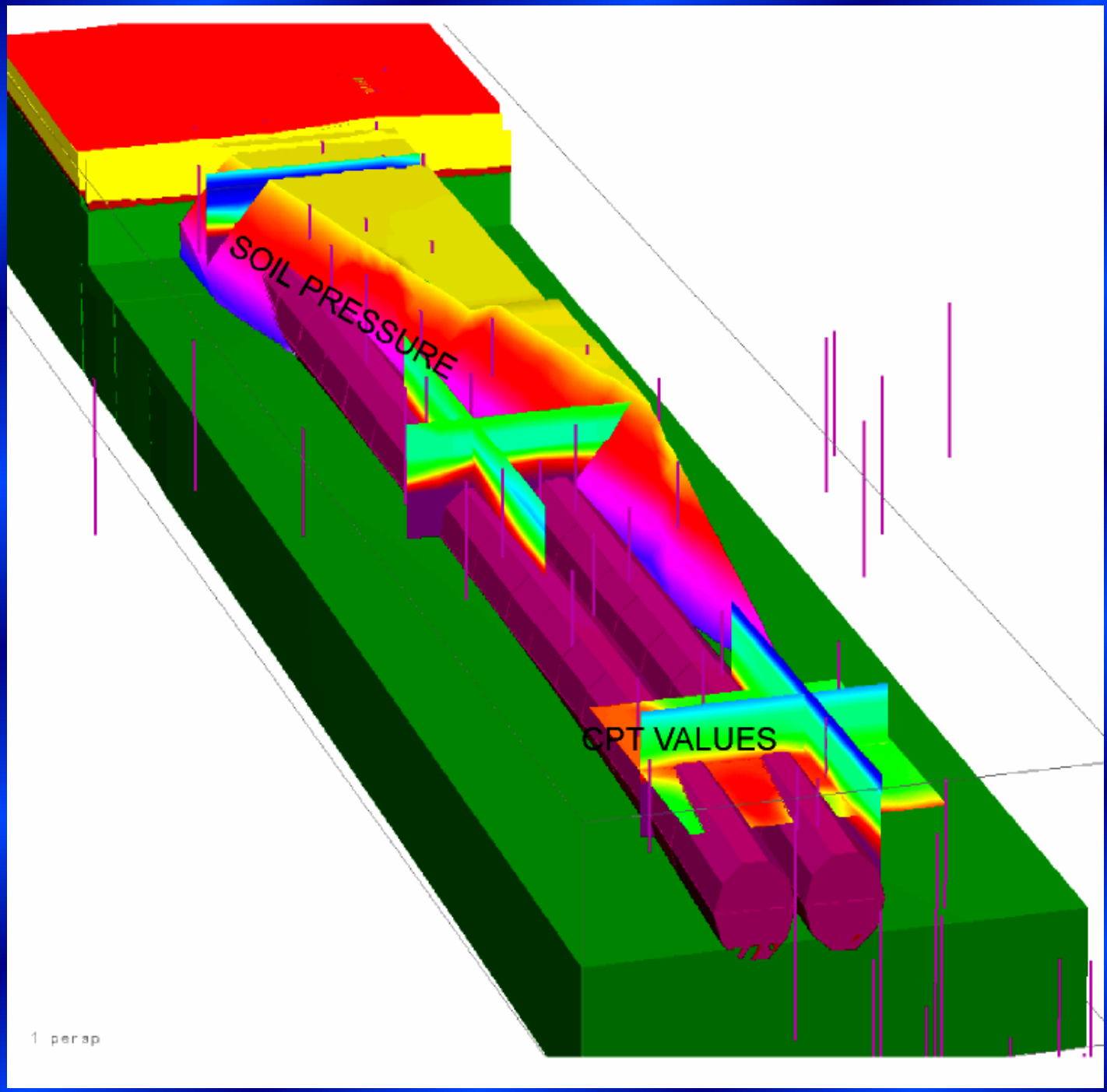
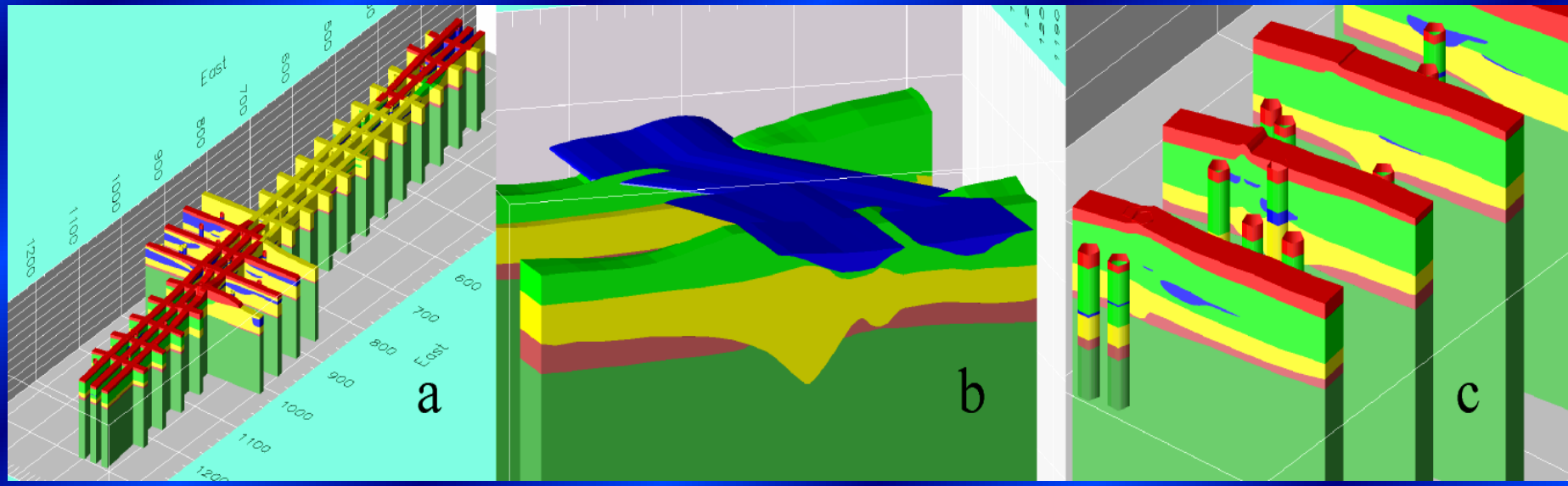
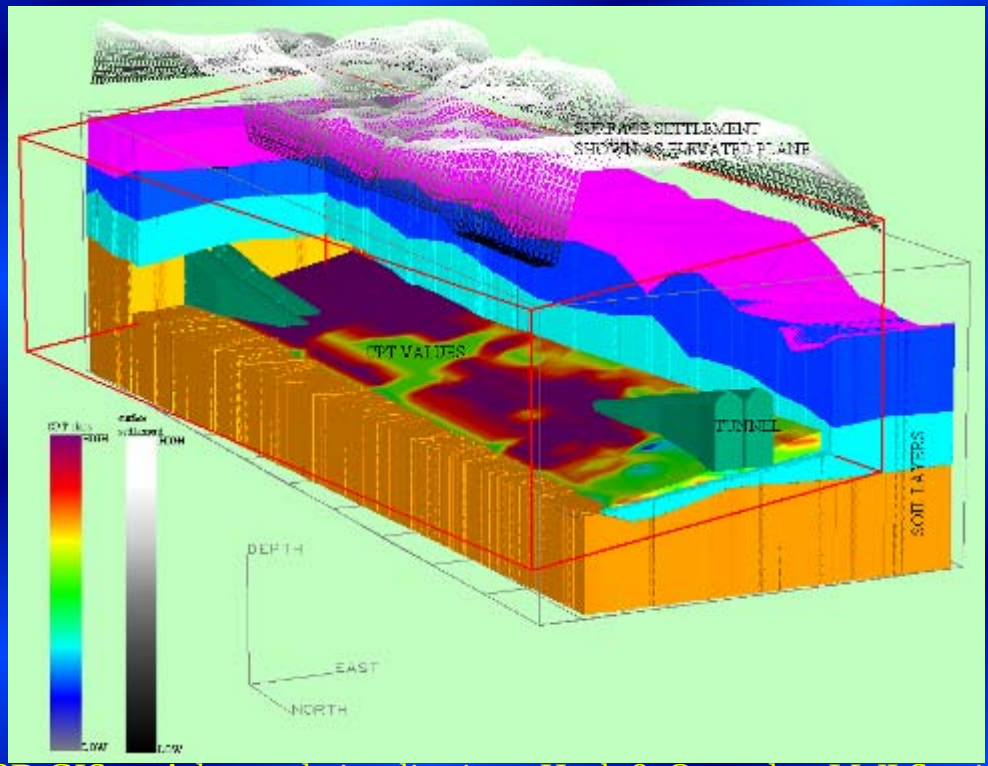



East
North
Elevation


SOIL PRESSURE
CPT VALUES
1 persp


a
b
c


SURFACE SETTLEMENT
SHOWN AS ELEVATED PLANE
SPT VALUES
TUNNEL
SOFT LAYERS
DEPTH
EAST
NORTH