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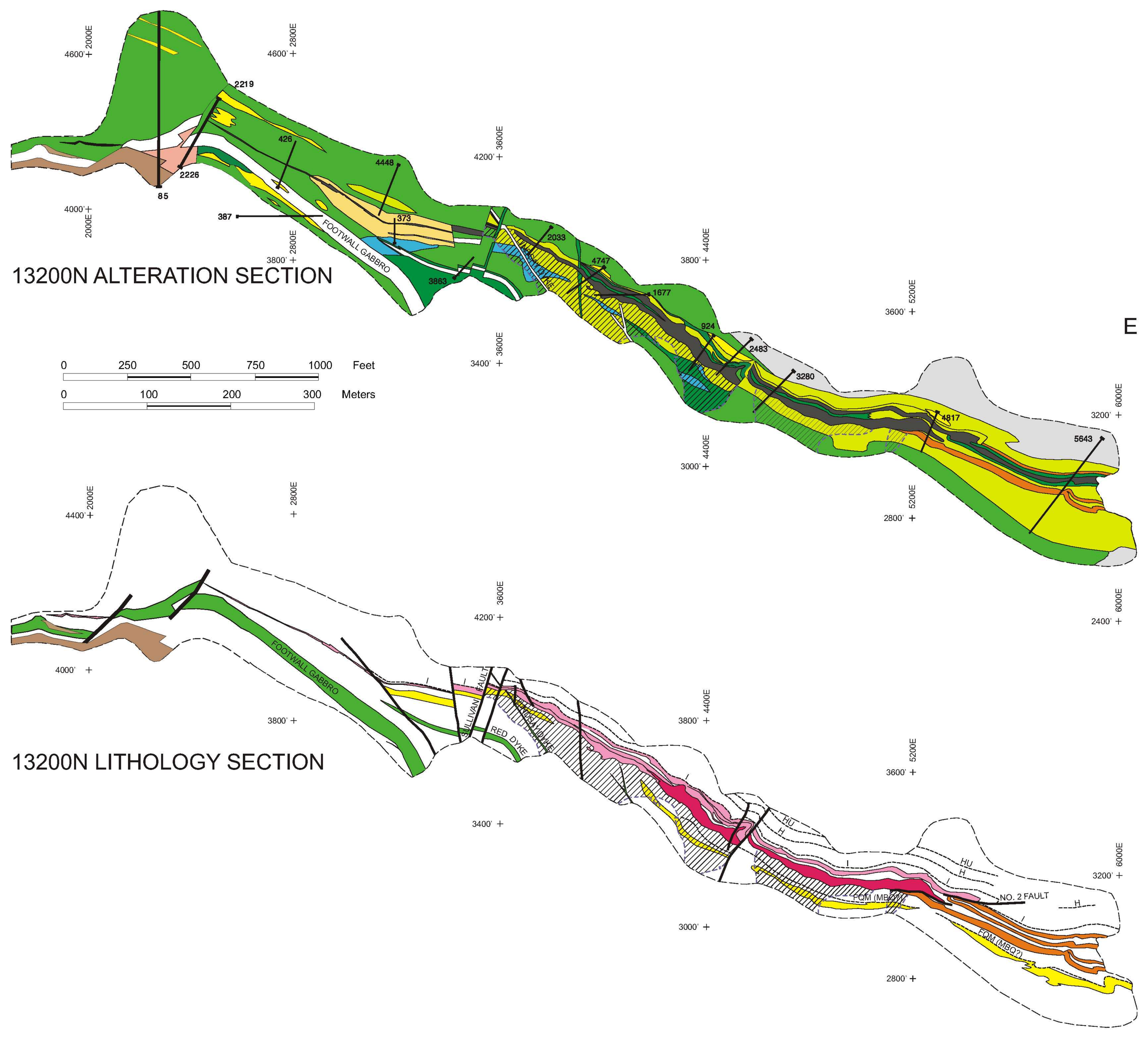
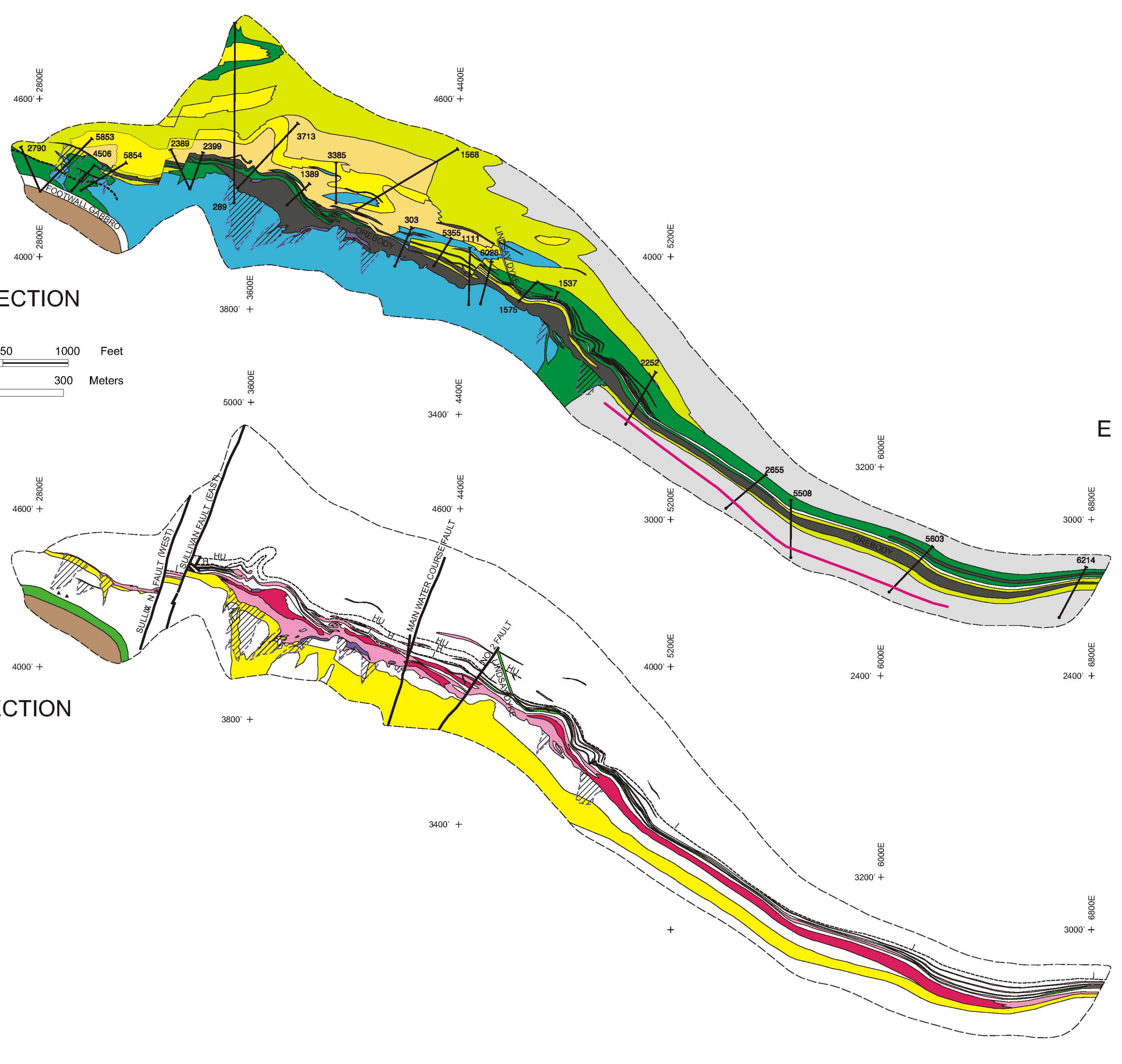
GEOLOGICAL SURVEY OF CANADA · COMMISSION GÉOLOGIQUE DU CANADA



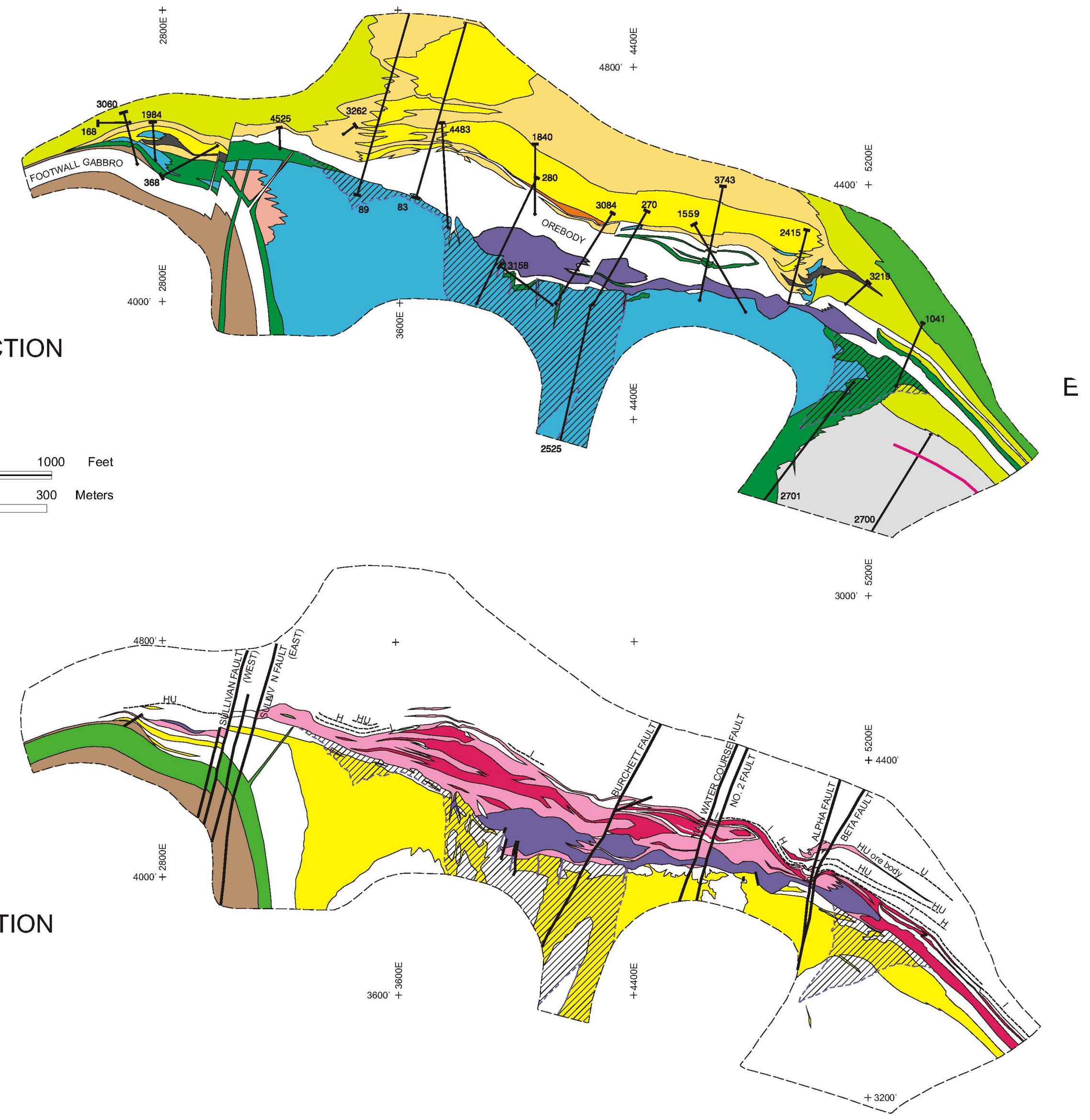
13200N ALTERATION SECTION

13200N LITHOLOGY SECTION



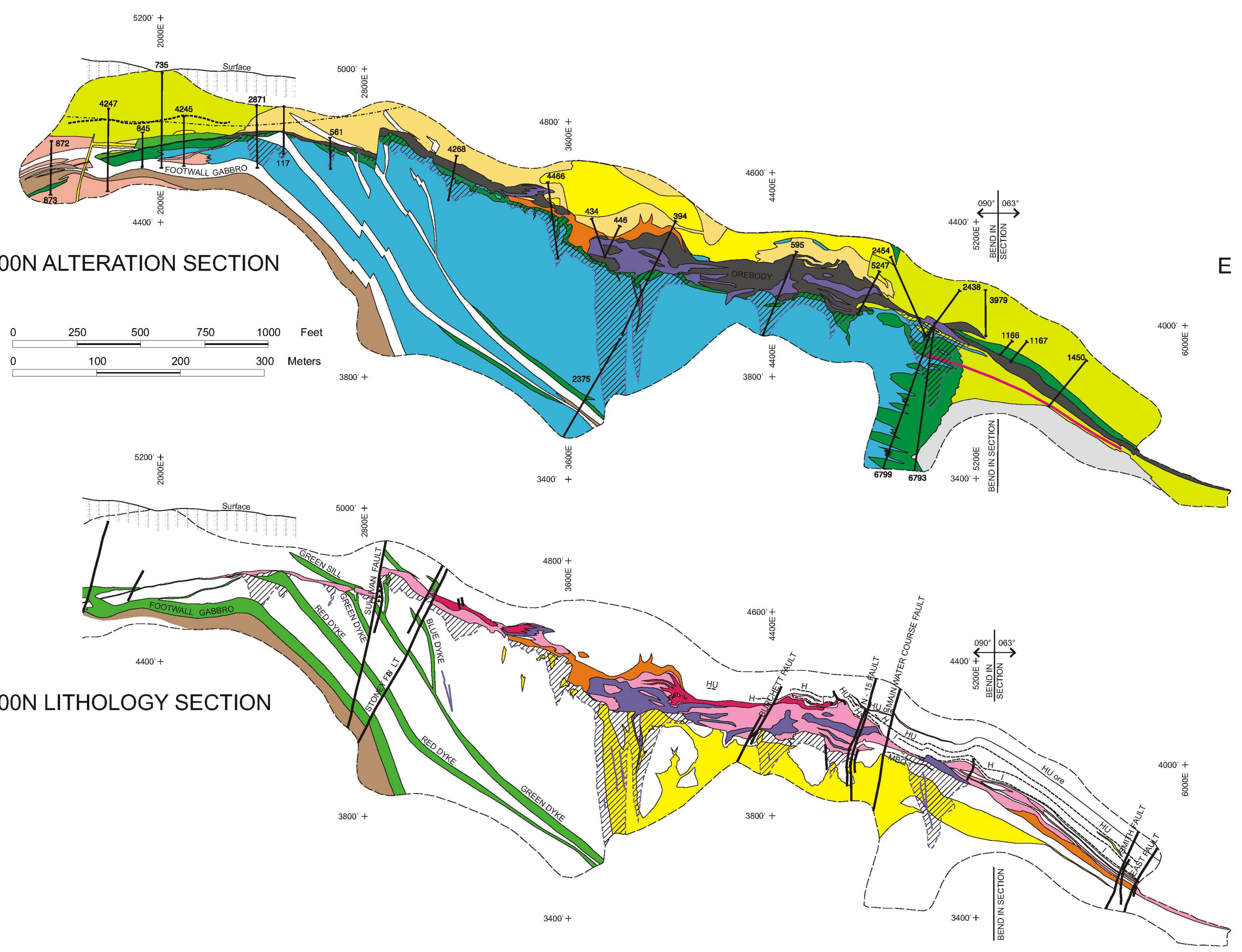
12400N ALTERATION SECTION

12400N LITHOLOGY SECTION



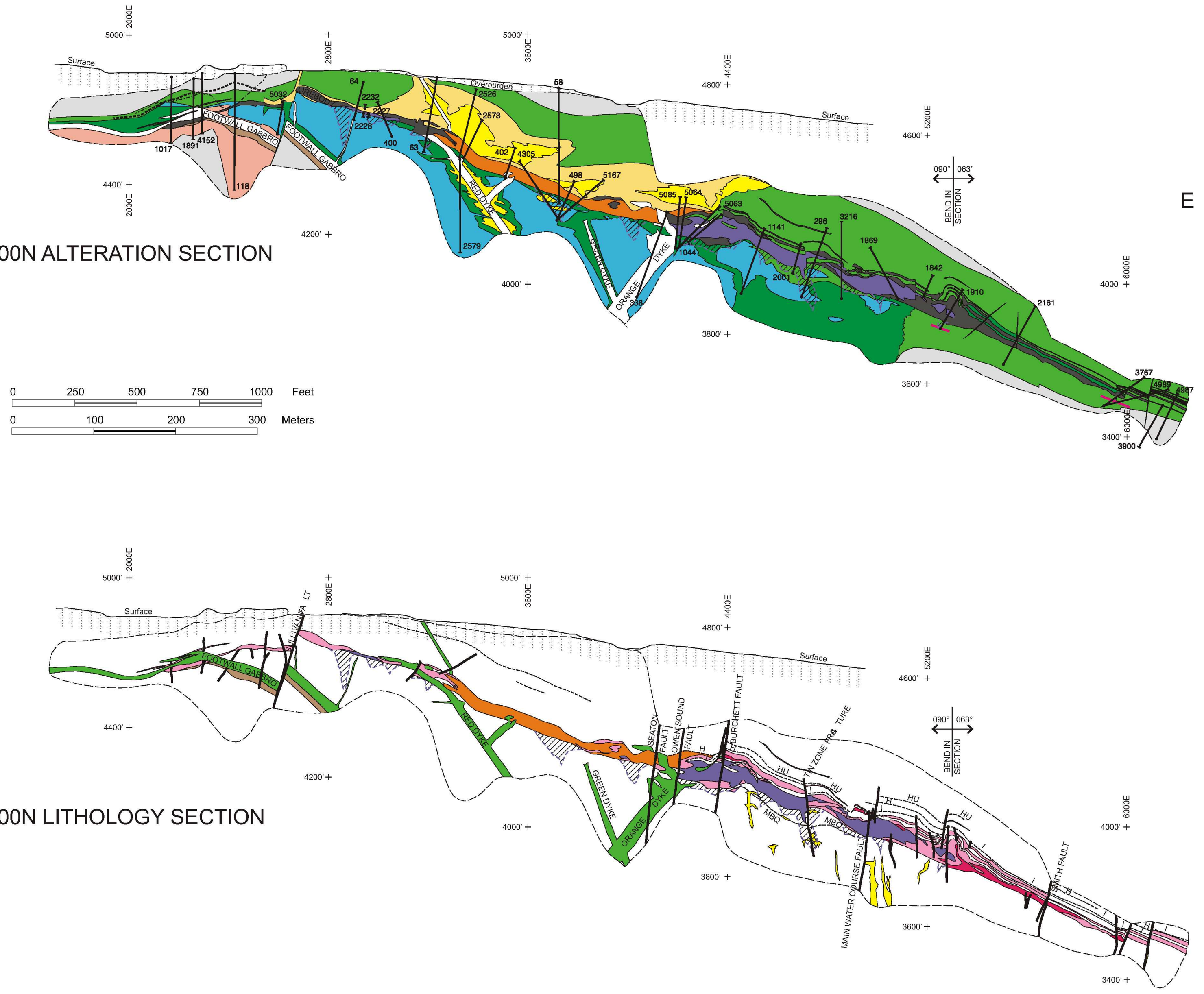
11600N ALTERATION SECTION

11600N LITHOLOGY SECTION



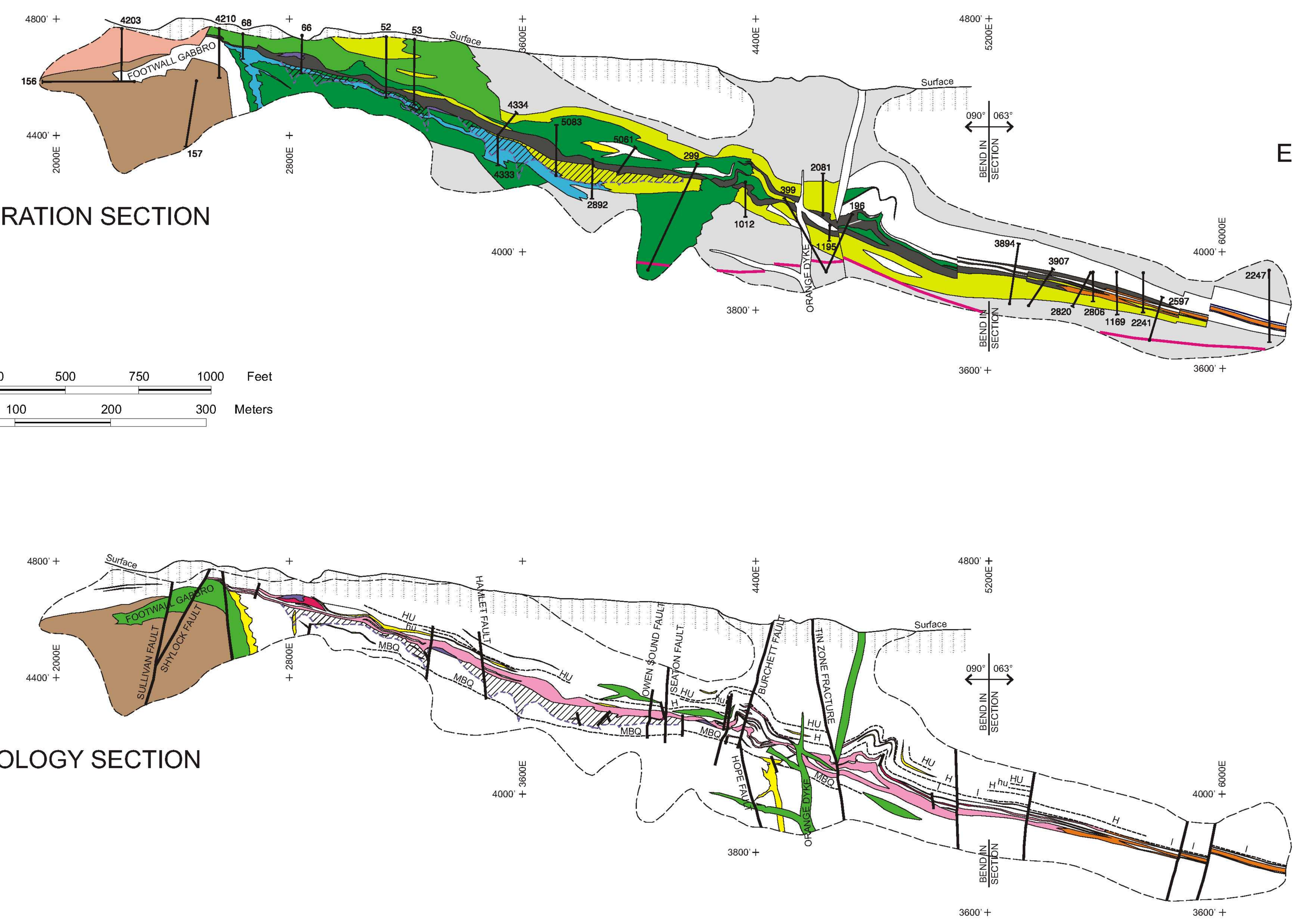
10800N ALTERATION SECTION

10800N LITHOLOGY SECTION



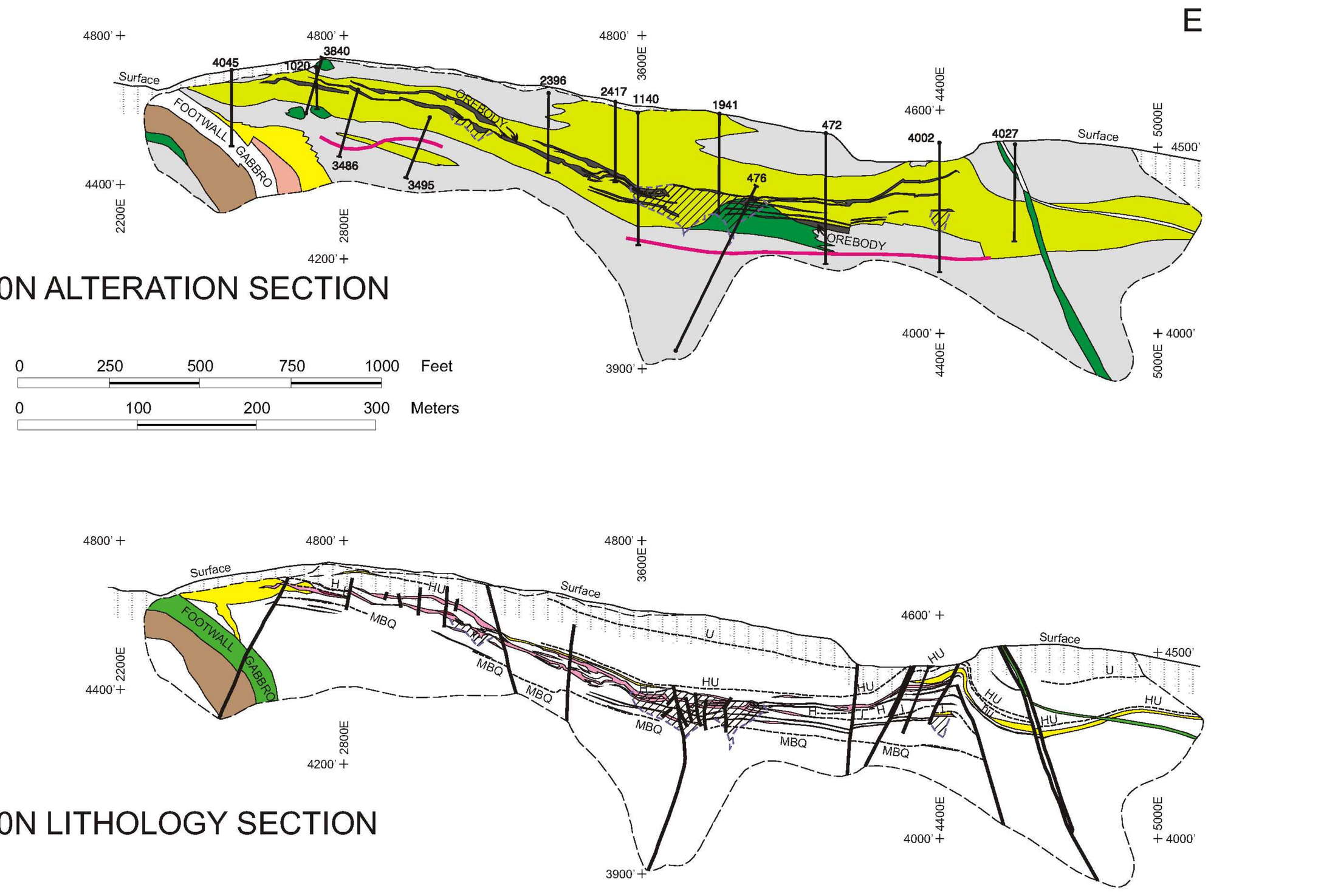
10000N ALTERATION SECTION

10000N LITHOLOGY SECTION



9200N ALTERATION SECTION

9200N LITHOLOGY SECTION



8400N ALTERATION SECTION

8400N LITHOLOGY SECTION

LEGEND

ALTERATION SECTIONS

Related to Gabbro Intrusion

- *Biotite hornfels (biotite-rich partially melted sediment usually transitional between granofels and sedimentary rock)*
- *Granofels (hybrid "igneous" rock formed from melted sediment +/- gabbro usually at contact of gabbro sills)*

Hydrothermal Alteration

- *Albite-chlorite-pyrite*
- *Chlorite-albite-pyrite*
- *Sericitic*
- *Sericite-chlorite*
- *Chlorite-pyrrhotite*
- *Tourmalinite*
- *Unaltered greywacke, siltite, argillite (Aldridge Formation)*
- *Pyrite-carbonate-chlorite alteration of orebody*
- *Pyrrhotite, massive (late ore-stage replacement of orebody)*
- *Unaltered ore body*

LITHOLOGY SECTIONS

- *Granofels (hybrid "igneous" rock formed from melted sediment +/- gabbro usually at contact of gabbro sills)*
- *Gabbro (dykes and sills of Moyie Sills suite)*
- *Pyrite-chlorite-carbonate alteration of orebody*
- *Pyrrhotite, massive (late ore-stage replacement of orebody)*
- *Base metal ore: medium grade ore (>4.5 units; 1 unit = oz. Ag/2+%Pb+%Zn)*
- *Base metal ore: high grade ore (>15%Zn or > 25%Pb)*
- *Greywacke, siltite, argillite (Aldridge Formation)*
- *Coarse clastic rock (includes the Footwall Conglomerate unit consisting of vent and eruption breccias of mud volcano, and the pre-ore Chaotic Breccia bodies)*

Coordinates based on Sullivan mine grid (elevation in feet; distance east of mine grid baseline in feet) .... 4000' + 6000E

Diamond drill hole and number (logged by CHBL and RJWT) .... Start 9894 End

Geological contact ....

Limit of geological control ....

Fault ....

Limit of weathering ....

Extent of biotite hornfels ....

Lowest occurrence of abundant garnet in footwall ....

Abundant footwall sulphide network (disseminated, veinlet, vein, and breccia-hosted sulphide), approximate extent ....

Vein, pyrrhotite ....

Marker bed (base of distinctive turbidite bed) .... H

NOTES

INTRODUCTION

The Sullivan mine in southeastern British Columbia was one of Canada's largest base-metal mines. Lydon et al. (2000) provides a comprehensive review of the geological character and setting of the Sullivan deposit. Geologically, the western part of the mine (see location map below) more or less corresponds to the hydrothermal up flow zone or vent complex of this Proterozoic seafloor hot spring deposit, and contains about 70% of the ore, whereas the eastern part of the mine more or less corresponds to the bedded part of the orebody. The purpose of this Open File is to place a representative portion of the company information into the public domain through a series of generalized and in part schematic sections that highlight the major lithologic and rock alteration features of the mine. Simplified versions of these sections, along with descriptions and discussion of the lithologies and alterations, are presented in Leitch et al. (2000) and Turner et al. (2000), as well as other sources in Lydon et al. (2000). The sections involve extrapolations, projections and permissive interpretations that result in the sections being a qualitative, semi-schematic representation of geological relationships of the Sullivan deposit along corridors up to 200 feet wide, and as such should not be used as a basis for quantitative measurements or calculations. The intent of the Open File sections is to illustrate the broad-scale features of the deposit rather than the exact details.

METHOD OF CONSTRUCTION OF SECTIONS

This Open File presents seven composite and generalized east-west cross-sections (8400N, 9200N, 10000N, 10000N, 11600N, 12400N, 13200N) on Sheet 1 and two composite north-south sections (4000E, 4800E) on Sheet 2. These sections were compiled from Teck Cominco Limited sections at the Sullivan mine, and modified by data from logging and petrographic study of 232 drill holes by the authors over the period 1991 to 1994.

The Teck Cominco Limited data consists of a series of cross-sections at a scale of 1:480 (1 inch = 40 feet), spaced every 50 feet. These sections represent the synthesis of geological and chemical data by Sullivan mine staff obtained by the logging and chemical analysis of cores from over 6000 drill holes and by detailed underground mapping over a time span of over 50 years. These sections are oriented east-west in the western part of the mine, and parallel to the average direction of dip of the orebody within mining blocks in the eastern part of the mine. Southwest of 12000N/5000E, sections trend 090. For the most part, north of 12000N, sections trend 045; east of 5000E and south of 12000N, sections trend 063. Teck Cominco Limited sections are based on drill core holes at approximately 15 metre spacing and mapping of mine workings (generally all development workings and some stope walls).

In the compilation process for the Open File east-west sections (Sheet 1), data from up to five of Teck Cominco Limited sections (i.e. up to 100' north or south) and core logging data collected by the authors were gathered together to form the generalized composite sections presented here. Where control points on a contact were less than 50 feet apart, the control points were joined by smoothed curves taking into account the attitudes of known perturbations such as faults. Where control points were more than 50 feet apart, contacts were drawn to reflect the geological attitudes and relationships shown on adjacent Teck Cominco Limited sections up to 100 feet away or information from the author's core logging. Under these circumstances, the sections presented here have the significance of a composite section which shows the generalized geological relationships within a corridor 200 feet wide centred on the line of section. Therefore angular relationships (e.g. attitude of contacts) or gradients (e.g. change of ore grade) may not reflect those of a true section. Where control points are more than 50 feet apart and where there are not controlled constraints on the nature or attitude of geological contacts within a radius of 100 feet, contacts are drawn to reflect natures and attitudes preferred by CHBL and RJWT based on interpretations of similar association elsewhere in the deposit.

The Open File north-south sections (Sheet 2) are based on similar sections previously prepared by Teck Cominco Limited, supplemented by plotting information from the intersection with the east-west composite cross-sections, and from diamond drill holes along the section (Teck Cominco Limited logs or core logging by the authors). During the compositing process, some discrepancies have arisen between the Open File east-west sections and the north-south sections, but were not adjusted because they do not significantly impact the intended use of this Open File.

ACKNOWLEDGEMENTS

We are indebted to Teck Cominco Limited for access to the mine sections prepared by Sullivan mine staff, which form the basis of these interpreted composite sections. We gratefully acknowledge their work and the permission to publish these data in its present format. Digital cartography was completed by Marianne Ceh, Richard Lancaster, and Craig Leitch. The manuscript was significantly improved with reviews by John Lydon and Paul Ransom, for which the authors are most appreciative.

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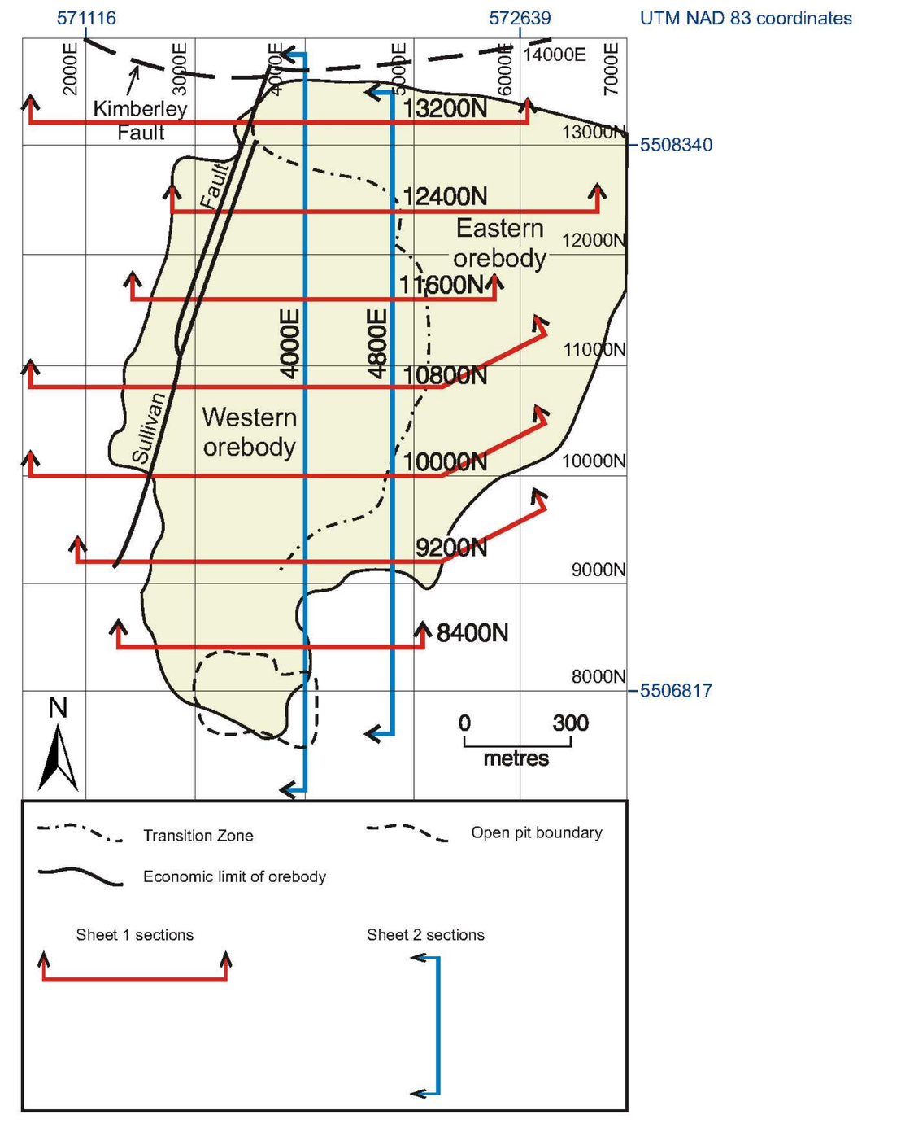
Leitch, C.H.B., Turner, R.J.W., Ross, K.V., and Shaw, D.R.
2000: Wallrock alteration at the Sullivan deposit, British Columbia, Canada; in The geological environment of the Sullivan deposit, ed. J. W. Lydon, T. Hoy, J. F. Slack, and M. E. Knapp; Geological Association of Canada, Mineral Deposits Division Special Publication No. 1, p. 633-651.

Turner, R. J. W., Leitch, C. H. B., and Delaney, G.
2000: Syn-rift structural controls on the paleoenvironmental setting and evolution of the Sullivan orebody; in The geological environment of the Sullivan deposit, ed. J. W. Lydon, T. Hoy, J. F. Slack, and M. E. Knapp; Geological Association of Canada, Mineral Deposits Division Special Publication No. 1, p. 582-616.

Lydon, J.W., Hoy, T., Slack, J.F., and Knapp, M.E. (editors)
2000: The geological environment of the Sullivan deposit, Geological Association of Canada, Mineral Deposits Division Special Publication No. 1, 834 p.

Location map of geologic sections across Sullivan mine



OPEN FILE 5701

COMPOSITE LITHOLOGY AND ALTERATION SECTIONS

SULLIVAN MINE

BRITISH COLUMBIA

Geology by Craig H.B. Leitch and Robert J.W. Turner
Digital cartography by M. Ceh, R. Lancaster, and C.H.B. Leitch

Sheet 1 of 2

EAST-WEST SECTIONS

CONVERSION OF MINE GRID COORDINATES TO NAD 83 COORDINATES

The Sullivan mine grid is converted to the NAD 83 metric coordinate system with the following formula provided by Teck Cominco Ltd.:

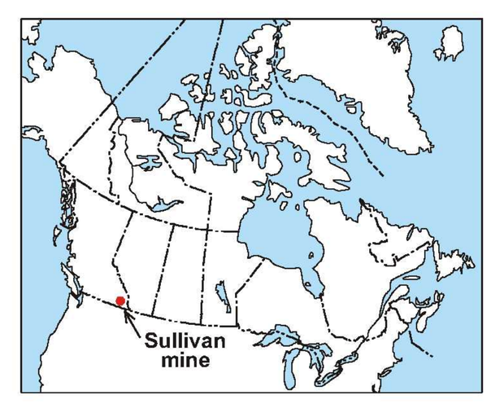
$N_{83} = 5504368.9257 + E_M(0.001592195) + N_M(0.304645839)$
$E_{83} = 570528.8681 + E_M(0.304645839) - N_M(0.001592195)$

Where: N_{83} = NAD 83 northing in metres
E_{83} = NAD 83 easting in metres
N_M = mine imperial northing in feet
E_M = mine imperial easting in feet

Mine imperial elevations are converted to the geodetic datum with the following formula:

$Z_G = 0.3048(Z_M + 49.11)$

Where: Z_G = geodetic elevation in metres
Z_M = mine elevation in feet



LOCATION MAP

OPEN FILE DOSSIER PUBLIC 5701

GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA

2007

SHEET 1 OF 2
FEUILLET 1 DE 2

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Les dossiers publics sont des produits qui n'ont pas été soumis au processus officiel de publication de la CGC.

Recommended citation:
Leitch, C.H.B. and Turner, R.J.W (with contributions by Sullivan mine staff)
2007: Composite lithology and alteration sections, Sullivan mine, British Columbia; Geological Survey of Canada, Open File 5701, scale 1:4620 (approx.)

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