

Mining Geomechanics and Materials Engineering

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Hellman & Schofield Pty Limited  
Lvl 4, 46 Edward St,  
Brisbane  
QLD 4000

Attention: Consulting Geologist - Simon Tear

Dear Simon,

**Re: Geotechnical Modelling: Nelson Bay River Iron Project**

Following receipt of the block model geological data and topography dxf I have constructed the overall 3D model for assessing the geotechnical stability of the proposed open pit mining excavation. The overall geotechnical model dimensions showing geology and topography are shown in Figures 1(a) and 1(b).

The locations of the various geological cross-sections shown in the drilling report [1] are shown in Figure 2; these have been orientated at 317 degrees, for some unknown reason. Comparisons of selected cross-sections from the geotechnical model with the geological cross-sections are shown in Figures 3 to 6. It is concluded that there is good correlation between the geological interpretations and my geotechnical model to proceed with the next stage of assigning material properties.

From the many reports provided to date there is extensive geological interpolation of the ore body petrology and structure but that there is very little data to define the characteristics of the country rock. I understand that it is essential to fully characterise the orebody petrology from the point of view of understanding the value of the resource. However, in order to establish a mine it must be understood that the open pit slopes will all be in country rock. It is essential therefore to include a similar effort for defining the host rock characteristics. These will include the structural characteristics (bedding, joints, schistose fabric, faults, etc.) and material properties of both the intact rock materials and joints.

In Figure 7, the geological interpretation on the angled cross-section at 10300mN is shown to include possible presence of an anticlinal structure the orientation of bedding planes in fold limbs. This is essential information which must be included in the geotechnical model in order to establish the stability of proposed slope designs. It would be appreciated if you could provide a more detailed rendition of the interpreted country rock geology around the ore body. This type of information is included in the geotechnical model to determine various Factors of Safety.

I would also prefer to re-construct the model based on AMG co-ordinates rather than the “mine grid” presented in the geological reports. To facilitate this process would it be possible to send me the block model and topography data in standard AMG co-ordinates.

As for determining appropriate material input parameters for the strength of the various rock units, I appreciate that these will have to be guesstimated for the initial modelling. However, it is recommended that a budget be provided for representative samples of drill core to be dispatched for standard uniaxial compressive strength (UCS), tensile strength (UTS) and shear strength of bedding / joint surfaces.

I trust that this provides you with some idea of the progress to date with regard to the geotechnical modelling and my envisaged data requirements for future developments.

Yours faithfully,

**GEONET Consulting Group**



Dr Ian H. Clark  
Principal Consultant, Director

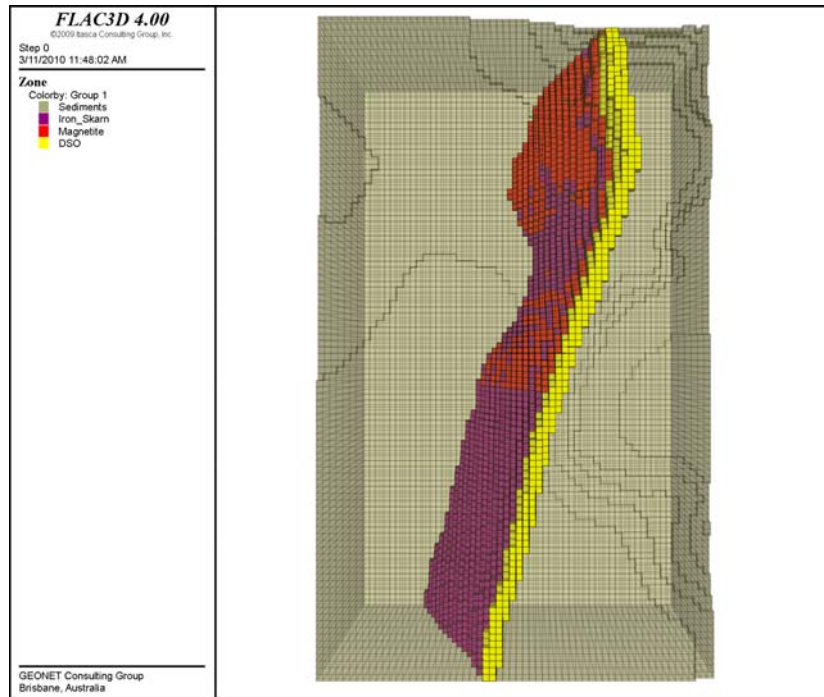


Figure 1(a): Plan view of model geology and topography.

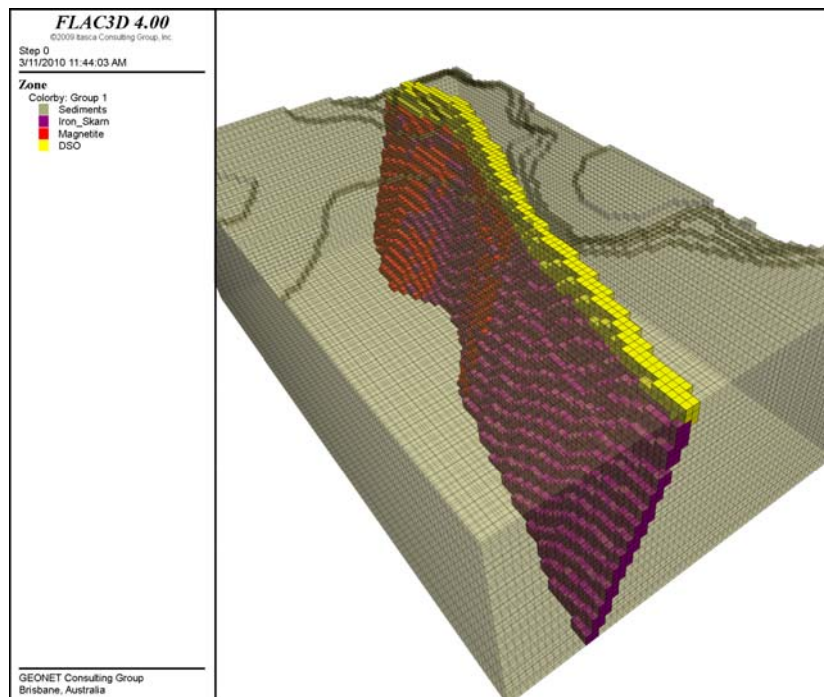


Figure 1(b): Oblique view of model geology and topography.

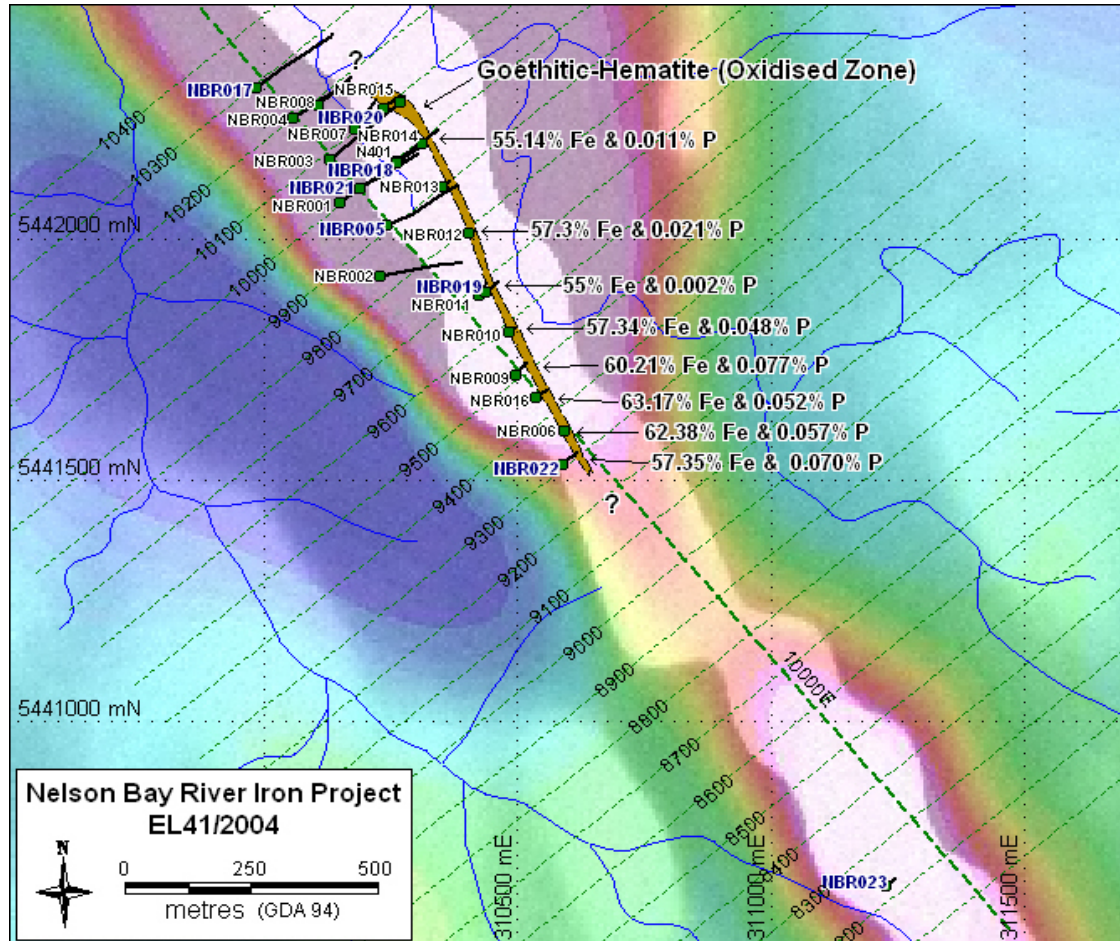


Figure 2: Location of geological cross-sections

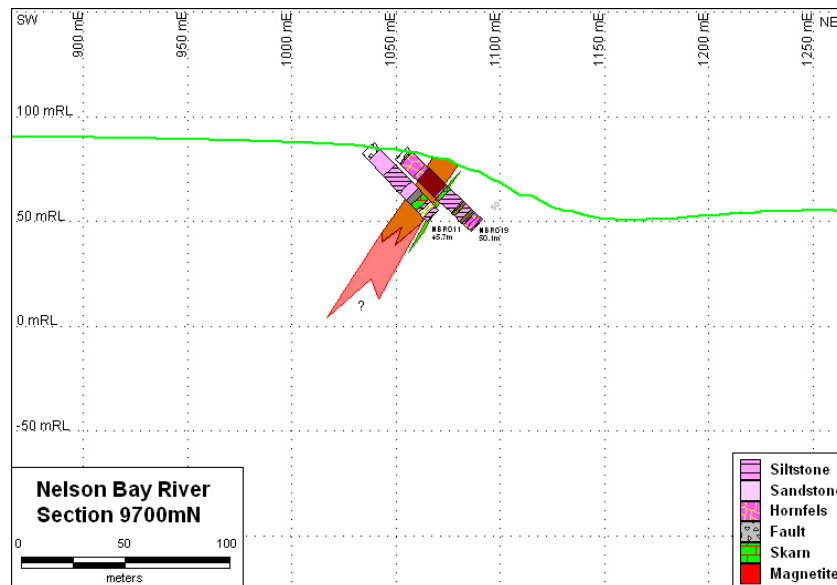


Figure 3(a): Interpreted geology from borehole logs with topography: Section 9700mN

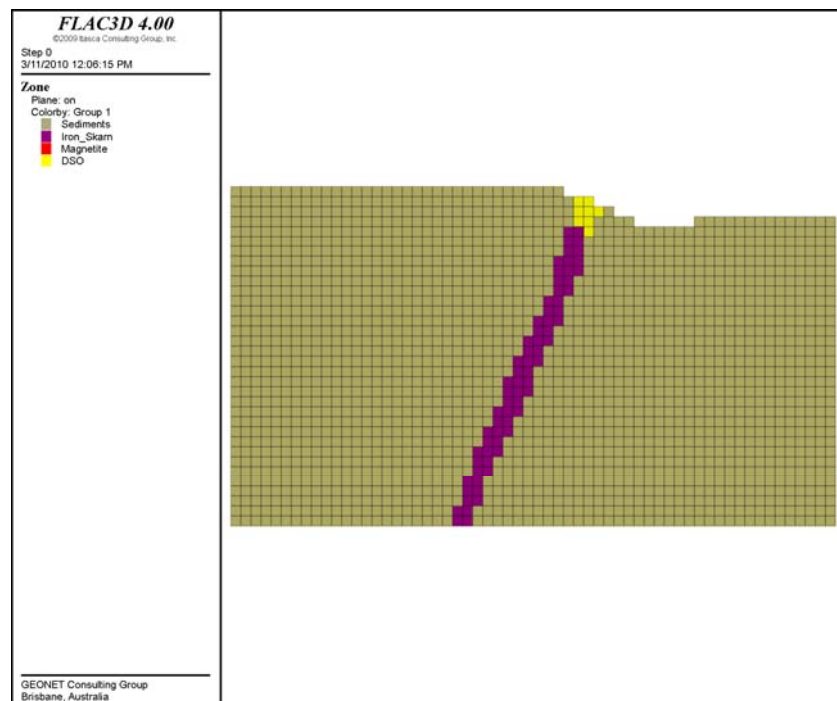


Figure 3(b): Interpolated block model geology and topography: Section 9700mN

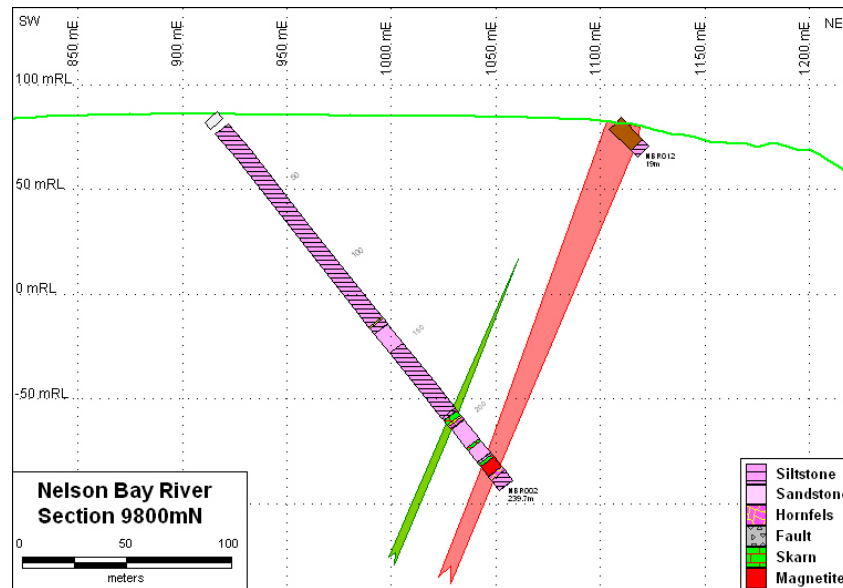


Figure 4(a): Interpreted geology from borehole logs with topography: Section 9800mN

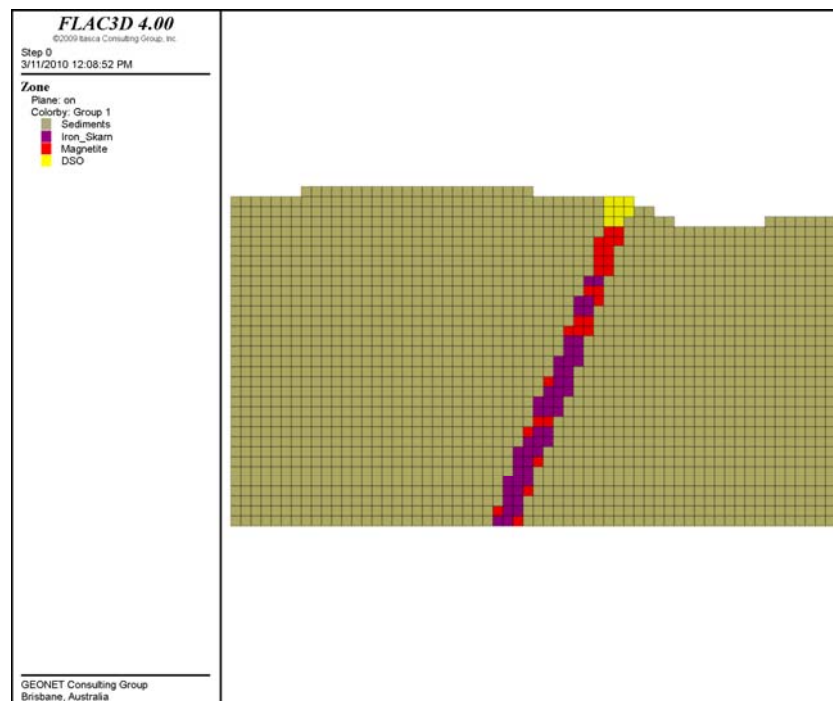


Figure 4(b): Interpolated block model geology and topography: Section 9800mN



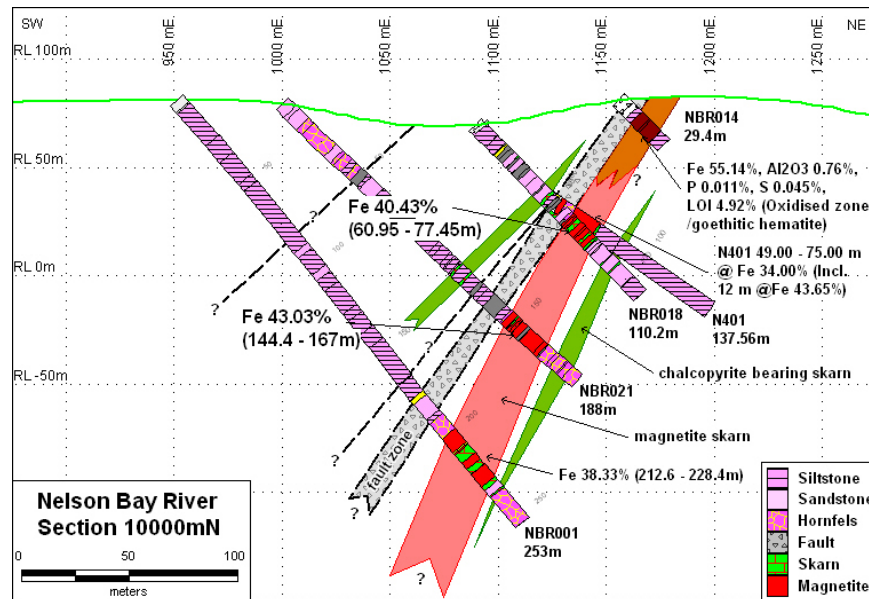


Figure 5(a): Interpreted geology from borehole logs with topography: Section 10000mN

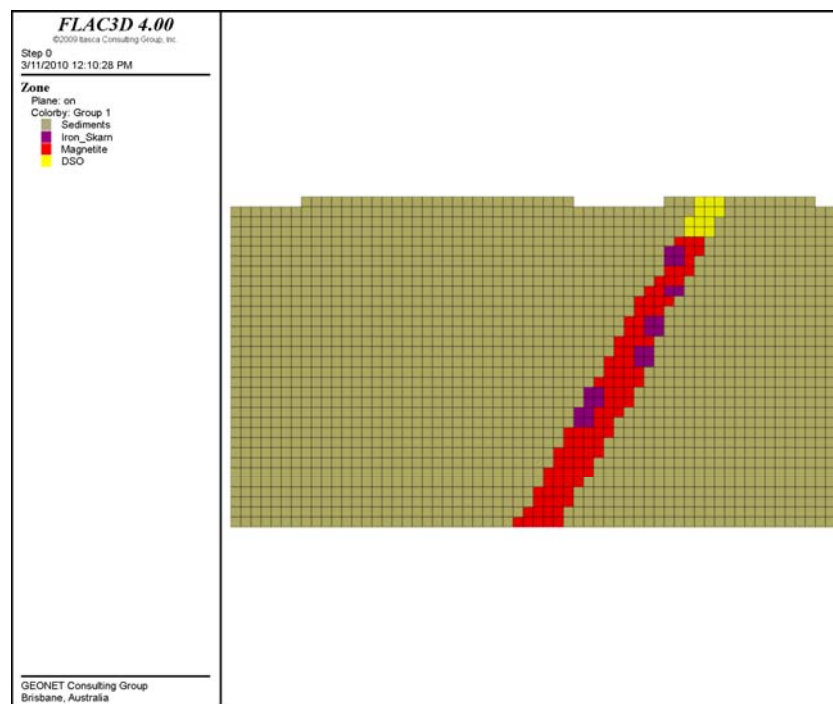


Figure 5(b): Interpolated block model geology and topography: Section 10000mN

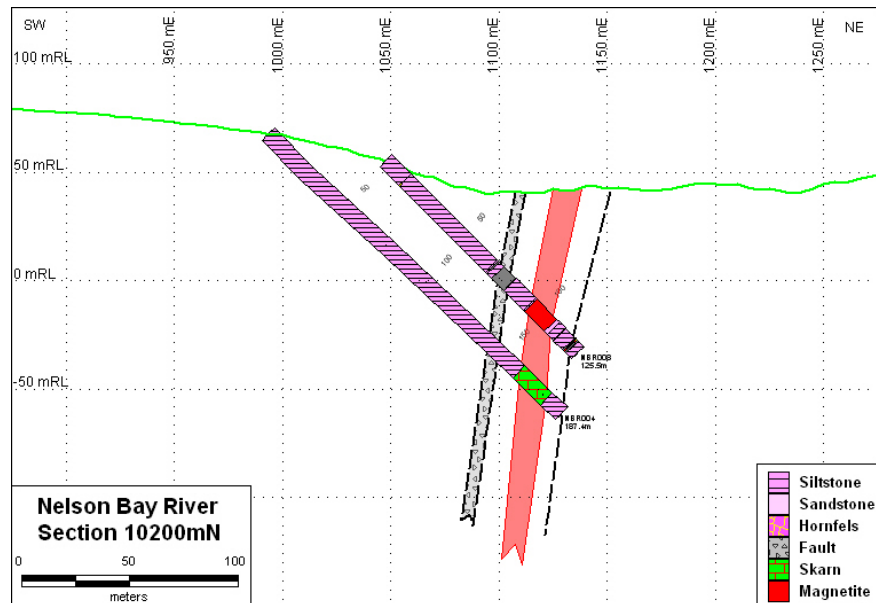


Figure 6(a): Interpreted geology from borehole logs with topography: Section 10200mN

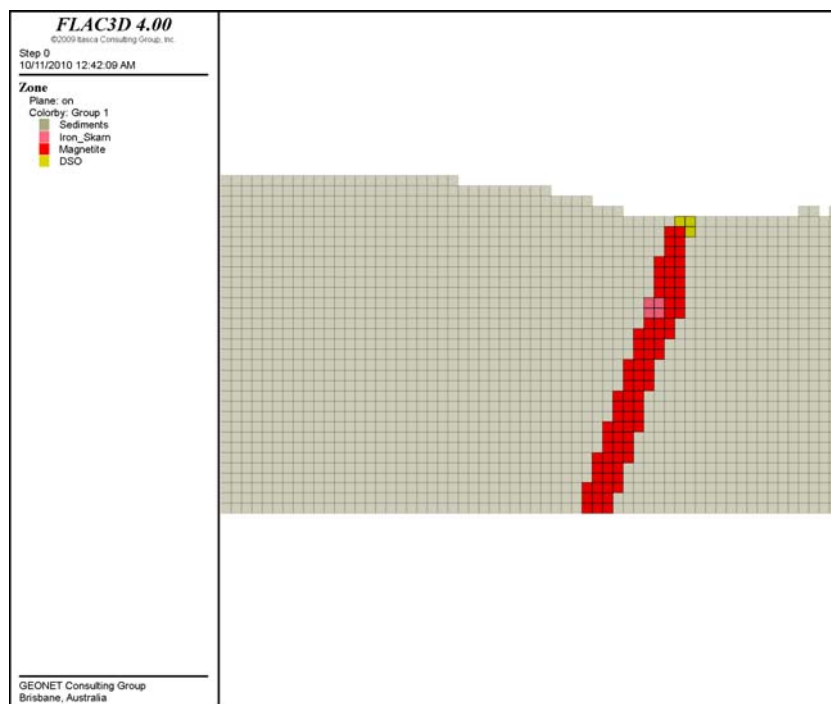


Figure 6(b): Interpolated block model geology and topography: Section 10200mN



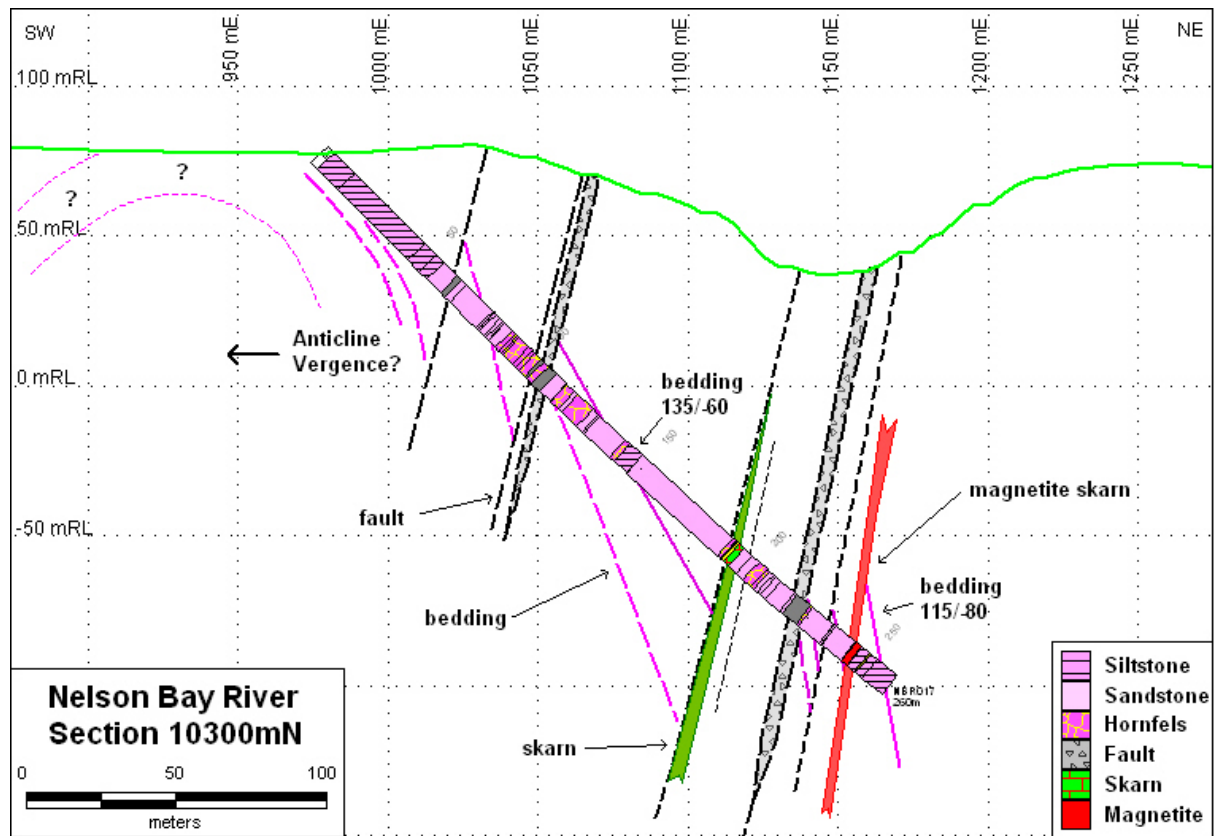


Figure 7: Geological interpretation on angled cross-section at 10300mN