

Tir Pentwys Access Road: Geotechnical Study

In July 2012, SLR submitted a Desk Study and Geotechnical Assessment of the 2.1km lower section of the haul road which is proposed to traverse the existing slope to the south of Cefn Crib Farm to a new access on to Crumlin Road. The assessment was subsequently incorporated into a Second Supplementary Environmental Statement submitted in January 2013.

The Assessment concluded that the analysis of the potential for structurally controlled failure mechanisms demonstrates that planar, wedge or toppling failure is unlikely to occur for the proposed access road design orientation and cut angle. However it recommended that prior to commencement of construction, additional discontinuity measurements should be made to reinforce the predictions made. The assessment also noted the possibility for kinematic risk of localised failure, and that the final design should thus incorporate some form of rock fall protection particularly where higher cut slopes are proposed. It also recommended that artificial support in the form of rock gabions be used in areas of cut overburden. The risk of any problems associated with historic deep mining was deemed to be low, but the Assessment recommended a programme of drilling to assess risk from shallow mining.

In July 2013, Parsons Brinckerhoff (PB) undertook a geotechnical appraisal of the SLR assessment. This generally endorsed the findings of the SLR assessment, but recommended that a number of additional studies should be undertaken which build upon the recommendations of the SLR assessment. These comprised suggested additional discontinuity surveys; additional topographic surveys to cover the full length of the scheme; details of route configuration and cutting heights; design slopes shown on a design drawing; rock stabilisation measures; overburden slope stabilisation (gabian baskets or similar); a programme of drilling; and cutting / stabilisation works at the Crumlin road junction.

These requirements from PB were amplified in a further letter dated 5th September 2014, which recommended an intrusive investigation via the drilling of a limited number of rotary cored boreholes along the centre line of the proposed route. This exercise would be designed to provide further information on rock quality / strength parameters which in turn would assist the design via a greater understanding of the geological sequence and the geological characteristics of the bedrock which will be encountered in constructing the road and cuttings. PB also recommended undertaking a non-intrusive geomorphological field mapping exercise above and below the centre line of the proposed cut. This would map breaks in slope and identify any areas of former land slipping that could be susceptible to reactivation by future excavation work.

The PB letter concludes, importantly, that *“it is our view that the construction of the lower haulage road slopes are geotechnically feasible”* but that there are areas of geotechnical uncertainty which should be addressed.

These areas of uncertainty would be addressed by a study comprising the following:

1. A detailed review of all previous studies published geological information and aerial photography.
2. Topographical survey of the haul road route.
3. 3D model with AutoCAD Civils 3D to determine scheme footprint (i.e. crest line of cut slopes and toe line of fill slopes) based on details shown on plan reference

C7777/SV/E dated 30th November 2011 (accompanying SLR letter dated 9th December 2011).

4. Geotechnical walkover survey and geomorphological assessment to include the collection of further rock mass discontinuity data and examine access and positions for subsequent intrusive ground investigation.
5. Ground investigation works consisting of rotary cored boreholes along the proposed alignment, targeted to areas identified in the geotechnical walkover survey, and sections where deep cutting is required. The ground investigation to include down hole optical televiwer logging to provide information and discontinuity spacing's and orientations with depth.
6. Geotechnical assessment based on findings of additional ground investigation works to:
 - Quantify risk of planar, toppling and wedge failures over full depth of cut slopes;
 - Determine final slope profiles to be undertaken through detailed design and whether intermediates berms need to be included;
 - Provide assessment of rock excavatability;
 - Provide a combined a combined ground investigation and geotechnical design report to reflect the above.
7. Produce general arrangement drawings showing:
 - Typical cross section shallow cut;
 - Typical cross section side long ground;
 - Typical cross section fill (hairpin bend);
 - Typical arrangement of rock bolt secured gabion facing (for areas of friable/poor rock);
 - Typical arrangement of drapery rock fall netting (for areas of moderate to good rock); and
 - Typical arrangement of reinforced earth fill.

In accordance with the implementation programme submitted by SLR on 14th March 2016, it is anticipated that the above works would be undertaken during August and September 2016, with the results of the geological study informing the designs and preparation of the above plans undertaken in September and October 2016.

It is proposed that the above measures be incorporated into a planning condition requiring the implementation of the site works, production of a geotechnical report, and preparation of the general arrangement design plans for submission to and approval by the local planning authority prior to commencement of construction of the access road.