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Our ref: 12684888

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EPA Review - FTAA1074 Green Steel - Geotechnical Advice

Dear Tim

1. Introduction

GHD has been commissioned by the Environmental Protection Authority (EPA) dated 25th November 2025, to undertake geotechnical review to support the fast track consent process for the National Green Steel site at 61 Hampton Downs Road, Waikato.

1.1 Scope and purpose

The purpose of the commission tis to provide specialist advice to the Green Steel Expert Panel appointed by the EPA to consider and decide the application.

The geotechnical specialist scope of work shall include and not be limited to:-

- Undertake a desktop review of the following application documents supplied by the applicant:
  - Attachment 12 – Geotechnical Assessment
  - Assessment of Environment Effects where it references the above report.
- Generate a draft report based on the documents, relating to the actual and potential environmental impacts of the proposed activity and the proposed mitigation measures

1.2 Documents reviewed

The following documents have been reviewed, with a geotechnical lens, in relation to this commission:-

- Preliminary Geotechnical Assessment Report 61 Hampton Downs Road, Hampton Downs. Prepared by Earthtech Consulting Ltd. Dated 28 May 2025 (Attachment 12 of application)
- Fast track Approvals Act Substantive Application to construct and operated a structural steel manufacturing plans and accessory activities. National Green Steel, 61 Hampton Downs Road. By Kinetic Environmental, Dated 2 July 2025
- Engineering Report Green Steel Monofill, Hampton Downs. Volumes 1 and 2 by Earthtech Consulting Ltd. Dated 30 May 2025 (Attachment 17 and 18 of application)

– Earthworks management and erosion and sediment control plan. Green Steel Project, 61 Hampton Downs Road, Hampton Downs. Prepared by Earthtech Consulting Ltd. Dated 23 May 2025 (Attachment 19 of application) (EMESCP)

2. Geotechnical Review

2.1 Steel mill platform

The geotechnical reporting for the development of this site is a preliminary assessment. It is based on field mapping, published desk top data and 9 CPT's, 2 Boreholes, 11trial pits and 8 hand augers. Ground water monitoring is limited to levels measured during the investigations.

The site investigations results are generally consistent with the published geology. The major differences being that the geological map does not show the overlying Hamilton Kaharoa Ashes and the presence of Kaawa Formation (sands) exposed on Harness Road and inferred from the investigations (CPT5 and 11).

The site will be subject to significant earthworks with the formation of an elevated platform at RL14m for the steel mill and shredding equipment. This platform will be formed from filling of the northern area and cut towards the south. Other platforms will be formed for the southwestern and northeastern monofils and the materials and finished products storage platform.

A preliminary earthworks balance for the initial formation of the platform has been provided. Noting there are two possible base grade levels presented for the SW monofill, the earthworks volumes appear to be based on the deeper subgrade of RL12-14m. The cut/fill volumes indicate a deficit of fill by 17,120m^3 and 126,000m^3 of unsuitable material which will be soft soils, peats and organics and with acid sulphate soil potential from the undercut of the stream alluvium. It assumes that all other excavated soils and rock will be suitable for reuse in the engineered fills, noting that some of these materials may be wet of optimum and require conditioning prior to use. There are no material suitability and compaction testing results provided in the documents.

The suggested geotechnical parameters presented in the preliminary geotechnical report are not based on any on site testing. Similarly, the predicted parameters for the fill materials are not supported by testing. GHD considers these parameters optimistic, and these will need to be proven at future stages of the project.

It is noted that some of the earthworks materials are sensitive to rework and moisture content. To mitigate some the challenges with these materials earthworks should only be undertaken during the earthworks season.

The recognised geohazards for the site and development are:-

- Liquefaction- low probability
- Compressible soils – present within the northern portion of the site as young stream alluvium and organic materials which will be loaded by up to 12m of fill platform. Ground water in this area is very shallow (c. 0.3-1.2m below ground level).
- Existing slope stability in natural soils – observed on the steep slopes to south and east.
- Stability of proposed engineered fills and monofils (monofill sites discussed below in section 2.2).
- Acid sulphate soils – low – moderate probability, except of areas of undercut in soft soils.
- Soil shrink swell behaviour – potential exists in the clays soils and will require management during construction.

The compressible soils under the platform will require extensive undercut and/or preloading. Under cut will be likely below the ground water table and preload will generate elevated groundwater pressures and result in settlements. There is no discussion in any of the documents reviewed which details a detailed assessment of the quantum of settlements, dewatering requirements or effects on neighbouring properties. Neither are there any construction plans or mitigations recommended to alleviate any potential effects. Given that portions of the platform fill are located close to the legal boundary, fill loading, dewatering and settlements can be expected to impact outside of the fill foot print, such detailed information is considered essential to support this application.

The proposed cut and fill slope angles are all 1V:3H. Geogrid reinforcing may be used to stiffen the fill. The long-term stability for the cuts and fills forming the main platform has not been demonstrated for static, seismic or elevated groundwater load cases. There is no information to demonstrate that the fill platform works will be stable and will not have an adverse effect on neighbouring properties.

There has been no acid sulphate soil testing for samples from site. The assessment of acid sulphate soils is based on the Waikato Regional Council GIS layer. This suggests portions of the site earthworks will encounter and/or exposure soils with either low or moderate probability of acid sulphate as part of bulk earthworks. High probability soils will be encountered in soft soil undercut prior to fill placement. These will be encountered in the Stage 1 earthworks. The management approach recommended in the EMESCP is to firstly identify the extent of problem soils and record on a plan; secondly leave undisturbed in place or entomb within compacted fills. Finally, if acid sulphate soils are in cut or under cut or within 1m of final level they should be removed and buried in fill areas. On site management is proposed and there are unlikely to any adverse offsite effects.

2.2 Monofill’s

Two fully lined and capped monofils are proposed for the site to take floc waste. The southwest site will be developed first. The level of design and reporting is more developed for the monofil sites than the main platform, but is based on the same geotechnical investigations.

For the southwest monofill the documents present 2 possible platform levels. An elevated platform at RL 23-20m or a lower platform at RL 12-14m. The remaining natural ground slope below the platform is steep and subject to known slope instability. There have been no investigations targeting the instability and identifying the depth of the shear surface and defining movement triggers. It is proposed to place buttress fill adjacent to the slope as a remedial measure.

Figure M4.2 (see snip below) provides illustration of how the buttress is applied up the natural slope and the monofill (green shaded area on the monofill side slope). This material extends to the final design level of the fill. The buttress material above the natural ground will form the side cover for the monofill and should meet cover specifications for permeability (with further discussion on capping performance discussed in the Landfill Review report). It is likely that the side slope buttress against the floc fill will be formed as the monofill is raised. When the monofill is functional there will be no bulk earthworks on site to produce the substantive quantity soils required for cover and buttress. There is not discussion on whether these materials will be sourced on site or off site. Importation of soil fill may have an offsite effect on truck and traffic numbers.

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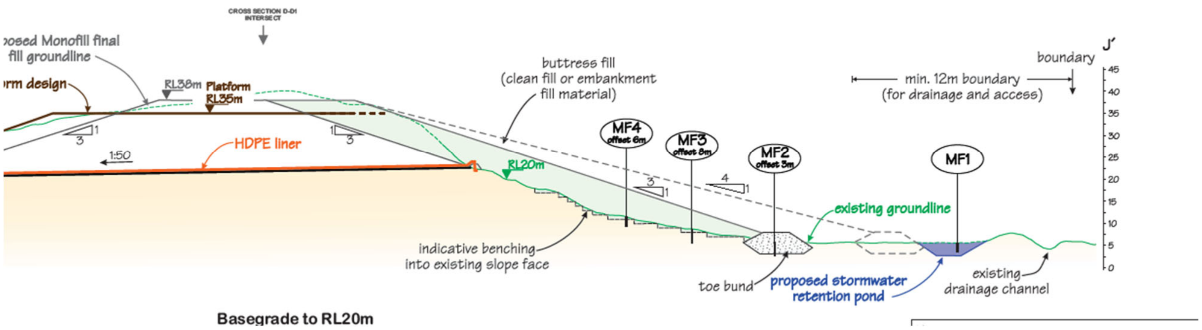
Excerpt from Figure M4.2 showing indicative monofill cross section and green shaded side fill.



The recognised geohazards related to the monofills are:-

- Existing slope stability in natural soils – instability observed on the steep slopes to south.
- Stability of proposed monofils.

Quantitative slope stability modelling assessment has been presented in the monofill geotechnical report for the buttress fill against the unstable natural slopes. These achieve acceptable factors for safety.

There is no stability assessments presented which demonstrate that the monofill slopes meet the required long term stability for the standard load cases including elevated leachate levels.

3. Information Requests

The following information requests are recommended and the information sought and assessed before determining the project;-

1. Provide a detailed breakdown of the cut and fill earthworks volumes relative to the geological units, and proposed reuse relative to the earthworks staging. Include the main platform, all elements of the monofill including buttress volumes to completion, liner, final capping; as well as stormwater bunds and ponds. In addition, provide an indication of how much soils will be required after completion of stage 3 earthworks during operation and closure of the site. An additional component of the earthworks volumes to be considered is daily and intermediate cover needs as discussed in GHD's Landifll Review report.
2. Provide details of the proposed disposal or end use for the unsuitable soils generated during construction.
3. Given that the bulk fills are, in places, located close to the legal boundary the fill loading, dewatering and resultant settlements may have an adverse impact on neighbouring land. Provide a technical assessment of the effects and impacts from the construction of the fill platform (undercut and preload) on the soft soils and associated ground water. In addition, present mitigation measures to prevent adverse effects.
4. Provide slope stability modelling of the following slopes to demonstrate there are no adverse effects:-

    1V:3H cut slopes natural materials

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1V:3H bulk fill slopes (model largest fill height)
1V:3H monofill side slopes

Ensure static, seismic and elevated ground water load cases are presented. For the monofils please also present elevated leachate case.

4. Limitations

his report: has been prepared by GHD for The Environmental Protection Agency (EPA) and may only be used and relied on by EPA for the purpose agreed between GHD and EPA as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than EPA arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

GHD has prepared this report on the basis of information provided by EPA and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Regards

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