Memo

File No:	61 91 33A
Date:	16 April 2025
To:	Cameron King, Stephen Howard
From:	Nicki Wilson
Subject:	**Technical review – Effects on Groundwater from proposed groundwater take, NZ Green Steel Limited, 61 Hampton Downs APP147422**

NZ Green Steel Ltd (NZGS) Limited have applied for various consents related to a recycled steel making process and a dedicated landfill (monofil) at 61 Hampton Downs Road, Hampton Downs. The applications are part of a development ("The Green Steel Project") listed under the Fast-Track Approvals Act 2024.

This memo provides high level technical advice related to the groundwater supply option presented in the Water Take and Supply Plan. A total water demand of 2,800 m^3 d^{-1} and 840,000 m^3 yr^{-1} is required for operations at the site, for which it is proposed 1,540 m^3 d^{-1} comes from an onsite groundwater supply.

I have reviewed the following document in providing this advice:

- Earthtech, 14 March 2025. Water Take and Supply Plan for the Green Steel Project: Groundwater, Surface Water and Harvesting Rainfall Runoff. Earthtech reference: R3660-1, WRC reference 31737895

The site is located above the Waitemata sandstone aquifer. Higher yielding areas of the Waitemata aquifer are present where this sandstone is fractured. The applicant has undertaken geophysical surveying to identify fractured zones within the boundary of the site. This survey resulted in two exploratory boreholes being drilled at the site – BH42 (72_12576, 300m deep, temporarily cased to 65m) and BH54 (72_12575, 250m deep, temporarily cased to 65 m). Bore yield testing was undertaken on both bores which indicated yields of 14 m^3 hr^{-1} and 336 m^3 d^{-1} for BH42, and 18 m^3 hr^{-1} and 432 m^3 d^{-1} for BH54. The applicant has proposed a yield of 64 m^3 hr^{-1} and 1,540 m^3 d^{-1} (approx. 18 l s^{-1}) for their groundwater take consent – anticipated to be split between four bores. It is proposed to undertake further geophysical and test bore drilling to identify additional bore sites, and to widen and case the production bores to a depth of 100 m (BH42) and 80 m (BH54).

No pump testing has been undertaken on the bores, but yield testing on bore BH42 indicated a low transmissivity of 12 m^2 d^{-1}. I have used this transmissivity value and a default storativity value of 0.0001 for a confined aquifer in undertaking my assessment.

Interference on neighbouring wells

Using aquifer parameters of T = 12 m^2 d^{-1} and S = 0.0001, the estimated drawdowns in the same aquifer are shown on Figure 1. I have used a pumping rate of 6 l s^{-1} (approx. 500 m^3 d^{-1}), to represent the likely maximum yield from bore on site based on yield testing.

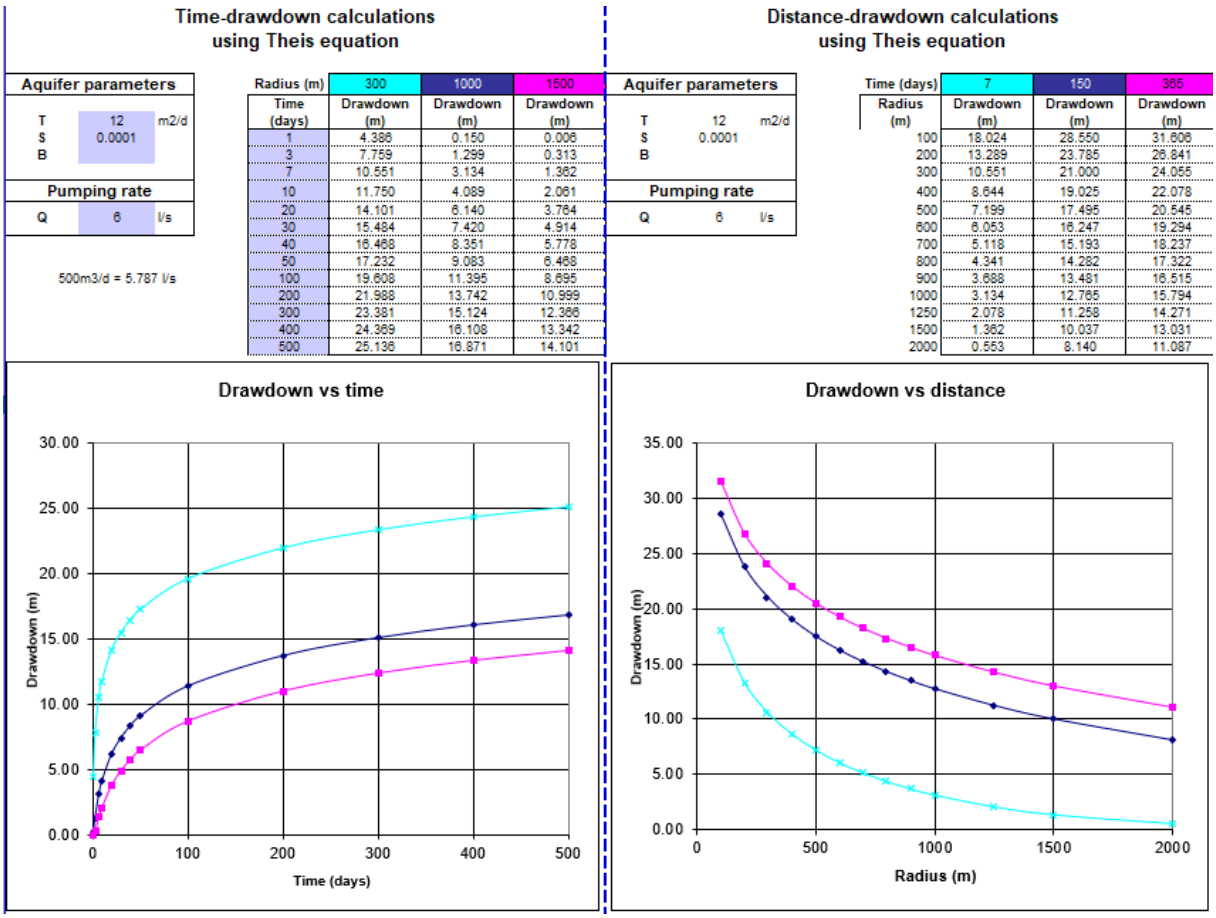

Figure 1: Drawdown assessment for typical Waitemata sandstone aquifer bore on site

The nearest neighbouring bore located in the Waitemata aquifer is 72_7098, which is approximately 1,000 m from the site boundary, and 1,500 from BH42. 72_7098 is cased to 42 m and has a static water level at 36 m, which leaves approximately 6 m of water column available for drawdown above the bottom of the casing. This well is used for stock water supply and has no water take consent associated with it. The projected drawdown at a of distance 1,000 m (site boundary) is approximately 16 m after 365 days of continuous pumping (Figure 1). At distance of 1,500 m (BH42) it is approximately 13 m after 365 days of continuous pumping (Figure 1). Depending on where the pump intake is located in 72_7098, pumping activities on site may have an adverse effect on 72_7098.

Bores BH42 and BH54 are approximately 300m apart. Projected drawdowns at a of distance 300 m are approximately 24 m after 365 days of continuous pumping (Figure 1). The drawdowns which the applicant's bores have on each other (in addition to their self-induced drawdown) will need to be considered when assessing the feasibility of additional bores on site. The available water column above the proposed production bore casing depth is 72 m for BH54 and 67 m for BH42, which leaves approximately 40-50m for self-induced drawdown, dependant on where the pumps are located within the bore.

Assessment of interference effects will need to be confirmed by pump tests once the production bores have been constructed.

Effect on surface water

The nearest surface water feature to the site is the Waipapa Stream, which runs along the western boundary of the site. The Waipapa Stream is at an elevation of approximately 5 m asl. The elevations of the proposed production bore casing depths are at -60 m asl (BH42) and -65 m asl (BH54), and static water levels in these bores are at 6.9 m asl (BH42) and 7 m asl (BH54), indicating confined conditions. Borelogs show some clays and silts in the upper 10-30 m which will provide some protection to the Waipapa Stream. The location and interconnectivity of fractures in the Waitemata aquifer will determine the connectivity to the Waipapa Stream. A review of aerial photographs indicates no sign of significant springs in the area, and WRC have no records of springs near the site. For these reasons, the take is unlikely to have a significant effect on the Waipapa Stream.

The take is likely to be intersecting water which would end up in the Waikato River.

There are no mapped wetlands nearby the site.

Aquifer sustainability

The site is outside of any mapped aquifer management unit. Given the lack of groundwater use in the area, I have no concerns over aquifer sustainability.

Concluding points

- Pumping interference may be issue for groundwater takes at the site, for both neighbouring bores and with the applicant's other bores. This will need to be assessed by pump tests once the production bores have been constructed.
- There is the possibility that no other fractured locations will be identified on site after further geophysical testing. The applicant may then need to consider other water sources to meet their demand.
- Effects on surface water are unlikely to be an issue for groundwater sourced from fractures in the Waitemata Sandstone at the site.