TECHNICAL MEMORANDUM

PROJECT NO.: WGA253138
DOCUMENT NO.: WGA253138-MM-HG-0001_B
DATE: 26 FEBRUARY 2026

COMPANY NAME	BCD Group
ATTENTION	Callum Davison
SUBJECT	Outline of Hydrogeological Assessment for Fast Track

1. PROJECT DESCRIPTION

A fast-track resource consent is being sought for the construction of a racetrack facility by Waikato Thoroughbred Racing. A groundwater supply will be required for drinking water, stock water and track maintenance/conditioning of the proposed thoroughbred racetrack facility.

WGA understands that the racetrack facility is proposed as a modern racing hub, intended to support the long-term future of the industry, providing infrastructure for New Zealand horse racing. The site will provide for regional and national events. The proposed site is currently two dairy farms covering 150-ha and is bound on the northwest edge by State Highway 1. During a normal day, up to 200 people are expected to be onsite, with numbers increasing to approximately 5,000 people during an event. Horse numbers are expected to be a minimum of 200 on a typical day, increasing to 300 to 400 horses during an event.

Waikato Thoroughbred Racing intend to drill a deep bore, or multiple bores, to provide a reliable water supply. WGA understands that the super hub water requirements are:

- Up to 500 m^3/day to cover race days for up to five days in a year
- An average volume of approximately 250 m^3/day outside of race days
- An annual volume of 92,500 m^3/year

2. KEY HYDROGEOLOGICAL EFFECTS TO BE ASSESSED

The hydrogeological assessment is for the effects of operating a production bore and the supply of water for the development. The key groundwater effects to be considered in the hydrogeological assessment include aquifer sustainability, effects on nearby groundwater users and effects on nearby streams and wetlands (Table 1).

Table 1: Activities Which Require Resource Consent

ACTIVITY	TECHNICAL ASSESSMENTS REQUIRED	CONSENTS
Drinking Water Infrastructure		
Abstraction of Groundwater for domestic, stock and irrigation water supply.	Groundwater/hydrogeology, including effects on surface waterbodies/wetlands, other groundwater users.	Controlled activity under WRP Rule Section 3.

3. GEOLOGICAL AND HYDROGEOLOGICAL BACKGROUND

The proposed development is located within the Hamilton Basin, a large tectonic basin centered on Hamilton City with an area of approximately 2,000 km^2 and traversed by the Waikato River. The basin is infilled with Tauranga Group alluvial sediments dating from the Pliocene to the middle Holocene, overlain by late Holocene unconsolidated alluvial and colluvial sediments.

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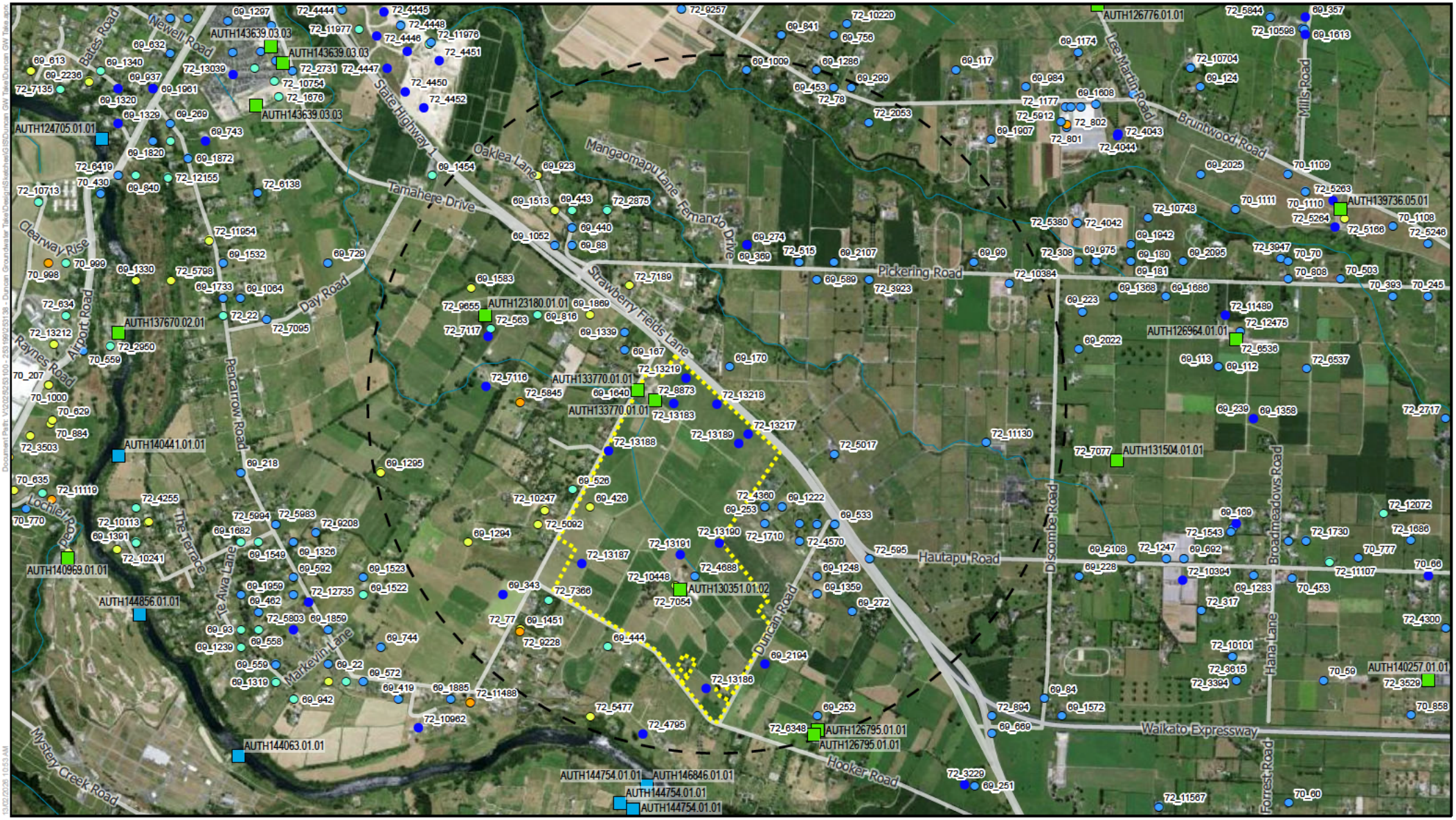
Hamilton
Cambridge
N
0 300 600 900 1,200 m
Scale 1:30,000 @ A4
Coordinate System: NZGD 2000 New Zealand Transverse Mercator
Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Any relevance placed on such information shall be at the risk of the user.
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LEGEND
Proposed Development Boundary
Watercourse
Ground water take
Surface water take
Bore 72_13218 2km Buffer
Nearby Bores (Depth (m))
Unknown
< 25
25 - 50
50 - 75
75 - 100
> 100
WGA
Figure 1
Waikato Thorough Bred Fast Track Development
Location of the Proposed Development

The Tauranga Group sediments include gravels, sands, silt, muds and peats of fluvial, lacustrine and distal ignimbrite origin. Two subgroups are recognised locally within the Tauranga Group, the Walton Sub-group (Late Pliocene to Middle Quaternary) and the Piako Sub-group (Late Quaternary), which together form a sequence up to 300 m thick.

The Piako Sub-group is the youngest unit of the Tauranga Group and has been deposited within the last 20,000 years. The Hinuera Formation and the Taupo Pumice Alluvium are the most widespread formations of this group. The Hinuera Formation underlies much of the Hamilton basin and comprises a variable, discontinuous sequence of rhyolitic and pumiceous gravelly sands, interspersed with pumiceous silt, clay and peat. The Hinuera Formation was deposited by braided river systems of the Waikato River, initiated by volcanism in the Taupo Volcanic zone (Petch, 1987).

3.1 AQUIFER GEOMETRY AND AQUIFER CHARACTERISTICS

The Tauranga Group sediments contain the aquifers used most extensively across the Hamilton Basin. Within these formations, the most productive aquifers consist of well sorted coarse sands and gravels. Lithological variability generally results in a number of zones of higher permeability within each of these formations rather than single continuous aquifer (Schofield, 1972). The shallow aquifer in the Hinuera Formation is named the Hinuera Aquifer and is used locally as a water source by landowners.

Literature values for hydraulic conductivity in the Tauranga Group in the Hamilton Basin range from 0.5 m/day in the silts and peat layers to 13.5 m/day in the coarse gravelly sands. Aquifer transmissivity values derived from pumping tests range from 10 m^2/day to 1,000 m^2/day but are usually less than 100 m^2/day. Aquifer transmissivities tend to be lower in the deeper deposits as they are older, more intensely weathered and have a greater proportion of clays and silts (Marshall & Petch, 1985). Storativity values vary from 0.0001 for deeper, confined or semi-confined aquifers to 0.1 for shallower, unconfined aquifers in the Hamilton Basin (Petch & Marshall 1988). In some areas, these discontinuous aquifers may yield up to 30 L/s (Petch, 1987).

The piezometric surface in the Hamilton Basin is closely related to surface topography. Piezometric gradients beneath un-dissected areas of the Hamilton Basin surface have a gentle slope that steepens near incised stream channels. Groundwater is recharged from rainfall, predominantly during the winter when soil moisture deficits are satisfied. The shallow groundwater subsequently discharges to the incised streams and the Waikato River. Isotope analyses suggest that the groundwater flux is mainly through shallow aquifers. Groundwater in deeper aquifers within the basin is significantly older, having been dated at up to 6,500 years old (Marshall and Petch, 1985).

4. NEARBY BORES

Based on representative parameters for the local deep aquifers, drawdown in the pumped aquifer is expected to be approximately 3 m or less at 1 km and about 2 m or less at 2 km from the production bore. The bore is initially planned to be more than 80 m deep; however, the final depth will be confirmed during drilling investigations to achieve the required yield and water quality.

According to the Waikato Regional Council (WRC) database, there are approximately 30 bores within one kilometre of the proposed racetrack development. Of these, nine are less than 20 m deep, eight are between 20 - 70 m deep, and four are between 70 – 100 m deep. The remaining bores have missing bore depth information.

As the proposed supply will target a confined aquifer at depths greater than 80 m, potential drawdown effects on existing users are considered to be less than minor. Predicted effects will be confirmed through aquifer testing once the bore(s) have been drilled and aquifer tests have been carried out to determine the site-specific aquifer parameters.

5. NEARBY WATER RESOURCE CONSENTS AND FLOW RATES

Current groundwater abstraction from other nearby groundwater bores was reviewed to provide an indication of the potential bore yields. Maximum consented daily abstraction rates in the area (within 2.5 kilometres) range from 28 to 1,620 m^3/day (Table 2). The lower flow rates relate to water being used for dairy shed washdown and stock water, and the higher flow rates relate to larger abstraction for irrigation/frost protection purposes. Therefore, WGA consider that groundwater at the site location will be able to supply sufficient volumes of groundwater for the intended use.

According to the WRC database, there are two existing groundwater consents on the proposed development site: AUTH133770.01.01 and AUTH130351.01.02, both associated with dairy shed washdown activities. AUTH130351.01.02 allows a maximum daily abstraction rate of 28 m^3/day with an annual volume of 10,220 m^3. AUTH133770.01.01 allows a maximum daily abstraction rate of 35.43 m^3/day with an annual volume of 16,581.95 m^3. WGA understands that both of these consents, with a combined maximum daily volume of 63.4 m^3/day and 26,802 m^3/year, will be surrendered if the proposed development proceeds.

Groundwater users are generally not concentrated near the proposed drilling locations. As such, interference effects resulting from cumulative local drawdown are not anticipated.

Table 2: Nearby Groundwater Consents Within 2.5 Kilometres

CONSENT NUMBER	WATER USAGE	CONSENTED MAXIMUM DAILY FLOW RATE (m^3)	CONSENTED MAXIMUM DAILY FLOW RATE (L/s)
AUTH123180.01.01	Shed wash	28	0.32
AUTH126795.01.01	Stock water and shed wash	48.3	0.56
AUTH126565.01.01	Shed wash	21	0.24
AUTH126626.01.01	Shed wash	23.8	0.28
AUTH131504.01.01	Shed wash	23.1	0.27
AUTH133770.01.01	Stock water and shed wash	45.43	0.53
AUTH130351.01.02	Shed wash	28	0.32
AUTH144063.01.01	Irrigation	245	2.84
AUTH146846.01.01	Irrigation	588	6.81
AUTH143639.03.03	Irrigation	355	4.11
AUTH144754.01.01	Frost protection	1,620	18.75

Note: Retrieved from WRC database

6. GROUNDWATER QUALITY

The local aquifers contain some areas where the groundwater is characterised by elevated dissolved iron concentrations. Dissolved iron concentrations vary between aquifers and laterally within the same aquifer. The iron concentrations in water from a targeted aquifer will not be known until test bores are drilled and samples taken. Dissolved iron causes staining and taste effects but is not considered a health risk in potable water supplies. Removal of iron through water treatment is not a complicated process and usually involves aeration followed by filtration. In some instances, treatment processes can involve increasing the pH, chemical oxidation, followed by filtration, greensand filters or ion exchange.

Groundwater abstracted from deeper bores is characterised by low nutrient concentrations, which is beneficial as elevated nutrients can be problematic with respect to complying with the drinking water standards. For example, nitrate removal through water treatment is generally considered costly. As a result, it is generally more practical and cost effective to target deeper aquifers with low nutrient concentrations in the water, even if the water in these aquifers has elevated dissolved iron concentrations.

From previous project experience in the area, WGA are aware that there are deeper bore(s) to the south of the proposed development that have encountered groundwater with elevated saline levels. This is attributed to an outcrop of basement greywacke. Because of this potential risk to the quality of bore water, WGA has recommended that the production bore(s) be located on the most northern side of the property boundary (i.e., near the Waikato Expressway).

7. AQUIFER ALLOCATION

The WRC's Regional Plan defines the aquifer in the area of the proposed groundwater abstraction to be the Hamilton Basin – South management zone. WGA considers that there will be allocation available for this aquifer via a meeting held between WRC with BCD, where it was indicated that the aquifer is currently allocated at approximately 8% of the allocation limit. Therefore, WGA concludes that this proposed development has allocation available and will not cause any long-term sustainability issues.

8. METHODOLOGY FOR THE GROUNDWATER ASSESSMENT

WGA has been heavily involved in advising the drilling and construction of groundwater production bores throughout the Hamilton Basin and the wider Waikato Region. Furthermore, WGA also has undertaken numerous groundwater modelling and effects assessments from operating groundwater production bores. The information gained from this prior work will be applied to this assessment.

In order to construct the required groundwater supply bore(s) for the development, WGA proposes to use the following workflow for each of the bores:

Gather Background Site Information

- Carry out a desktop survey of the site to establish local lithological information and identify any factors that may affect, or be affected by, the proposed groundwater take.

Drill Pilot Bore

- Drill a 75 mm pilot bore to inform the precise depth that the test bore and production bore will target.
- Collect and record underlying lithology.
- Determine from the underlying stratigraphy if the site is suitable or if another location is needed.

Construct Test Bore

- Drill a 100 mm test bore and carry out a production test.
- Collect a water sample during the production test and have it analysed.
- Assess if the target aquifer can provide the desired water volumes and quality, or if additional drilling is required to target deeper groundwater.

Construct Production Bore

- Drill and construct a production bore close to the test bore. The diameter of the production bore will be determined based on pump and water requirements.
- Undertake a stepped rate and constant rate pumping test on the production bore.
- Analyse the pumping test data and carry out forward projections to assess the effects of operating the production bore.

9. CONCLUSION

Waikato Thoroughbred Racing are seeking up to 500 m^3/day and 92,500 m^3/year. The available groundwater allocation within the Hamilton Basin – South management zone is sufficient to support the proposed production bore(s). A review of nearby large-diameter bores indicates that many achieve yields exceeding the daily flow requirements of the super hub, demonstrating that the local aquifer system is capable of supplying the necessary volumes.

Most existing bores in the surrounding area are shallow and likely draw from an upper aquifer(s). In contrast, the proposed production bore(s) will target a deeper, confined aquifer system, reducing the likelihood of interference effects with those shallow bores. WGA understands that two existing consents to take groundwater (26,802 m^3/year) will be surrendered if the proposed development proceeds. While treatment for iron and manganese may be required, these parameters are readily managed through standard water-treatment processes.

A structured programme of drilling, testing, and analysis is planned to confirm the optimal bore depth, number of bores required, and expected long-term performance. This approach will ensure that the abstraction is appropriately designed to meet both volume and water quality objectives.

Based on WGA's experience and the information currently available, there are no identified constraints that would prevent the proposed groundwater development from proceeding under a fast-track consenting pathway. Any potential environmental effects can be appropriately managed through standard consent conditions and bore construction best practice.

10. REFERENCES

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Petch RA. (1987). Water Resources of the Mangaonua Catchment. In: Mangaonua Catchment Management Plan. Waikato Valley Authority Technical Publication N0.30.

Schofield JC. (1972). Groundwater of the Hamilton Lowland. New Zealand Geological Survey Bulletin No.89.

Yours Sincerely

Clare Houlbrooke
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WALLBRIDGE GILBERT AZTEC

APPENDIX A
NEARBY BORES

Table 3: Nearby Bores Within 1 Kilometre of the Proposed Development (Waikato Regional Council)

BORE NUMBER	STATIC WATER LEVEL (m bgl)	DEPTH (m bgl)
69_1640		24
72_8873		
72_13183		
69_167		5.2
72_13219		
69_1339		7.3
72_13218		
72_13188		
69_1869		62.5
69_170		7.62
72_7189	11.4	73.35
72_13189		
72_13217		
69_816		47.2
72_5845		93
69_526	18.5	46.9
69_426	29.2	64
69_88		9.3
72_7116		
72_563	23	50
69_1052		10.5
72_7117		
72_10247	5.5	75
69_440		17.6
69_274		
69_369		11.4
72_9655		100
72_4360	4.8	14
69_253		3.5
72_2875	15	26