

Before the Independent Hearing Panel

UNDER The Resource Management Act 1991 ("Act")

IN THE MATTER of Variation 3 to the Proposed Waikato District Plan

Statement of evidence of Anna Ruth Noakes on behalf of Anna Noakes and MSBCA Fruhling Trustee's Company Limited

Dated: 4 July 2023



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Introduction

1. My name is Anna Ruth Noakes, office worker and farmer residing in Auckland.
2. I live in north Franklin on the family farm and support the family dairy goat business where needed by filling in with milkings, kiddings and kid rearing duties also completing a lot of supporting admin & regulatory functions. I am employed as a full-time permanent Export Team Leader for a Company based in Penrose, Auckland.
3. I have farmed the land at 157 Potters Road, Tuakau (**the Property**) for over 20 years and have firsthand and intricate knowledge of the stormwater and groundwater characteristics of the Property.
4. This evidence is presented in support of the primary submission¹ and two further submissions on Variation 3 (**the Variation**) to the Waikato District Council (**Council**) Proposed District Plan (**PDP**) lodged by Anna Noakes and MSBCA Fruhling Trustee's Company Limited as trustees of the Fruhling Trust being the owners of the Property.
5. The Land is zoned general rural under the Operative Waikato District plan and General Rural Zone (under the Waikato Proposed District Plan (PDP). It is bare land and has no services and is used for rural productive purposes.
6. The Pookeno urban residential area is immediately to the east of the Property.
7. The key concern raised in the primary and further submissions is that the cumulative effects of more intense urban development and increased impervious surface area in the district, which will be enabled by the Variation, will generate and exacerbate adverse stormwater and run-off effects.
8. The primary and further submissions:
 - (a) supported the Urban Fringe qualifying matter as it would also have gone some way to addressing my concerns regarding the Variation's potential cumulative adverse stormwater effects.

¹ Submission number 44.

- (b) Sought that if the Variation is approved then the stormwater management provisions throughout the PDP ought to be amended, in support of and consequential to, the intensification enabled by the Variation, to ensure that such adverse stormwater effects on properties downstream of proposed developments are appropriately, avoided remedied or mitigated. Specifically, the stormwater provisions of the PDP ought to be amended to address the adverse stormwater effects of more intense development in terms of altered natural flow paths, and altering the hydrological conditions, including the volume, frequency and duration of discharges, the extent of inundation on downstream properties and adverse effects on water quality.
 - (c) In the absence of the urban fringe qualifying matter, my concerns regarding stormwater effects and the need for an amended stormwater management regime have been heightened.
9. I have engaged Mr Matthew Davis of Project Lab to provide me with technical stormwater advice and advice about the specific changes required to the Variation to address the concerns in my primary and further submissions.
10. The purpose and scope of my evidence is to address the following matters:
- (a) Identify and describe the Property.
 - (b) Explain the rural productive use of the Property.
 - (c) Provide my observations of the pre and post development stormwater environment at the Property and on adjacent urban land.
 - (d) Explain the implications of these changes on the rural productive use of the Property.
11. I have read and am familiar with the Variation materials, the information provided in the Council's section 42 report / evidence and other parties' evidence that are relevant to the stormwater concerns raised in the primary and further submissions.

Executive Summary

12. I have farmed the Property for over 20 years and have observed the natural stormwater and groundwater conditions in both wet and dry periods over that time.

13. Urban development to the east of the Property has seen stormwater from those urban areas discharging to my Property concentrated to two outfall structures (D1 to the north of Paddock 3 and D2 to the north Paddock 2) and two constructed overland flow paths (Stage 5 Paddock 2).
14. I have observed distinct changes in the stormwater and groundwater environment since the development has occurred. I have observed these changes in both a drought season and, most recently, in a wetter than usual season. In short, the extent of wetted areas on my property have expanded and areas that were only intermittently wet are now wetted for a longer duration.
15. Naturally water flow is intermittent and would only be seen on my land during a normal rainfall season from approximately August to October (possibly November at the latest) with the remainder of the year seeing no flow, all areas of my land would dry out.
16. The creation of artificially wetted areas on my Property makes areas of the Property unusable for grazing or stock movement and means that existing farm infrastructure is over capacity for the altered stormwater flows.
17. I am aware that earthworks and discharge consents for the urban runoff were granted by the Waikato Regional Council and that is a matter outside of this process or the Waikato District Council's purview. However, the proposed intensification of urban land uses under the Variation has the potential to exacerbate the problems that I am already experiencing on the Property and the PDP needs to properly manage those adverse effects of intensification through a robust stormwater management regime.

Background

18. My family and ancestors have been farming in the Franklin district for generations. I spent my childhood on my parents' farm in Franklin. In 2002 I purchased the Property as I wanted to own and farm my own piece of land. The Property is approximately 23.5 ha in area. The Property was originally leased to the family farming business and used as a run-off block to rear our dairy replacement heifers. Some of the paddocks were harvested in spring and autumn as hay or silage.
19. The family farm was converted to dairy goats in 2013. Approximately 19 hectares of the Property is now used to produce crops that support the family milking goat business. Predominantly a goat mix of clovers, plaintain,

chicory and rye grasses have been grown that are made into silage whenever they are ready and conditions for harvesting are favourable.

20. I now use the areas not harvested to rear a small number of beef stock. I have planted areas of natives predominantly, I am a registered bee keeper and have hives on the property. I have grown seedlings and purchased trees to create planted areas providing food and shelter for native birds, bee's and stock.
21. I am working towards a pest free environment and try to encourage native species to my land with plantings, shooting, trapping and poisoning. One day I would like to build a small home and live on the Land.

The Land and surrounding area

22. **Figure One** shows the location of the Property (shaded red) and surrounding areas. The existing urban area is shown to the north. The Havelock Precint is outlined in blue and the Havelock Slope Residential area is shown immediately adjacent to the Property, hashed orange.:



Figure One: 157 Potter Road and surrounding areas

23. The Property has one road access entry from Potter Road, Whangarata, it is at the end of a loose gravel single lane road that travels along a ridge and drops down to my gate and a turn around area. Potter Road forms my southern boundary.
24. The Property is north facing and predominantly slopes gently down to the North Island Main Trunk Line (**NIMT**) on the northern boundary. Beyond the railway line I have a rural neighbour and then see Whangarata Pookeno Road that links Pookeno and Tuakau townships.
25. On my western boundary is a larger rural block of land of approximately 80 acres owned Karl Ye (Havelock) and is used for stock grazing. Along the northern portion of the Land's eastern boundary is the Dines subdivision and the Havelock Precinct is along the southern part of that eastern boundary.
26. The Property is bare land with no services and does not have access to the services that serve the adjacent residential area.
27. Fencing, railway bridges, culverts and crossings were created to allow safe and functional stock movements and grazing when the NIMT was realigned (for safety purposes) and from the time I purchased the Property it had functioning infrastructure including races, fencing, gateways, waterlines, crossings and culverts, most paddocks had at least some stock shelter trees.
28. As discussed below, naturally water flow is intermittent and would only be seen on my land during a normal rainfall season from approximately August to October (possibly November at the latest) with the remainder of the year seeing no flow, all areas of my land would dry out.
29. When I purchased the Property none of the gullies were planted, the stock grazed all areas keeping them in productive use and they kept the grass growth and weed pest species under control. The capacity of my culverts and other farm infrastructure on the Property reflect that these only needed to carry water flow during a very short duration and of a very low volume.
30. All the plantings on the Property were undertaken by myself. I chose to plant where I saw winter flow and tried to plant predominantly native. Given my knowledge of the water and drainage characteristics of the Property, I specifically chose species that did not require year-round water to survive. I attempted to plant kakaitei throughout, other species I planted in groups (e.g. I have a small kauri stand, other areas of teatree, flax, carex grass, cabbage etc). The naturally dry environment coupled with drought seasons made it difficult to establish plantings.

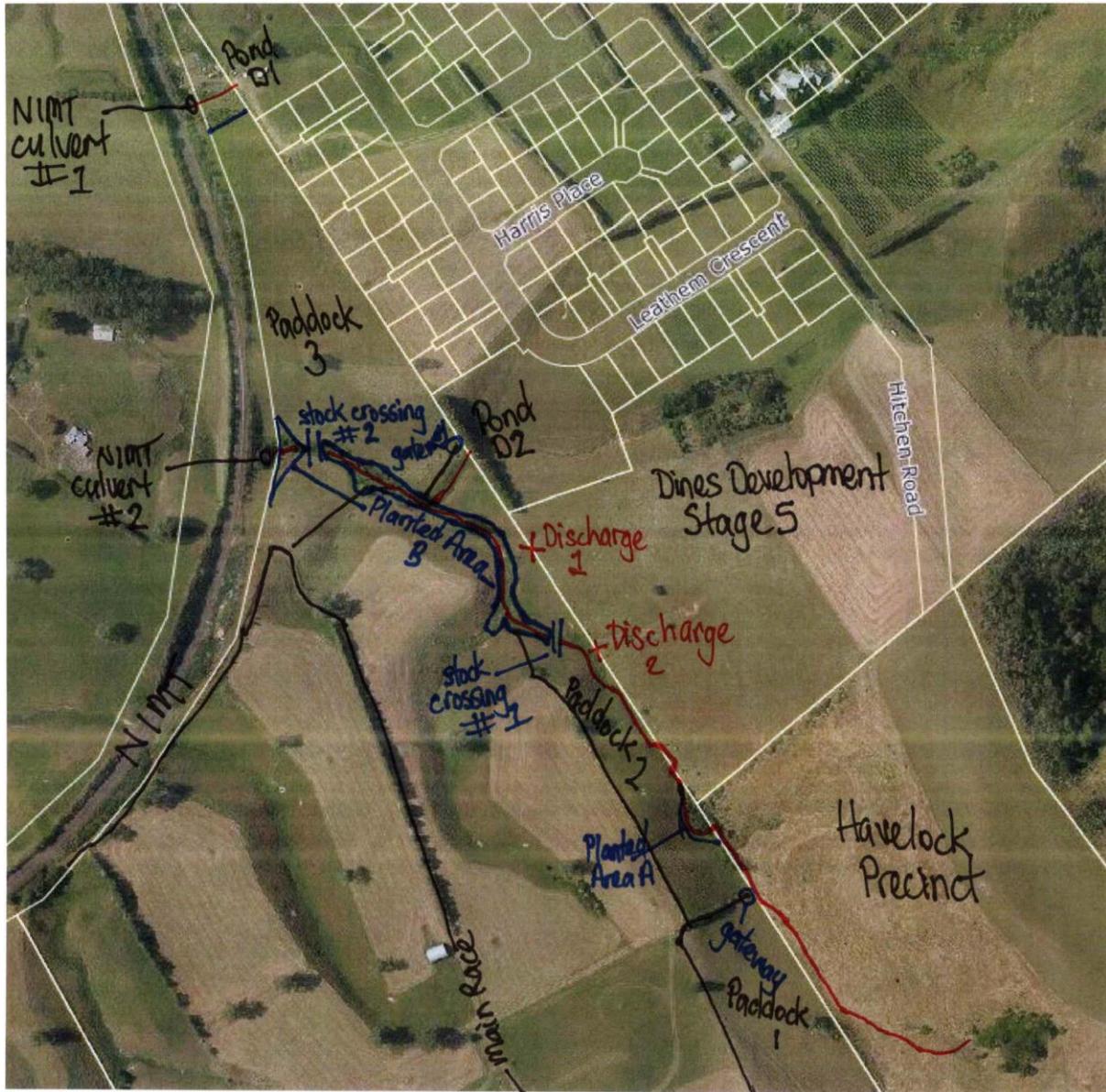
33. The land on the western side falls gently to the railway line to the north. The majority of this side is used for cropping with most of the fences and troughs removed. The central portion of the property is mostly flat and gentle rolling contour, the southern two central paddocks adjacent to the paper Potter Road are elevated. The eastern side also has a large area where the fencing and water troughs have been removed to allow for cropping and harvesting. A number of other paddocks are harvested seasonally but do not form the area of land dedicated only for that purpose, fencing and water lines and troughs remain in place for the stock. The land on the eastern side is more broken and contains some steep areas. **Annexure One** shows photographs of the topography of the Property and surrounding area..
34. Since I purchased the Property it has been used for rearing young stock and making supplements for the family dairy farm. Earlier all of our heifer calves were reared on the block, potentially 70-80 head and hay or silage made from several paddocks.
35. In 2013 the family changed to dairy goats much of the internal fencing was removed to create large paddocks on either side of the main race, three areas, marked as 'cropped' figure two, are used solely for growing supplements for the goats. A number of the other paddocks contain suitable contour and grass is made into silage when necessary.
36. I run a small number of beef stock, currently I have 17 R1 heifers/steers that I will rear from weaners to prime. They are control grazed rotationally around the paddocks (but not in paddocks dedicated to the growing of supplements for the goats).
37. The stock graze in a rotation with gateways between the paddocks that provide valuable and efficient access and ensures that to move stock from one paddock to the next I can open a gate and close it behind them. Without this access I could find myself having to drive stock back the way they have grazed (in the case of my eastern boundary this would require me to drive them through three paddocks, including the steepest paddocks I have).

Stormwater environment overview

38. Based on my 20 years of farming and observations, there are no natural perennial water flows on my land. The contour of my land encourages natural draining and the north facing aspect allows it to catch the available sun and encourages the land to dry.

39. During a normal rainfall season all areas of my land naturally stop flowing and dry out completely over the summer and shoulder months.
40. Advice received from Earthtech Consulting Limited in May 2019 confirmed my observations that prior to development the Property only had intermittent stormwater flow. A copy of the Earthtech Report is contained in **Annexure Two**.
41. I note that where I have observed changes occurring post development in this statement of evidence, I have observed these occurring prior to the unseasonably wet 2022/2023 season, including in the recent 2021 drought season.
42. **Figure 3** shows the location of the Havelock Land, Dines Stage 5 development, paddocks and planted areas on the Property and key stormwater elements such as discharge points on the Dines property, gullies, and culverts on the Property.

Figure three: Map showing location of key elements of the stormwater environment and infrastructure.



Pre and post development stormwater observations

Havelock Precinct slope area (Adjacent to Paddock 1)

43. In my approximately 20 years of owning the Property the southern most paddock (**Paddock 1**) adjacent to the Havelock slope has had no visible overland water flow path nor evidence of erosion or slumped off sections.
44. The Havelock Precinct land adjacent to my land is very steep. There is a natural spring that I see flow from a stand of trees on the Havelock land, in a normal season I would see the spring flow for several months of the year beginning commonly in August in a concentrated form and flow until November. This was the source of the only visible water flow down my Property.

45. From November on the spring would not flow and the entire length of the intermittent flow path from the spring on the Havelock land to the NIMT #2 would evaporate and dry out completely.
46. The spring water travels several hundred meters from its source down their paddock and across to the boundary fence line where it flows along their side in an open drain. It only enters my Property approximately 25 meters from the Havelock northern corner boundary. Therefore the wetting effects and water flow onto my land along our boundary is naturally a very short distance and duration.
47. The water flow across the boundary was limited to one single flow path that could easily be stepped over even during the peak winter flow.
48. Very soon after purchasing the land I put a fence around this area on my side of the fence line and I planted predominately natives, including a stand of Kakaitea trees) (**Planting A**). The flow path was easily stepped over and in most places was only as wide as of my gum boot length.
49. Once the water passed through the boundary fence line it would have a clear path to escape and this meant the vicinity was not boggy and saturated and remained firm underfoot including during the winter flow months.
50. Attached in **Annexure Three** are photos showing the Havelock Precinct Land and the parts of the Property adjacent to that land in different years and seasons.

Dines Pookeno Development Stage 5

51. Paddock 2 shares a small portion of its southern end boundary with the Havelock land. The majority of this Paddock 2 shares a boundary with the Dines Stage 5 housing development (**Dines Development / Dines Land**). Prior to development, the Dines Development land naturally sloped back up into their paddock. **Appendix Four** contains photographs of eastern boundary pre-and post the Dines Development work.
52. The northern half of Paddock 2 from the stock crossing 1 mid way is mostly flat with a gentle downward contour to the planted area.
53. Paddock 2 has gateways in the southern and northern ends. These provide me with access for stock movements between the northern and southern

paddocks along this side of my land. This access is required to allow efficient movements and supports my rotational grazing pattern.

54. Prior to my purchasing the land Paddock 2 was grazed entirely. I fenced off the area along the internal paddock fence line where the winter water flows from the farm culvert crossing in Paddock 2 (**stock Crossing 1**) to the culvert crossing in Paddock 3 (stock crossing 2) in the north by the NIMT line (**NIMT #2**) to create a native planting area (**Planting B**). December to August in a normal rain fall year including the water flow path running south to north through its entirety.
55. There were no visible storm water flow paths across the boundary of Paddock 2 adjacent to Stage 5.
56. The Dines Development earthworks undertaken in October 2021 to construct a steep bank and two large bunds are constructed to direct the water onto my Property via a funnel shape.
57. Attached in **Annexure Five** are photos showing the changes in slope topography before and after topography of the Dines Pookeno development Stage 5 onto the Property.

Planting Area B, upstream of D2 discharge

58. Naturally the water travelled in a narrow flow path. The wetting effect was contained to this area. The sides of the flow path were firm to walk along and the flow path narrow enough to step over.
59. The fenced and planted area from my stock crossing 1 in paddock 2 to the end of this paddock where D2 discharges carries more water than naturally occurring. Despite this the whole area still dries out in a normal rain fall season.
60. I have also noticed a new water flow since winter 2021 after the adjacent land was altered with earth works. This flow is visible on my land on the southern side of the D2 discharge point entering my plantings. The flow is substantial during the winter months and begins/ends for a longer time period than the natural south to north flow.
61. Attached in **Annexure Six** are photos showing changes in the stormwater environment upstream of D2 the before and after topography of the Dines Pookeno development.

D2 and Gully

1. In October 2019 Dines piped a perennial spring to my boundary fence line and started D2 pond construction. These discharges have created a permanent boggy, saturated flow path from the boundary to the far side of my paddock. Photos show the path created by the natural flow south to north with no flow while the discharge from D2 is creating flow from that direction.
2. The part of the Property where D2 discharges to is a relatively flat gully sloping very gently down to my internal boundary fence line and joins the winter water flow path that during winter passes down to the NIMT #2.
3. During the dry season this entire length should naturally dry out. The discharge from D2 has created an artificial and permanently wetted area on the Property.
4. D2 discharges heavily within a short time period after any heavy rain fall event resulting in sediment and vegetation being pushed down to the end of the gully by my native tree plantings, degrading the downstream water quality.
5. Attached in Annexure Seven are photos showing changes in the stormwater environment D2 discharge gully before and after the Dine Pookeno pond construction.

Downstream of D2 discharge junction

1. The natural water flow from this junction to the NIMT #2 would normally begin to flow in August of a normal rain fall year. The entire length of the natural water flow path would stop flowing November-August and would completely dry out.
2. The intermittent water flow would begin from the Graham Block and meet at the T junction and continue south. This was a minor flow in a normal rain fall year and did not add a lot of volume or velocity.
3. The flow path from this junction to the NIMT #2 culvert remained narrow, it was easily stepped over.
4. There is a small holding pond approximately 8m upstream of the stock crossing 2. This ponded area would dry out completely during summer of normal rain fall. This pond would take some time to fill after the winter rains started .

5. Since 2020 when the discharge from D2 created an artificial permanent flow I have noticed that the water flow path from the junction to the small holding pond is progressively scouring out a wider path in all parts and in some places has become too wide for me to be able to jump across.
6. My small holding pond no longer offers me any filling capacity. The pond outlet is being scoured out and widened with every season. The pond's footprint gets longer every season.
7. During periods of very heavy rain fall the quantity and force of the stormwater is so great that the water floods up and over the ponds edge.
8. The stock crossing 2 is unable to cope with the quantity of water and is choked pushing the water up and over the crossing. The culvert is ~460mm internal diameter. The concrete slabs that formed the base of the stock Crossing 2 are now slumping and falling into the water.
9. The lower side of the stock crossing #2 is progressively eroding and the flow path to NIMT #2 widening.
10. Attached in **Annexure Seven** are photos showing the stormwater environment downstream of D2 before and after the construction of D2.

D1 and Gully (Upstream of D1)

6. The paddocks surrounding the immediate area on Ken Graham's land adjacent to mine (the Graham Block) were gently sloping. The area further north had a steeper contour.
7. There was a small boggy area above the boundary fence line. I was not aware of a spring in this area, for the majority of the year there was no or very little flow. The flow was intermittent in my experience.
8. The Dines Development stormwater travels down and along the boundary fence line, it is approximately 6 meters.
9. The pond discharging pipe has been constructed much higher than naturally occurring being positioned off to one side.
10. Downstream of D1 discharge
 11. After the construction of D1 the area was completely altered as was the normal intermittent nature of the flow. After heavy rain the pond quickly

begins to discharge onto my land. There is always visible clay silt and erosion.

12. After several years of observation I believe that a natural spring has either been piped to my land or there is an underground flow path that discharges constantly onto this part of my land. Even when the pond outlet has no visible water flowing there is substantial water flow further down on my land above NIMT culvert 1.
13. I own quite a lot of land beyond where the water now permanently flows but access is physically difficult and hazardous.
14. I had understood from my conversations with Council officers at an open day in August 2008 and Colin Botica of Dines in 2017 that this area was to be acquired as a stormwater reserve. However, the Dines Development and the D1 discharge was consented without this occurring and the effect has been that this part of my Property has effectively become a stormwater reserve for the urban development.
15. Attached in **Annexure Eight** are showing the stormwater environment before and after the construction of D1.
16. Land between D1 and D2 discharge
17. Paddock Three located between ponds D1 and D2 has a flat contour. The fence line between the two paddocks and the stock water trough were removed to allow the entire flat area to be harvested. It has historically been used for harvesting and stock grazing. It has been a highly productive paddock.
18. I receive a large amount of overland water flow onto this paddock. The housing sections have been unnaturally built up. This paddock is now too wet to produce good crop yields or as much feed as it should and once did.

NIMT culverts

1. The land above the 900mm NIMT Culvert # 1 has been built up approximately ~4 meters, above the natural land height. This culvert receives the D1 urban stormwater discharge.
2. The land above the 900mm NIMT Culvert # 2 has been built up approximately ~8 meters, above the natural land height. This culvert

receives the natural intermittent stormwater from the Havelock Precinct, Stage 5 discharges and D2 urban stormwater discharges.

3. Prior to the urban stormwater going through this culvert it would only carry water during a few months of the year and much of the culvert capacity would be available.
4. Over the past couple of years I have noticed occasions that the water accessing this culvert is very high with little capacity remaining. The water has created an enlarged ponding area that is now wider than the culvert mouth.
5. Attached in **Annexure Nine** are photos showing the size and location of the railway and railway culverts.

Implications of changing stormwater on rural use

6. The Property is zoned for rural purposes and I do in fact use it for productive rural purposes.
7. In my experience, and as discussed above my ability to use and enjoy my Property as I have for the previous 20 years has been compromised by these altered discharges:
 - (a) The discharges from D1 and D2 and other alterations to the stormwater environment has altered the natural flows on my land from intermittent to perennial which impacts how I can now use my land.
 - (b) My Property is being damaged and I have experienced a reduction in my usable and productive land because a greater extent has now been artificially wetted.
 - (c) The farm infrastructure that I depend on to run my farming operation such as the holding pond and Stock Crossing #2 (that has supported my rural activities for 20 years and the previous owner dairy farming so is built for purpose) is being damaged.
 - (d) Land and soils that were healthy and able to produce well are now wetter and compromising their growth capacity.
 - (e) Increased wetted areas means that access around my land via gate ways to move stock in an efficient rotational pattern between grazing paddocks has been compromised. Needing to drive stock back through

three paddocks including steep areas is a significant adverse effect on the farming operation.

8. While I of course recognise that water flows downhill and my Property is required to receive natural flows from the land above what has occurred here goes far beyond normal natural flows.
9. I am deeply disappointed with the existing stormwater management regime of both the Waikato Regional and District Councils that has seen urban development authorised in a way that has significantly altered the hydrologic characteristics of those natural flows in a way that is having significant adverse effects on the Property and my farming operation.
10. In summary, I do not consider that:
 - (a) I should be expected to have to install new storm water infrastructure, repair or/and upgrade my rural infrastructure to suit the requirements for urban stormwater.
 - (b) It is not fair and reasonable for me to need to change the way in which my farm operates because of the way others are using and altering my land as a result of the new discharge points, altered water flows, volumes and duration created by urban stormwater.
 - (c) I do not consider that it is fair and reasonable to expect me, a private rural land owner, to have my land bear the burden of providing stormwater management services for the benefit of the adjacent urban land use.

Variation 3

11. I have already lost the use of an amount of productive land as a result of the current discharges. Some areas are now unnaturally wet with artificial perennial water flow coming across the boundary in two places via two artificial ponding systems, and two artificial earthworked structures creating new discharges.
12. My concerns are that the intensification enabled by Variation 3 will see more volume, longer duration and lessened water quality. More intense development as enabled by Variation 3 will result in additional altered and artificial stormwater discharges onto my land exacerbating adverse effects and further compromising the rural use of the Property. If further effects

occur as a result of intensification then I expect that I would need to drop my stocking rate or cease stocking entirely.

13. Unlike some existing urban environments that already constructed (and infilled) there are parts of Pookeno from which stormwater flows to the Property that are yet to be developed. This means that there is a real prospect that Variation 3 would add more houses and more impervious surfaces and increase and extend the water discharging onto my Property.
14. I would question whether D1 and D2 ponds are adequately functioning with what they receive off the current structures for me to be witnessing such significant damage and I am concerned regarding the effects of future, more intense, development.
15. Given the effects of what has been consented, I do not consider that the existing stormwater management regime is adequate and have sought amendments to the stormwater management provisions of the PDP via my Environment Court appeal to ensure that future development against a planning framework that seeks to maintain hydrologic characteristics (i.e. frequency, volume and duration) of flow rather than focussing only on maintenance of peak flow and flooding effects.
16. With Variation 3 enabling even more intense development these hydrologic characteristics become even more crucial and my submission seeks further strengthening of the stormwater management regime based on the advice that I have received from Davis.

Anna Ruth Noakes
4 July 2023

Annexure One: Photos the Property Topography



Western side of main race Land looking north to NIMT. Photo ref: DSC_0064 25 June 2023.



Eastern side of the main race Land looking north to NIMT. Photo ref: DSC_0088_1 1 July 2023.

Annexure Two: Earthtech Consulting Report.



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AHN/R4156-1/slh

21 May 2019

Anna Noakes
157 Potter Road
Pokeno

Dear Anna

**RE: EFFECTS OF PROPOSED URBAN DEVELOPMENT AT 201 HITCHEN ROAD
BOUNDARY AND WETLAND D2 DISCHARGE EFFECTS**

Following our site visit on 13 May 2019, we have reviewed the relevant aspects of the following documents.

1. Documents Received

- Regional Stormwater Discharge Consent Application, Hitchen Block, Pokeno, prepared by CivilPlan Consultants, August 2018 including application forms A, B and C (119 pages).

The assessment has concluded that:

- *The proposal does not require public notification or limited notification;*
- *Any actual and/or potential adverse effects on the environment generated by the proposal are less than minor; and*
- *The proposal is consistent with the environment outcomes contemplated by the relevant planning documents and consistent with the purpose and principles of the RMA.*

p.56

- Resource Consent Application to Waikato Regional Council for Hitchen Earthworks Stage 5, prepared by CivilPlan Consultants, January 2019 including application forms A, B and C (593 pages)

The assessment has concluded that:

- *The proposal does not require public notification or limited notification;*
- *Any actual and/or potential adverse effects on the environment generated by the proposal will be less than minor; and*
- *The proposal is consistent with the environmental outcomes contemplated by the relevant planning documents and consistent with the purpose and principles of the RMA.*

pp.75-76

2. Your Concerns

We understand that you have not been consulted and that your concerns relate to:

- Peak flood flow changes.
- Low flow discharges causing gullies and watercourses that are frequently dry (ephemeral) to become permanently wet (perennial), resulting in significant pugging damage and the inability to move stock across the gullies during wet periods.
- Definitions of gullies, streams and watercourses.
- Discharges from eight underfill outfall locations shown on the boundary.

Our interpretation of the site conditions and documentation is as follows:

3. Definitions

The Waikato Regional Council defines streams as follows:

Ephemeral Streams: Streams that flow continuously for at least three months between March and September but do not flow all year.

Perennial Stream: A stream that flows all year round assuming average annual rainfall.

There are no definitions provided for gullies or watercourses but we generally consider gullies to be areas where stormwater will flow during significant rainfall events and watercourses where water is continuously flowing.

Figure 1 of the Ecological Report (p.553 of Earthworks Application) does not show gullies but indicates both ephemeral and perennial streams as watercourses, including the Tanitewhiora Stream itself which flows continuously below the railway culvert.

Figure 19 of the Ecological Report (p.570 of Earthworks Application) defines gullies NW1, NW2 and SW2 as ephemeral streams and SW1 as a perennial stream for the lower third of its length above your boundary. The description, however, is based on a small channel which apparently discharges from the vegetation covered area approximately half way up the gully (Figure 22, p.572 of Earthworks Application). The mapping is not consistent with the description or photographs.

There is no question that the gully was completely dry during our site visit on 13 May 2019 and you report that it is dry for long periods over summer and even at times during the winter. The D2 gully joins a much larger tributary valley which was also completely dry as far as the railway line culvert on 13 May 2019.

In our opinion, the D2 gully is ephemeral, not perennial and the other three are simply gullies.



Wetland D2 Gully Looking North-east, 13 May 2019

4. Peak Flow Effects

In relation to peak flow events, the calculations indicate a reduction in peak flow volumes discharging across your boundary for each of the 1:2, 1:10 and 1:100 year flood events. Discharge is via an overflow outlet manhole and then via a 600mm diameter stormwater pipe which discharges on to a rock rip-rap apron of 6m x 1.8m, located immediately upstream of the boundary (drawing 1950-00SK313, Wetland D2 General Layout, p.83 Stormwater Discharge Application).

The calculations consider the existing peak flow discharges off the farmland and then model the effects of urbanisation which greatly increase the peak runoff rates. They also include a predicted increase in rainfall of 16.8% to allow for climate change over the next 100 years. These higher rates are attenuated or reduced by initially catching the runoff in a pond, which then spills into a large wetland area. Extreme flood events require an emergency spillway, but under these conditions the farmland is fully saturated and peak runoff for the rural versus urban catchment is similar.

The extended wetland provides an attenuation function and a water quality polishing function so that the discharge water post development should be cleaner (less sediment) than the current runoff from the farmland.

Overall there should be no adverse flood effects across the boundary.

5. Low Flow Discharge Effects

The wetland outlet is sized to release the design volume over 24 hours via the 110mm outlet pipe shown on the drawings (p.83 and p.85 of Stormwater Application). A cleanwater bypass outlet also discharges into the 600mm pipe. This collects water from the ephemeral wetland area in the central portion of the gully, which is to be improved by fencing and planting. In practice, the wetlands do not fully drain between each storm event, resulting most likely in a steadily reducing trickle of water which may run for days or even weeks. In our opinion, this low discharge is likely to result in a permanently wet area on the boundary at the D2 discharge point.

The stormwater report does not address this low flow issue any further. The application documents refer to streams and continuous flows, i.e. implying that the gully is already continuously wet.

We understand that you currently manage your stock in this area by allowing movement across the gully only when the gully is dry (most of the time) so as to avoid pugging, pasture damage and water quality deterioration. With the completion of the D2 wetland, it is highly likely that the area will remain continuously wet.

We understand that the Applicant has not made any attempts to consult with you or provide details of the stormwater system prior to lodgement of the application. Given the scale of the works and the outlet location on your boundary, there is no doubt that you are an affected party and should have been consulted.

We suggest that the following mitigation will satisfy your concerns:

- i. Construct a 4m wide earthfill crossing of the gully, approximately 1m high x 6m long and finished with 150mm layer of GAP65 or topsoiled and grassed. Refer to sketch attached (Figure 1).
- ii. Install a short length of 600mm culvert pipe under the crossing (note there is approximately 1m fall near the boundary and the proposed 600mm pipe may need to be reorientated).
- iii. Place a second rip-rap apron downstream of the crossing on your property.
- iv. Fence the immediate gully area and plant with wetland and dry bank native plants, as appropriate.
- v. Fence the unnamed tributary downstream as far as the railway culvert as this area is also likely to become permanently wet.

This mitigation will provide further polishing and control of the discharge waters while still allowing you to run stock across the gully at any time of the year.

Rule number 4.2.9.2 of the Waikato Regional Plan allows construction of a simple farm track and culvert as a permitted activity and no further consents should be required.

6. Underfill Drainage Outfall Effects

Figure 3.1 of the Geotechnical Report (p.337 of Earthworks Application) indicates eight outfalls located on your boundary. The text (Section 11.3.6 Underfill Drains) indicate these are expected to be 160mm pipes in a drainage metal surround.

These drains will be placed in the base of all gullies and connected to any springs or seeps identified during earthworks. The outlets frequently flow all year round and are often discharged to the piped stormwater system.

The effect of these outlets as shown is likely to be eight areas of continuously wet and boggy ground across your boundary.

Possible mitigation includes connection to the stormwater system or inclusion of a trench soakaway system at each location so that the collected water soaks away below the surface.

7. Conclusions and Recommendation

In our opinion, the D2 wetland gully is not a perennial stream but the proposed changes will most likely result in a continuous discharge across the boundary. Simple mitigation measures are available and should be discussed with the Applicant and/or Waikato Regional Council and Waikato District Council.

Yours sincerely



A H NELSON
Senior Geotechnical Engineer
EARTHTECH CONSULTING LTD

Encls: Figure 1, Wetland D2 Mitigation Works
Figure 1, Stage 4 and 5 Earthworks Boundaries within the Graham Block Site, Freshwater Solutions, November 2018
Figure 19, Classification of Streams within the Stage 5 Earthworks Footprint, Freshwater Solutions, November 2018
Figure 22, Perennial Stream Habitat along Watercourse SW1 within the Upper Vegetated Area (top) and Grazed Pasture Mid-lower Reaches (below), Freshwater Solutions, November 2018
Figure 3.1, Engineering Details Summary Plan, Lander Geotechnical, 6 August 2018
Drawing 1950-00-SK313 Rev B, Wetland D2 General Layout, CivilPlan Consultants, July 2017
Drawing 1950-00-SK315 Rev B, Wetland D2 Details, CivilPlan Consultants, July 2017

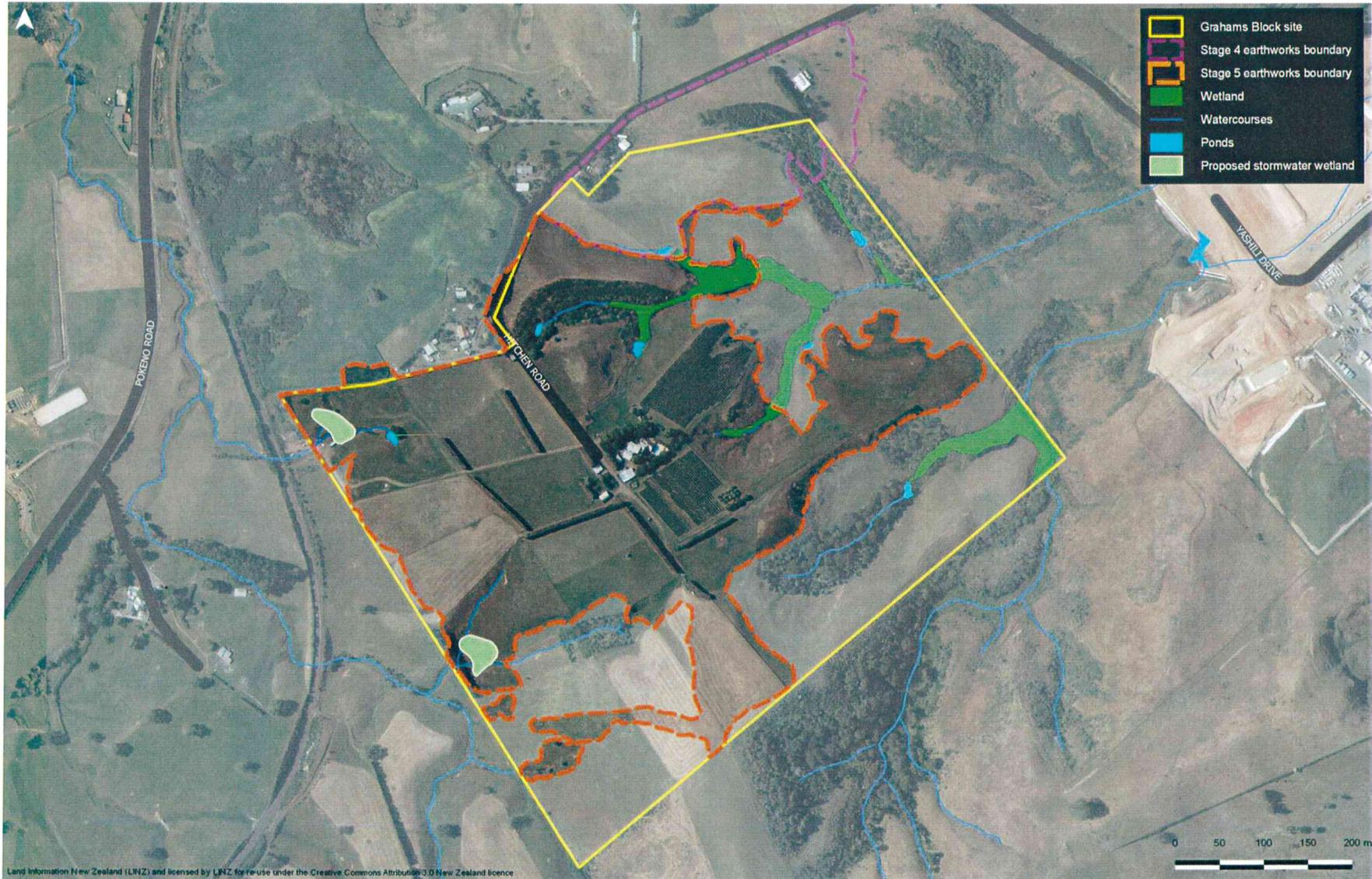


Figure 1: Stage 4 and 5 earthworks boundaries within the Graham Block site.

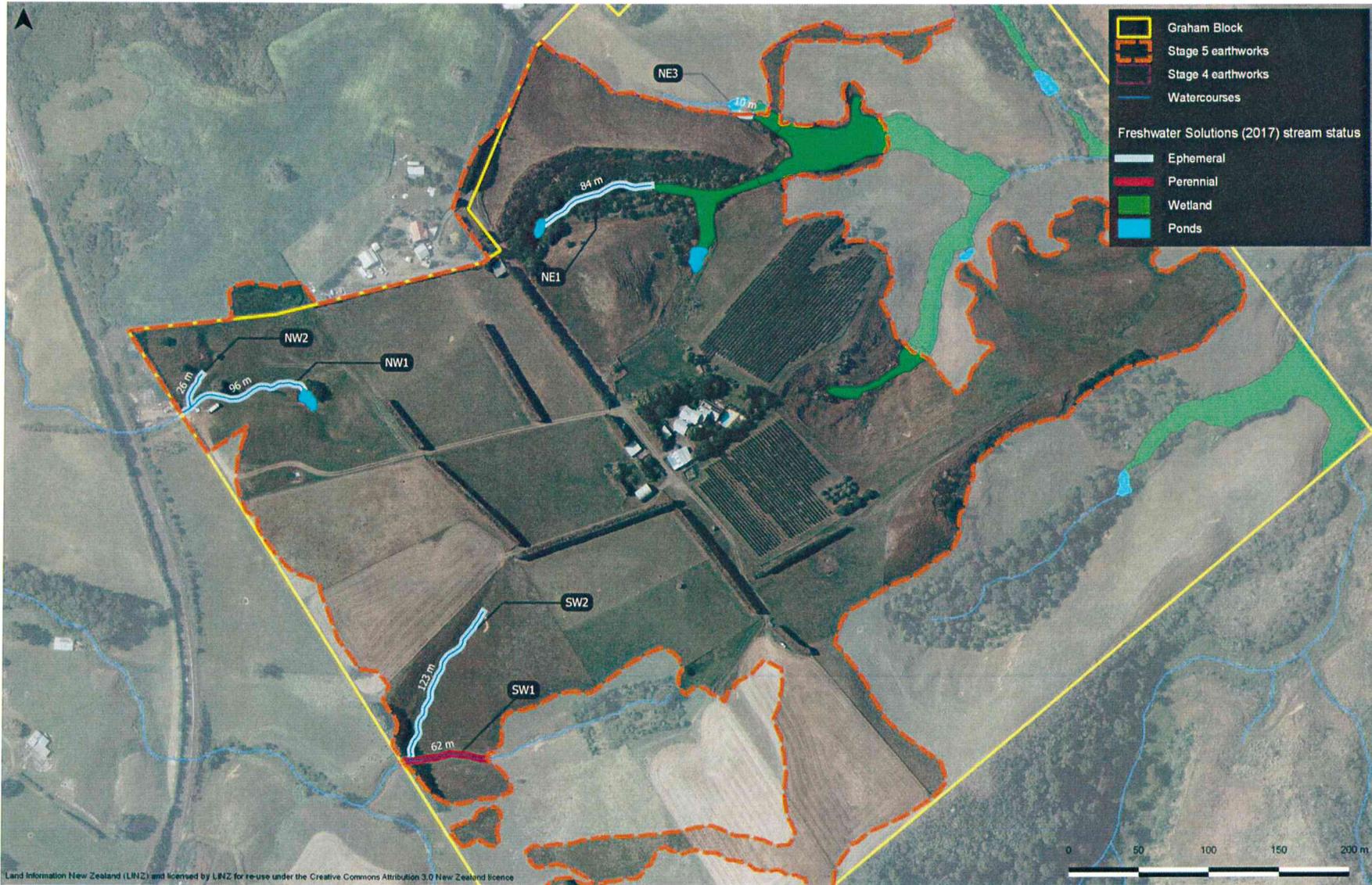


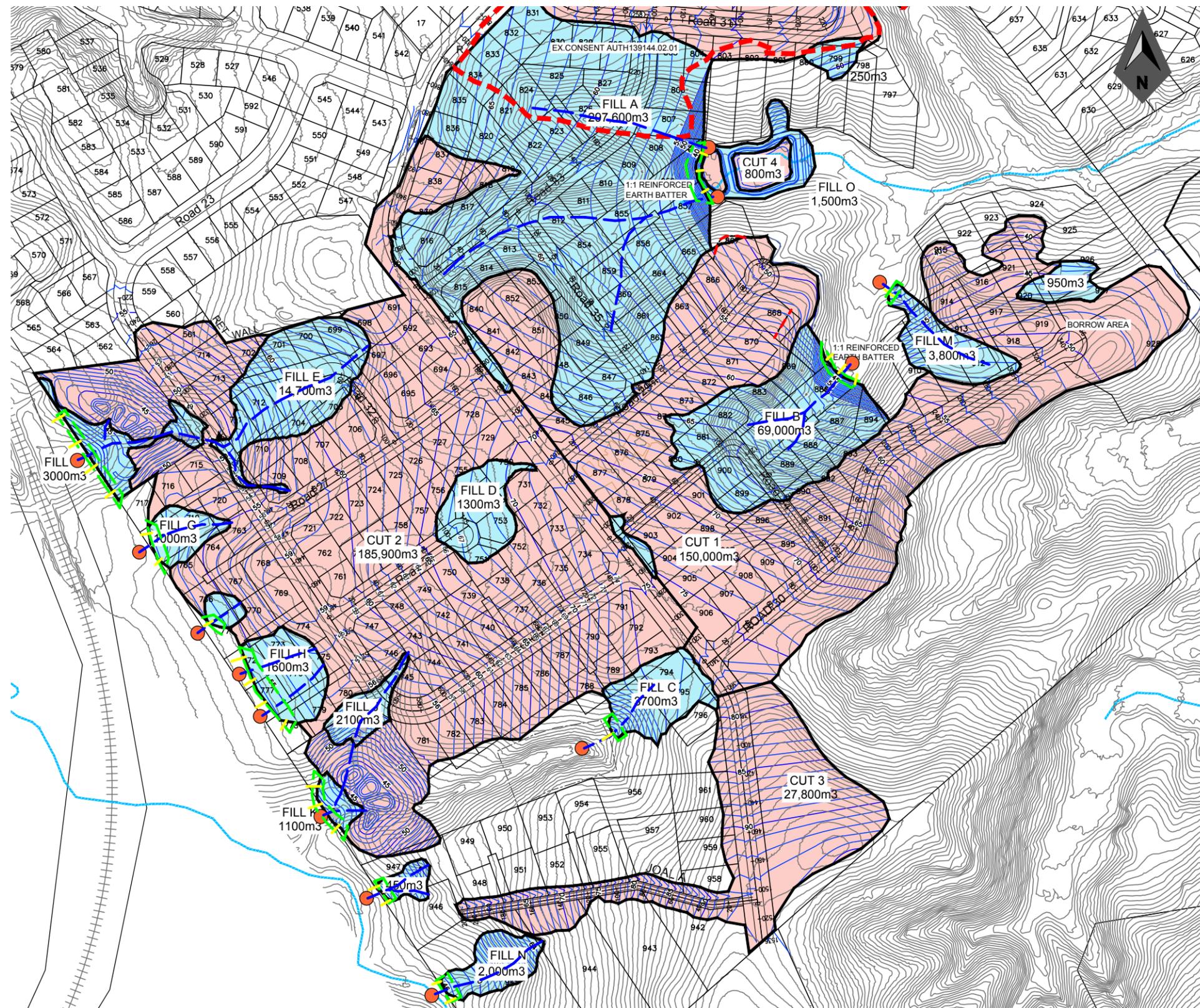
Figure 19: Classification of streams within the stage 5 earthworks footprint.

Perennial Stream Sections

The perennial section of watercourse SW1 originates within an area of fenced off vegetation as a narrow (<0.2 m wide) and shallow (<0.1 m deep) channel that drains a flat area of grass/herbs surrounded by trees/shrubs that provide moderate shade (Figure 22). Although perennial, the channel is small and aquatic habitat is limited due to the shallow nature and silt streambed. Downstream of the upper vegetated area, the stream flows into an unfenced and grazed V-shaped gully in its mid-lower reaches. The mid-lower reaches are heavily grazed and the channel damaged resulting in poor channel definition and poor habitat quality in its current state (Figure 22). Filamentous green algae cover was rare (<5% cover) and macrophytes recorded included moderate cover of water pepper (30%), *Ludwigia palustris* (5%), watercress (1%) and *Isolepis prolifer* (1%). The WRC habitat score for NE1 was 46 (out of 180) and indicates very poor aquatic and riparian habitat quality.



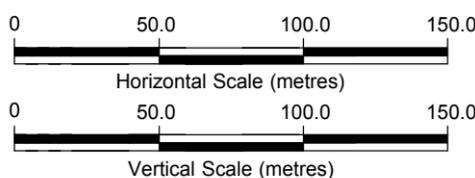
Figure 22: Perennial stream habitat along watercourse SW1 within the upper vegetated area (top) and grazed pasture mid-lower reaches (below).



Legend and/or Notes:

-  Indicative underfill drainage alignment
-  Proposed underfill drainage outfall location
-  Proposed toe key location (refer to Figure 3.3) - extent to be determined on site during earthworks
-  Proposed toe key drainage outfall structure location
-  Building Restriction Line (refer to Table 6.1; Appendix 6 for specific details)

revision	description	drawn	approved	date

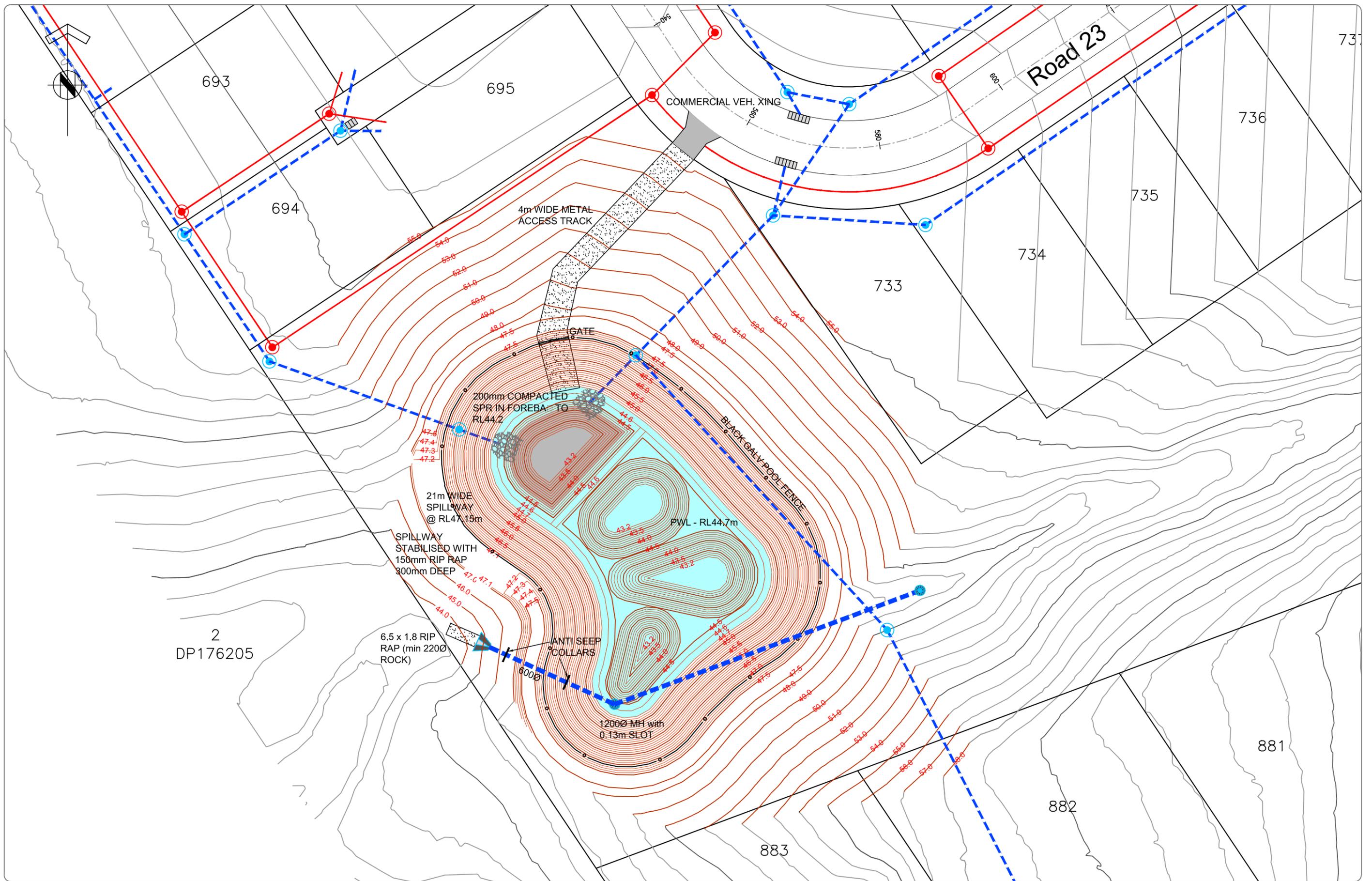


drawn	KM
approved	SGL
date	6.08.18
scale	1:2500
original size	A3



client:	DFH JOINT VENTURE LIMITED
project:	HITCHEN ROAD STAGE 5, POKENO
title:	ENGINEERING DETAILS SUMMARY PLAN
project no:	J00741
figure no:	3.1

Template revision: 1:1000 (10/12/14)



REV	REVISION DETAILS	BY	DATE
B	REVISED FOREBAY AND SPILLWAY. ADDITIONAL PIPES.	RJP	22.6.18
A	ISSUED FOR CPNSENT	RJP	07-17

PLOTTED:	DATE:	07-17
DRAWN:	DATE:	07-17
APPROVED:	DATE:	07-17

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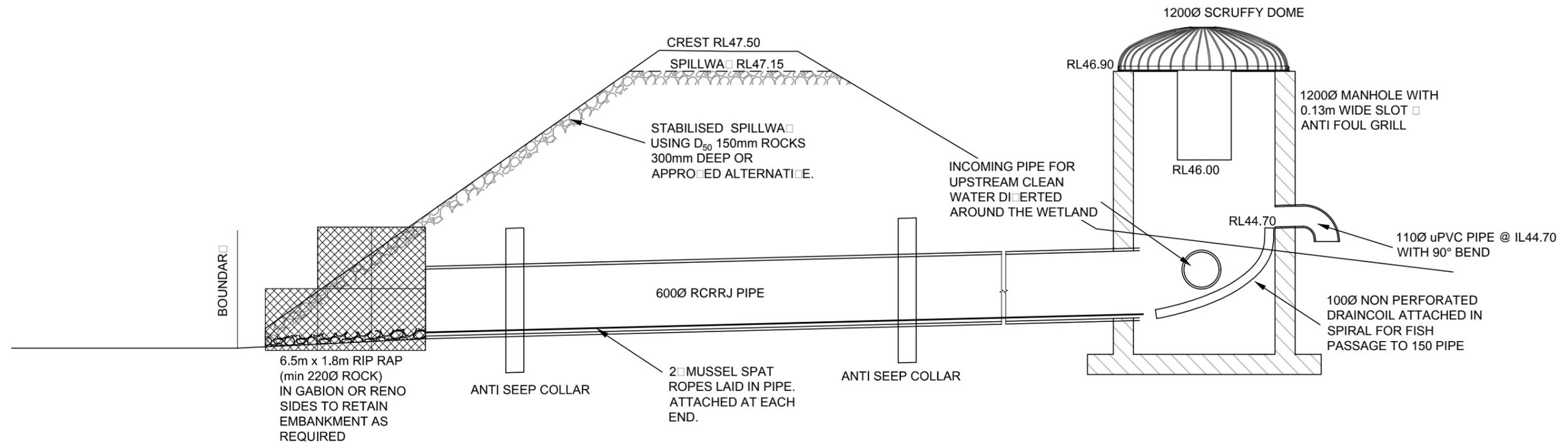
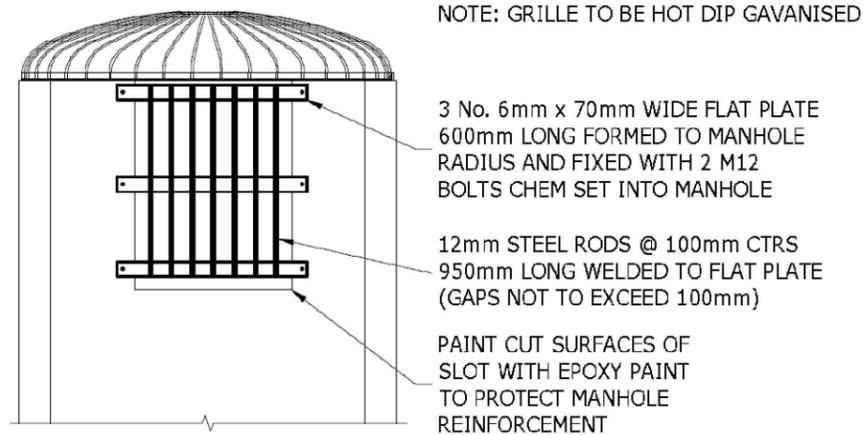
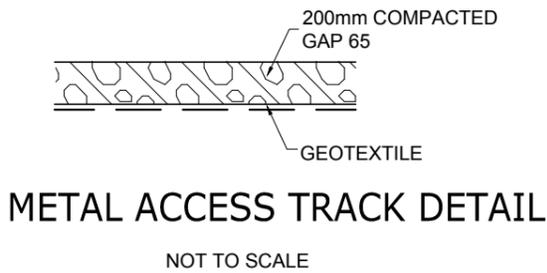
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PROJECT TITLE:
**DFH JOINT VENTURE
HITCHEN STAGE 13 SW CATCHMENT
POKENO**

SHEET TITLE:
**WETLAND D2
GENERAL LAYOUT**

ISSUE STATUS: **RESOURCE CONSENT**
SCALE: (A1/A3)
1:250 / 1:500
DRAWING NUMBER: **1950-00-SK313** REV: **B**

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REV	REVISION DETAILS	BY	DATE
B	MH EVELS & OUTLET AMENDED	RJP	23.6.18
A	ISSUED FOR CONSENT	RJP	07-17

PLOTTED:	DATE:	07-17
DRAWN:	DATE:	07-17
APPROVED:	DATE:	07-17
MSS		

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PROJECT TITLE:
**DFH JOINT VENTURE
HITCHEN STAGE 13 SW CATCHMENT
POKENO**

SHEET TITLE:
**WETLAND D2
DETAILS**

ISSUE STATUS: **RESOURCE CONSENT**

SCALE: (A1/A3)

NOT TO SCALE

DRAWING NUMBER: **1950-00-SK315** REV: **B**

Filepath: ---- C:\DATA\POKENO\HITCHEN\SW D\1950-00-SK315.DWG

Annexure Three: Havelock Precinct Land



Havelock Precinct adjacent to the south eastern paddock 1. Photo ref: DSC_0061 13
November 2022.



Havelock Precinct adjacent to the south eastern paddock 1. Photo ref: DSC_0308 11
February 2023.

Annexure Four: Eastern boundary pre and post Dines Earthworks.



Eastern boundary prior to earthworks. Photo ref DSC_0713 24 October 2016.



Southern paddock showing eastern boundary fence line. Photo ref: DSC_1115 11 June 2023.

Annexure Five: Dines Stage 5 pre and post earthworks



Stage 5 discharge 1 pre development. Photo ref: DSC_1398 24 November 2018.



Stage 5 discharge 1 pipe and construction of discharge point onto my land. Photo ref: DSC_0480_1 2 October 2021.



Stage 5 # discharge 1 northern showing effects of long term wetting, erosion effects on grazing paddock. Photo ref: DSC_1206 17 June 2023.



Discharge #1 Stage 5 eroding the stock tracks, clay & gravel in plantings B. Photo ref: DSC_1376-1 27 March 2022.



Stage 5 discharge #1. Dines created structure to slow the water flow of their artificial discharge onto my land. Photo ref: DSC_1470_1 29 April 2022.



Dines development Stage 5 discharge 2. Photo ref: 0392_1 7 August 2021.



Dine development Stage 5 Discharge 2. Photo ref: DSC_0028 19 May 2022.



Dine development Stage 5 discharge #2. Photo ref: DSC_0802 29 April 2023.

Annexure Six: Planted Area B, stock crossing #2



Water flow path between D2 junction and small holding pond. Photo ref: DSC_1210 17 June 2023



Small holding pond located above stock vehicle culvert crossing. Photo ref: DSC_1212 17 June 2023



Upper side vehicle, stock culvert crossing showing erosion. Photo ref: DSC_1215 17 June 2023.



Upper side vehicle, stock culvert crossing not coping with storm water volume. Photo ref: DSC_0849 10 May 2023.



Lower side vehicle, stock culvert crossing showing erosion. Photo ref: DSC_1217 17 June 2023.

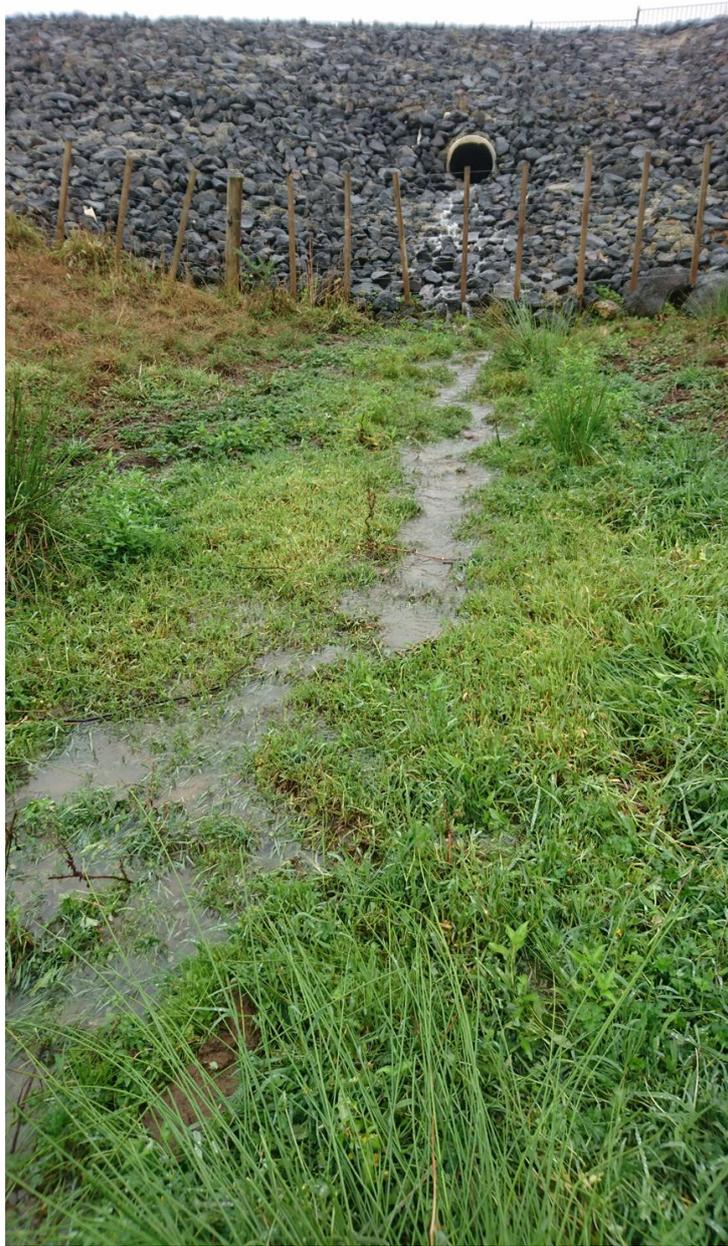
Annexure Seven: D2 and Gully pre and post alterations



D2 discharge point pre development looking across to Ken Graham land. Photo ref: DSC_1615 3 July 2019.



Looking down gully from D2 boundary fenceline to Plantings B. Photo ref: DSC_1371 24
November 2018.



D2 discharging when main water flow not flowing. Photo ref: DSC_1046_1 7 February 2022.



Water flow path above the junction with D2 discharge with no flow. Photo ref: DSC_1049_1
7 February 2022.

Annexure Eight: D1 Pre and post development.



Pre development D1 pond boundary fenceline with Ken Graham. Photo ref: DSC_1546 24 March 2019.



Pre development D1 pond site Ken Graham land. Photo ref: DSC_0369(1) 28 January 2018.



D1 pond face and stormwater outlet. Photo ref: DSC_0240_1 7 June 2021.



D1 discharge near NIMT culvert entrance sediment and erosion visible. Photo ref: DSC_1171 11 June 2023.

Annexure Nine: NIMT culvert # 2.



NIMT culvert #2. Photo ref: DSC_2723 27 February 2021.



D1 discharge showing erosion and clay stone sediment above NIMT #1 culvert. Photo ref: DSC_0938 13 May 2023.