BEFORE THE HEARING PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER Plan Change G

BRIEF OF EVIDENCE OF LES FUGLE

Dated: 4 November 2023

I, **LESLIE WILLIAM FUGLE** of Palmerston North, Project Manager, say:

1. I am Les Fugle and I have been working in the Manawatu region, as a propertied and infrastructure developer for in excess of 30 years.

2. I am the shareholder and director of Woodgate Limited, which company owns the land contained within Valuation No 14700 123 00 an area of some 48ha

3. I am, also, speaking on this occasion on behalf of Terra Civil Limited, which is the owner of the property Valuation No 14700 130 00 an area of some 49ha

4. Between the interests of Woodgate Limited and Terra Civil Limited, the interests on whose behalf I speak today, comprise a significant proportion of the land subject to Plan Change G (**PCG**).

5. The structure plan implemented by PCG, to my understanding, has consequences upon only three private property owners, with the interests on whose behalf I speak being by far the most affected by the plan change.

6. My perception is that the representatives of Council, despite the planning and preparation for PCG having apparently been underway for a significant period, have failed to enter into any constructive dialogue with myself, or with our two adjoining property owners, Mr Green and Mr Waters, until late September 2023.

7. In September, as the three primarily affected landowners, we were invited to a prehearing meeting that extended for two-part days.

8. While during that prehearing meeting, I, with the support of our expert planner (Paul Thomas of Thomas Planning) canvassed the matters that I now raise below, I came away with the clear view that Council attended with some quite fixed views and the meeting was being regarded by the Council representatives as being something of a rubberstamping exercise, rather than an opportunity for the genuine exchange of views and consideration of options. In expanding, Council pre the aforesaid meeting, and pre-closing date for public submission, had applied to Environment Court (“ex parte”) for declaration PCG be given effect. The fact Council’s officers went behind submitters back highlights troubling concerns with Council officers’ willingness to listen to submitters.

9. It is my understanding, and disappointingly, Council officers have not adopted, or advanced any of the concerns put forward by any of the landowners at the prehearing meeting.

10. My understanding is that this hearing is for the Commissioners to consider whether the Council officer's recommendation should be accepted in full, in part or rejected outright.

11. It is my view, that the starting point for the consideration of PCG, ought to be that this Panel ought not impose rules, or resulting land use restrictions, that are unnecessary, which duplicate existing rules and/or restrictions, or which are unnecessary to ensure the orderly use and development of the land at issue. To do so exacerbates the costs faced by the developer(s), and ultimately the burden of those additional costs must either be absorbed by the developer, which may render best use case design/development untenable, for those costs must be placed in at point of sale, restricting affordable section, and thereby house and land packages.

12. Palmerston North City Council (**PNCC**) has long signalled its desire to see affordable sections being brought to market, however the developer's perspective is this objective is rendered increasingly unachievable, due largely, to the ballooning costs of meeting Council's planning strictures. It is my understanding that that PNCC estimates that to achieve compliance with the requirements of PCG, there will be an added, circa $70,000 worth of expenditure required for each new section developed. An increase of that extent will curtail any potential for the development of affordable sections within the area regulated by PCG, and will result in a significant decrease in growth as sections will be out of reach for all but a few once those costs are factored in.

13. Reduced sales volumes not only render development non-viable, the resulting lack of development of that land for residential/aligned purposes, but also serves to take away revenue which would otherwise fuel business and Council income streams. For each section created within Aokautere, Council receives approximately $10,000 in development contributions, plus ongoing annual rates of (circa) $2,500

14. From the developer's perspective, and I apprehend this is a view shared by my fellow landowners affected by PCG, is that consultation and development has been handled poorly. There has been only minor dialogue with the affected landowners, and that dialogue has given rise to very little, or no, modification or accommodation within PCG to ensure a mutually beneficial utilisation and development of the land can occur. To

date, it is my understanding that Council officers have expended more than one million dollars of ratepayer's money to bring this matter to a hearing. In the context of what, I am advised has been extensively long-term planning, and significant expenditure, it is disappointing that the opportunities for genuine engagement, and integration of significant landowners' feedback has been minimal and ineffectual while placing affected landowners to the engagement of consultants at significant cost which ought not need to suffer. Such use of ratepayers' capital would have been better served using such in a more constructive way.

15. From my assessment of PCG, it effectively entails two elements; there is a rezoning of land, and the imposition of a structure plan that "dictates", among other aspects, where Road (S) may be located. In behind those two primary functions sits consideration in relation to land stability, stormwater, wetland, and traffic management.

16. In my submission, if Council wishes land to be available for urban growth, no more than rezoning is necessary. There is, I consider, sufficient protection within the rules, presently in place, to address the aforesaid concerns.

17. In respect of rezoning, I note that doing so comes at a considerable expense to the landowner; for instance, moving greenfield land into with eventual rates classification. Given, for much of the land at issue in PCG, it may be many years before there is a need and a viable business case which would enable the development of any "rezoned" land, in my view it would be proper, indeed in order to ensure financial viability in the interim, it is essential that any greenfield land within the rezoned PCG area which is held pending residential development, be taken outside of the residential rating policy until such time as the land is connected to the city services. To impose rates, calculated on a residential land use basis without connection to city services on greenfield land which may not come within residential use, and therefore will not impose residential infrastructure costs upon Council, potentially for a decade or more, is not commensurate with the underlying policy purposes for the residential rating basis, and actively inhibits the potential for affordable section development into the future.

18. I can see a case, for the rezoning contemplated by PCG, however imposing a ridge road layout by way of the structure plan is unfeasible. There is no need nor engineering justification for Council to seek to stipulate where any road must be built.

19. I note Council officers are concern that cul-de-sac road(s) have been used within the Aokautere existing residential zone and wish to avoid further such use. Cul-de-sac's have been used only on Mr Green's land and with prior approval by Council, and only where there is no possibility to have a 'connecting' road. That said, some section buyers prefer not to live on a through-road but that within a quieter cul-de-sac. It is difficult to understand Council's concern with cul-de-sac roading, particularly given their common use thought out the city and fact such meets Council's promoted engineering standards for land development ("ESLD").

20. Neither Woodgate Limited nor Terra Civil Limited, support the land owned by those entities being set aside for stormwater, wetland utilisation, or commercial use in the manner proposed under PCG.

21. Likewise, aforesaid do not support the removal of the residential zoning, upon land commonly known as the Abby gully; nor is their support for the recommended setback distance from the gully edge and setting aside gully land for reserves.

22. We do not support the effective prohibition, on the bringing to market or further sections in the absence of the wider road network being upgraded.

23. By way of background, I note that companies, or entities in respect of which I, or the owners of Terra Civil Limited, or Aokautere Land Holdings Limited, have been or are interested, have undertaken all the urban development between Aokautere Drive and to the east to the land owned by Brian Green's entities. This has involved the construction in excess of 3,000 meters of roading with the associated infrastructure which created some 400 sections i.e., over $1m into Council coffers by way of annual Rates.

24. The success of Aokautere growth is not Council driven but the hard work of the innovation and development undertaken by the private sector. Council needs to be conscious their unnecessary interference will only hamper growth and revenue into supply merchants associated with land development.

25. The interests on whose behalf I speak have approximately 100 hectares of land affected by PCG. PNCC is aware of owner/developer intention in relation to development/road layout of this land. I make this observation for two reasons, firstly, as alluded, Aokautere urban development has not been driven by Council but success arriving from developer's foresight who clearly have the insight as to what section buyers seek. It is latter that governs road layout, section size, and the management of

stormwater, etc. Secondly, I note that essential services have been installed at the owner/development cost in order to facilitate future growth. Council affords no weight to the fact developer's are required to install services/pipes that capable of no less than 80 year life use. I accept this panel is not here to undertake an investigation into development levies, however, I am signalling this issue as will be a matter that will come alive before Council at a future point.

26. Having regard to the recommendations advanced by PNCC's officers, I feel it may be useful if the Commissioners were aware of two underlying issues, which intersect between the interests on whose behalf I am speaking today, and PNCC.

PNCC stormwater:

27. PNCC retains ownership of a 450mm diameter stormwater pipe located at Monaco Grove. That pipe consolidates and discharge of stormwater from the Monaco Grove development onto land which is beneficially owned by Woodgate Limited. There is a somewhat complicated history to how that situation arose, however, for the purposes of this submission it is sufficient to say that the discharge both has, and continues to cause substantial erosion, sediment outflow and flooding. Further, the water inflow occasioned from the PNCC infrastructure, service to significantly exacerbate any future development expenses, relating to stormwater management within Woodgate site. Damages are being sought from Council. The landowner interests have sought to develop a collaborative means of remedying the damage from the stormwater outflow and, facilitating land use. Invitations to assess those issues, by way of informal or supported/mediated meetings have been declined so far by PNCC. How Council discharge is controlled, directly interfaces with subsequent stormwater management methodologies and costings.

Abby Road gully:

28. In or about 2007, PNCC approved the filling of the Abbey gully; a resource consent contemplating network issued and work on the site commenced. That work was halted, due to staff being required on another project. The gully formation was stripped, drainage installed, and clay material placed in the gully at a cost of some $500,000. A request to renew the consent, upon lapse, was declined.

29. The intention behind the filling work, as Council aware, was to enable a 30 lot subdivision to follow declined, strangely, PNCC officers approached myself to say that

while they would not support the gully filling as sought they would support a partial filling to enable Abby Road to be extended to join up with Johnstone Drive !!.

30. I declined to engage with their proposal and on that basic leading to Council serving a Notice of Requirement. That Notice of Requirement was subsequently confirmed as a designation. An application is currently being prepared on behalf of Terra civil Limited Ltd, asking the Environment Court to order PNCC either to withdraw the designation, or proceed to purchase the affected land. I have significant concerns around Council's decision to issue the Notice of Requirement and pursue a designation, given the cost to buy the land, earth fill the proposed section of the gully and thereafter build a road upon would, in my estimation, easily exceed $5 million, with only very few traffic movements shall benefit from that road extension.

31. I do not support Abby gully being rezoned from Residential to Recreational zone, such rezoning would effectively prohibit all future development options relating to the gully, such as a renewed application to develop the gully into sections. It is noteworthy that residential rates have been paid on this land for some 30 odd years. Rezoning would significantly devalue the land, plus effectively rendering the land as non-saleable. Nor support what appears to be rezoning of area between G10 and G11 marked on the structure plan map. It appears Council officers are recommending Council's parcel of reserve abutting Pacific Dr (ought to be retained for playground use) be zoned residential leading way to urban development and, to compensate that reserve loss, rezone Terra Civil's flat land from its current residential zone to reserve that in turn leading way to Terra Civil suffering significant financial loss.

Structure plan – roading:

32. Council proposes a road (specified within PCG) be constructed from the terminus of Allen Mier Drive, extending to the Brian Green property interests, and thereafter onto and into the Water's property. I consider the alignment through the land I speak for, to be ill-conceived and say that the siting of the future road, provided it complies with sightlines/transportation safety and engineering considerations, is something that is best left to the developer.

33. As example of Council's poor foresight is the section of "wiggle" road, which is proposed by Council officers, cannot be constructed in compliance with PNCC's engineering/roading standards, nor built without potentially undermining the bank stability of the adjoining Coutts Way properties. A by far more logical and feasible,

from the engineering perspective, location to cross the gully has been proposed by the landowner, as depicted with the annexed. The landowner finds it frustrating (and costly) to remain debating this wiggle road when Council officers are more than aware of the technical issues with their alignment.

34. It is a development truism that road and position is driven by market demands, including as to number and scale of sections and those demands are variable; they are often unable to be ascertained until closer to the construction phase, particularly so in a volatile global economic environment.

35. There are stringent, existing rules, which require as part of any application to build a road, that the developer must submit engineering certification/sign-off that the road meets Council's engineering design standards and that the requisite land formation/land stability works have been undertaken in its construction. With these rules already in place, nothing further is required to ensure that road placement and road engineering is completed to a uniformly high standard. This includes the displacement of stormwater and road sits upon stable land.

36. It is very probable that a market use/engineering case analysis will demonstrate that come time of development, the extension of Allen Mier Drive beyond gully crossing is more appropriately positioned along the gully edge in order to achieve views towards the gully, and also in order to yield higher section numbers.

37. The positioning of the road proposed by PNCC's officers, running as it does along the crest of the land, serves to consume the most desirable land available for section development and removes visual outlook.

Gully setback:

38. PCG proposes a setback of between 5-10m. This is unnecessary and unsuitable in terms of engineering methodology.

39. Fixing a general distance, fails to take account of actual land topography and stability, and will result in the loss of developable land. It is my understanding that PNCC is yet to undertake any core sampling to support their recommendations.

40. In the context of previous developments, I have been involved with, the development entity has been required to produce engineering certificates detailing how close to the gully edge a building may be placed, which methodology minimises land wastage, maximises residential utilisation, and ensures that decision-making is based upon

individual engineering assessments. This methodology is clearly preferable to the imposition of a generic setback. It is worthy to note many areas of the Aokautere gully network have been re-contoured to either produce additional sections and/or shore up the gully slope to stabilise existing allotments. This practice, which the plan change seeks to remove, must be allowed to continue.

41. I noted that planning rules already exist which necessitate that any proposed land is stable and suitable for its intended use and as such I do not consider that any further rules, nor any setback of this type is necessary.

Stormwater:

42. PNCC proposes, in effect, that a series of retention ponds and wetlands are established/retained to control the stormwater volume and regulate discharge velocity.

43. In respect of the land, for which I speak, this is entirely unnecessary for consideration as a resource consent is presently before PNCC, by which the construction of a retention dam, sufficient to accommodate the stormwater for the entirety of the land at issue is sought; In saying that there is a small area, at the western gully, which will not be directed into the proposed retention dam, but which is intended to be directed to the Moonshine waterway. A copy of that application is annexed together with stormwater engineer, Mr Clark report confirming the retention dam will accommodate and control the velocity discharge of land I represent.

44. By way of short overview, what is sought within the aforesaid consent is permission to build a earth bund dam, over topped by Allen Mier Drive. The proposal is that the dam include a 600mm pipe at the gully floor, thereby restricting the discharge volume and velocity to a neutral run-off discharge rate. Horizons Council have granted their consent to disturb the encircling land and for the dam build.

Wetlands:

45. PCG entails the proposal that areas of the gully, presently zoned as residential, be rezoned to comprise conservation. This is opposed. Significant areas within the Johnstone Drive gully are consented, both by PNCC and HRC to be earth filled, and that work is currently underway at very substantial cost.

46. Converting urban lands to wetlands takes the land out of the development framework and effectively necessitates its retirement for any other use. Should Council wish to procure land for that purpose, it ought to do so via an arms-length purchase

mechanism. There is no engineering reason for the setting aside of lands for wetland utilisation given the resource consents already before Council.

Commercial zone:

47. The imposition of a commercial zone is opposed.

48. The business case in support of the construction of a commercial hub, to the extent that it has been undertaken, is clearly flawed.

49. There is an insufficient catchment, at present, and within the proposed rezoning to warrant a future commercial use of the land, in order to make the commercial hub viable. Small dairy businesses simply cannot survive as no longer able to compete with supermarket if cited in nearby area as the case on hand.

50. The land where the hub is proposed is zoned residential and there is an application before PNCC to enable, part of which, be developed into sections, and thereafter sold down. Rezoning that land will result and a direct loss to the developer of no less than 15 sections or some $6m in revenue. The developer, as an experienced landowner, has assessed the potential best use case for that land and has concluded that a commercial hub is simply not viable.

51. If the land was rezoned to commercial there would be considerable and ongoing holding costs for the landowner to carry with no return. The property owner is open to sell the land at market residential value should Council consider a purchase variable. I furthermore advance should Council requires a commercial hub then such ought to be positioned within eye of highest orderly traffic movement i.e., fronting Pacific Dr.

Traffic congestion:

52. Council officers contemplates several upgrades being required before any further urban development would be approved.

53. The imposition of what are apparently quite blanket prohibitions on further development, prior to quite significant roading infrastructure upgrades, will render future development opportunities non-viable, given the likely timetabling for the carrying out of those works.

54. I question the view expressed by Council that there is traffic congestion within Aokautere, of a degree/standard that necessitates the proposed upgrades. In today's

society a degree of traffic congestion/delay is norm/expected let alone within Aokautere area situation is less than many other intersections thought-out the city, that which are accepted. The abstract there ought to be no traffic wait time at intersection, traffic signal, round about is unrealistic position let alone to achieve be unaffordable upon the ratepayer purse.

55. Further, the development of the Aokautere residential suburb has taken some 40 odd years to develop to its current size. Accordingly, while the rezoning proposed by PCG will add additional vehicle movements, the pace of Aokautere expansion is such that increase vehicle movements will arrive incrementally over many years (potentially decades). It is fallacious thinking to presume that the making available of land for residential purposes, immediately entails all or a significant proportion of those contemplated would manifest at an early point following rezoning.

56. Secondly, the apparent effective prohibition of further development is highly problematic given PNCC has, as do all Councils, a limited revenue/capital base, and is faced by a number of pressing priorities, including wastewater treatment processes and earthquake strengthening commitments. Those matters are likely, I understand, to be prioritised in advance of capital allocation for these roading upgrades, and any effective prohibition/overzealous gatekeeping to development arising from misconceived additional traffic volumes, would quite simply, stifle future Aokautere land development.

57. Thirdly, it is of significant economic concern that having acquired the land with the purpose of future residential development and having paid rates and associated costs in respect of that land for, circa, 20 years (by one development entity or another) that the land is now sought to be prohibited from development, in effect, until roading upgrades are undertaken, particularly so given Council has set no funds aside and there is no timetabling for the completion of those roadworks extant.

Medium density development:

58. It is my view, as an experienced property developer, that medium density housing is unlikely to work/be taken up within the Aokautere area. If, however, the plan leaves room for that possibility, and medium density demand increases in the future, I support the inclusion of that option drafted into the district plan.

Progression:

59. While I can agree that there needs to be further rezoning, to allow future demands to be met, the highly restrictive and prescriptive rules sought to be imposed by PCG, will serve to frustrate rather than promote its intended purposes of orderly, affordable section and commercial utilisation.

60. The structure plan is, quite simply, unnecessary; it places significant capital burden upon developers, and its gatekeeping mechanisms/preconditions to further urban development, will result in a significant slowdown in development and materially higher section costs to purchasers at an unaffordable extent.

61. PCG in essence seeks to 'land-grab' private and developable land, without compensation.

62. Existing regulatory policy and rules suffice to protect concerns Council officers have advanced i.e., earthworks, land stability, stormwater and roading design are all matters already controlled by Council within policy documents i.e. district plan, engineering standards for land document, stormwater attenuation design guild all which must be complied with ahead of subdivision approval.

63. PCG ought to be restricted to the rezoning land for future growth.

64. This submission, draft version, was delivered to Council officers ahead of filing asking whether they would like to discuss any aspect, however, officers did not perceive a need to enter dialog prior to filing.

65. I welcome any questions that the panel may have.

Dated; 4th November 2023

Les Fugle

Aokautere Subdivision

Design Report -Gully Crossing

25/5/2021

Aokautere Subdivision Proposed Gully Crossing

Quality assurance statement

Task	Responsibility	Signature
Project manager:	**Stu Clark**	
Prepared by:	**Stu Clark**	
Reviewed by:	**Roy Bar-Shalom BE**	
Approved for issue by:	**Stu Clark**	

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Report Status: Final

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1.0 INTRODUCTION

1.1 BACKGROUND

Aokautere Land Holdings Limited has been the developer responsible for an approximately 120 (currently developed and immediately proposed), lot subdivision in the Johnston Drive area of the Aokautere Suburb, Palmerston North City. The subdivision area consists of a series of south to north flowing gullies, separated by elevated flat terraces.

The current terrace under development is shown in the centre of figure 1 below, with the proposed future extension of the development into the adjacent terrace to the west, marked in brown, via a gully crossing proposed to be located in the section marked in yellow.

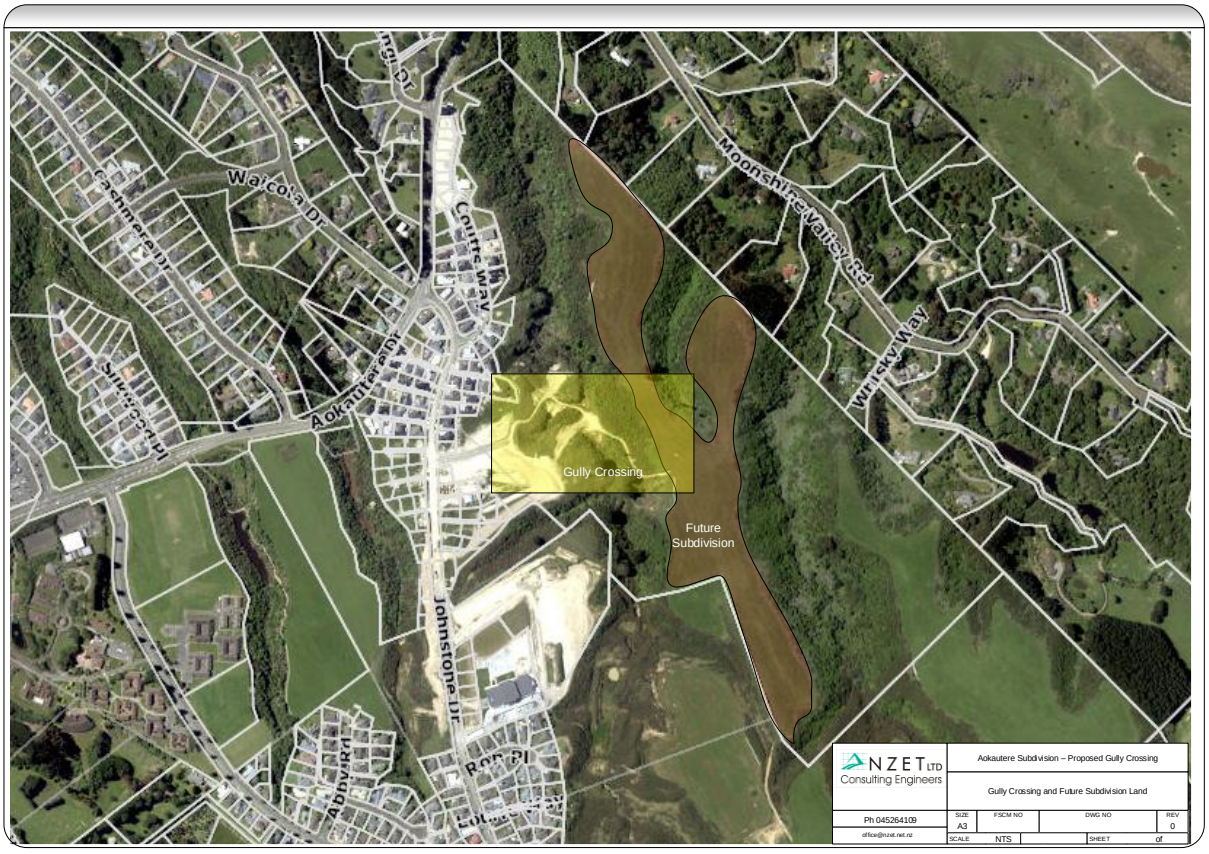


FIGURE 1. EXISTING AND PROPOSED FUTURE DEVELOPMENT AREAS AND PROPOSED GULLY CROSSING LOCATION.

The purpose of this report is to provide the general rationale and design considerations to support the proposed gully crossing.

1.2 RATIONALE FOR LOCATION OF CROSSING

A number of intermeshing factors have contributed to the proposed gully crossing loaction. These are:

- Proximity to the centroid of the future development areas on the eastern terrace. As can be seen from figure 1 above, the future terrace development to the east, which is to be serviced by the gully crossing, the available land shape is relatively narrow and long. This will be further exacerbated by the potential additional setback no build distances from the edge of the steeper gully slopes. This shape favours servicing by a central road, with individual "tentacles" branching out from a hub as opposed to a more extensive roading infrastructure which would leave little available land for sections.
- Accessibility to existing roading. There is already an appropriately sized road branching off from Johnstone Drive and aligned to lead onto the proposed crossing and future subdivision area.
- Reasonable heights and gradients, commensurate with available fill volumes. The crossing height of the gully at the proposed point is approximately 25m from gully base to terrace level and with a mild vertical curve, this can be serviced by a 15m approx maximum height embankment and constructed with fill material which has been stockpiled nearby and is suitable for the embankment construction.
- Ground conditions at the site have been tested are suitable to support the superimposed loads without sigfncint consolidation. The same may not be true of other possible locations.
- The embankment in the proposed loaction will in future serve a double function as a stormwater detention structure, ….to dampen out peak stormwater flows and allow them to attenuate by slowly discharging through a restricting orifice. This has been proposed since the development of the current subdivision and agreed with the then PNCC stormwater engineer. If the crossing were further upstream it would have an inadequate catchment, and if further downstream, the retained volume would be too large and potentially destabilise the gully sides.

1.3 SCOPE

The investigations conducted for the gully crossing have been to provide.

- A review of the site Geology and potential seismic loading from a desktop study of available GIS data, (sections 2.1-2.3)
- A review of historical in situ and laboratory testing of the soils proposed to be used to create the crossing embankment, (sections 2.4 and 2.5)
- Results of the specific geotechnical, (CPT) test results into the insitu soils beneath the gully crossing, (section 3.1, and Appendix A)
- Analysis of the likely slope stability and construction details of the proposed embankment, (section 3.2)

2.0 GEOLOGIC CONDITIONS AND SEISMICITY

2.1 INTRODUCTION

The local geology of the site was determined from data obtained from the GNS, GWRC and NZGD databases. The GIS databases provided information on the sites':

- Geology,
- Liquefaction Potential and,
- Seismicity.

2.2 LOCAL GEOLOGY

The local geology of the site as per the GNS GIS database:

- Main rock type: Gravel.
- Description: Beach deposits of marine gravels and sand, with overlaying loess deposits
- Subsidiary rocks: Loess silt sand.
- Key group: Late Pleistocene sediments.

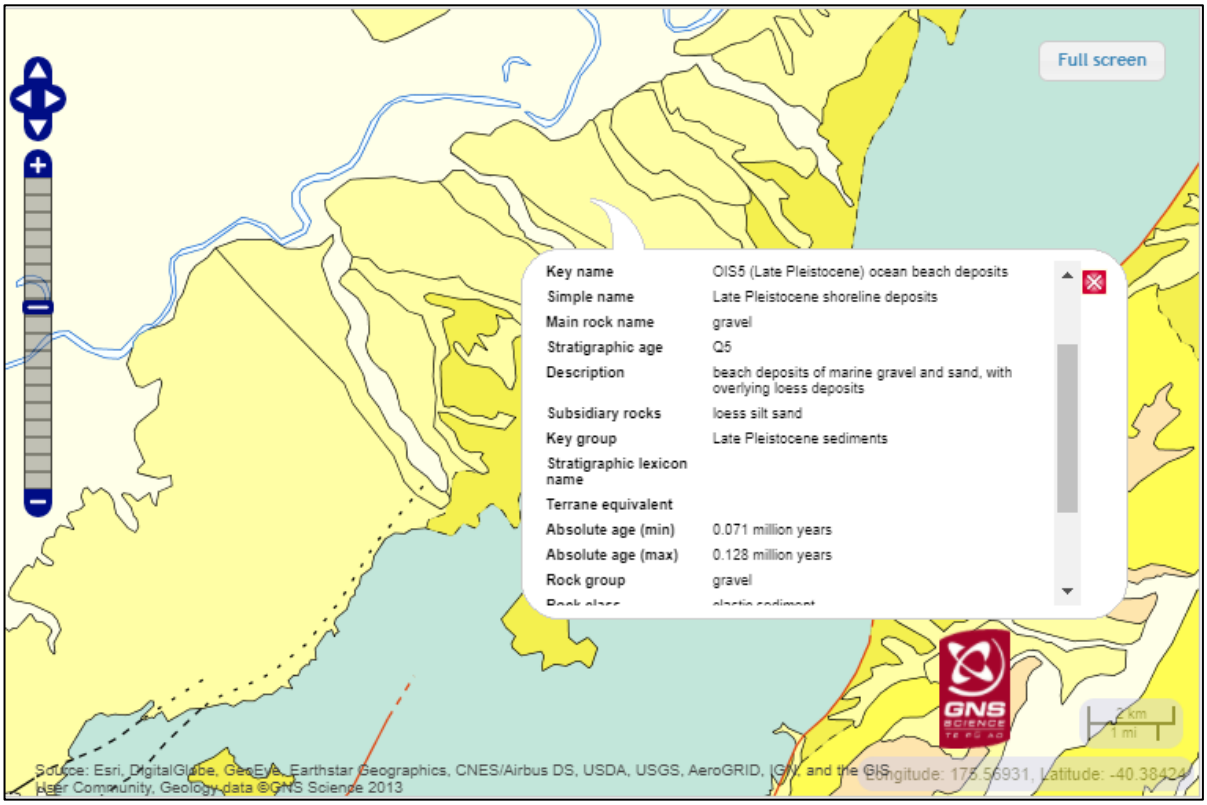


FIGURE 1: SITE GEOLOGY: MAIN ROCK TYPE: GRAVELS (LATE PLEISTOCENE SEDIMENTS) (GNS WEBMAP) SITE IS AT TAIL OF DESCRIPTOR

2.3 FAULTING AND SEISMICITY

There is limited Earthquake risk data available for the site or nearby, Figure 3 below shows a map of the potential liquefaction risks around Palmerston North, provided by GNS, which does not rate the site. The site however is in close proximity to areas rated as moderate risk, (mainly gully floors in the area).

Figure 3 below was obtained from the above report and shows the risk data for the region:

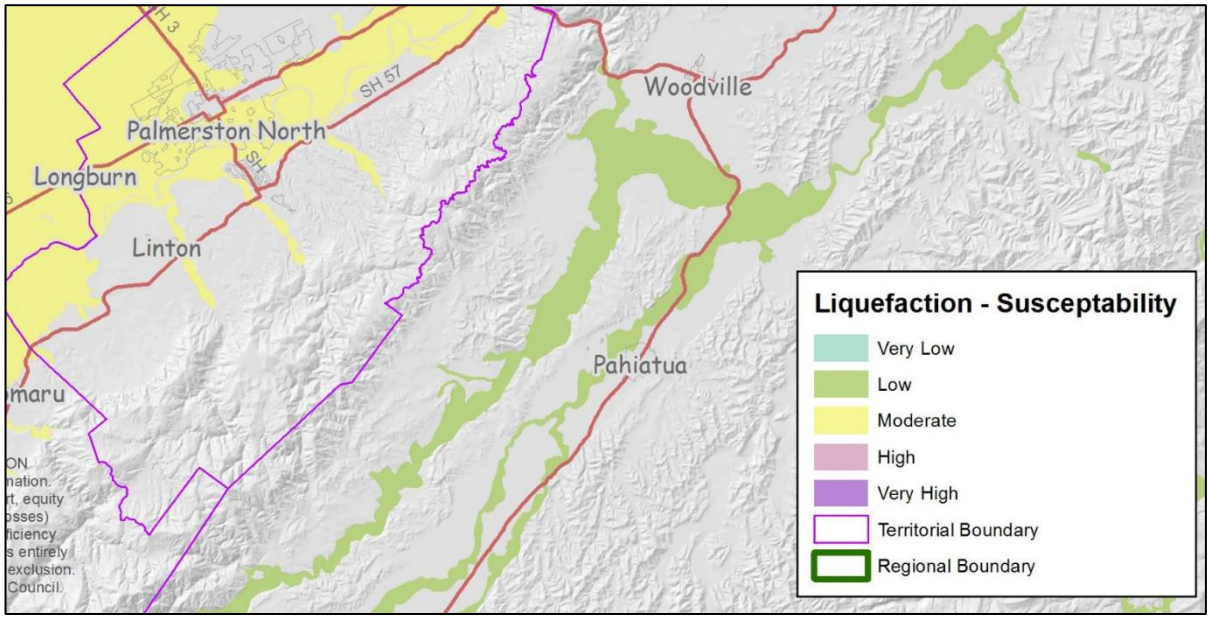


FIGURE 2: SITE LOCATION APPROXIMATELY AT BLUE CIRCLE

The faulting proximity data was obtained from the GNS database. The database shows that the site is located close to two active faults, these active faults are:

- Wellington Fault (8.2km), and
- Northern Ohariu Fault (9.6km)

Figure 4 overleaf is a plan from the PNCC GIS database illustrating the sites' location relative to the active faults.

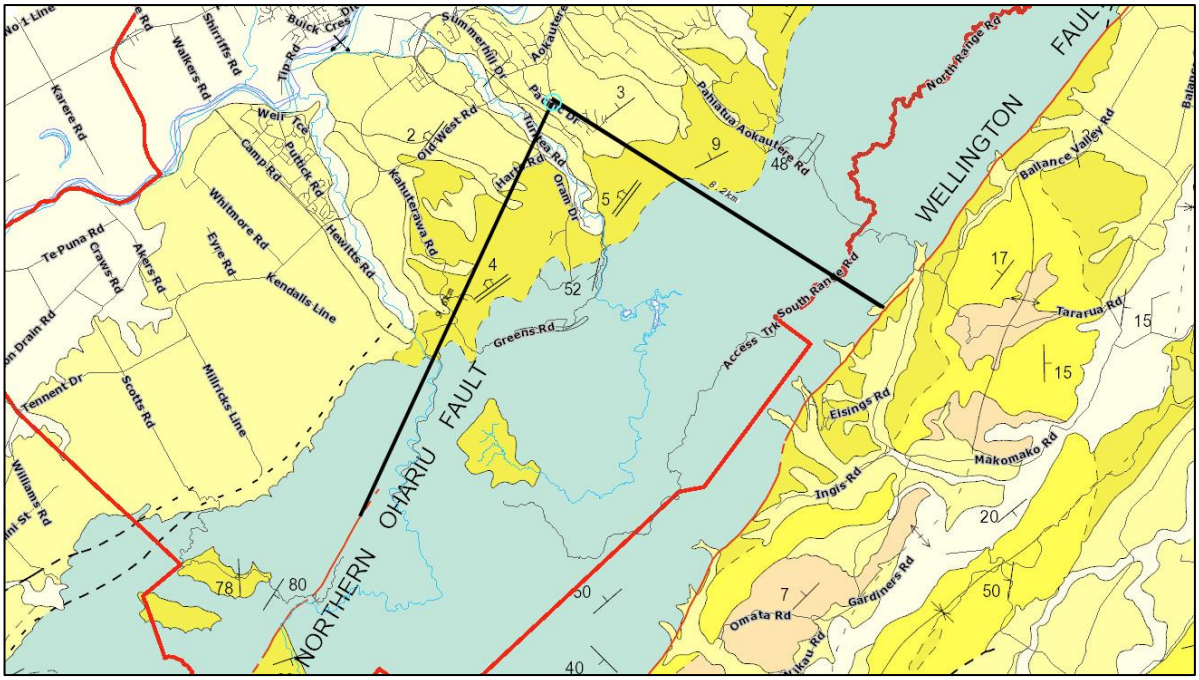


FIGURE 3: SITE LOCATION APPROXIMATELY AT BLUE CIRCLE RELATIVE TO ACTIVE FAULTS SHOWN AS PINK LINES, (GNS DATABASE)

The description of the faults are as follows:

- **The Wellington Fault** has an estimated 840-year recurrence interval and an estimated 5m maximum single event displacement under a magnitude 7.0 event.
- **Northern Ohariu Fault** has an estimated 2550-year recurrence interval and an estimated 3.8m maximum single event displacement under a magnitude 7.4 event.

It is also of note that the trend line of the northern Ohariu fault is heading towards the site. The justification for the termination is unknown.

2.4 SOILS

The predevelopment information available for the site included the following sources: Landcare New Zealand Land Resource Inventory (NZLRI) maps, a Slope Stability Assessment by David Napier and Associates, a study conducted by Cowie in 1964[1] which identifies the soil profile, and a geotechnical assessment report by Opus on a nearby development. The site is not covered by the more details online S Map system. In this section information from these sources is summarised and discussed in respect to this report and subdivision. Site investigations were also conducted by NZET and Landcare Research scientists to develop a generalised stratigraphic model of the underlying strata on the stage 6.1C site, to test in-situ and take further samples for laboratory analysis.

NZLRI maps provide background information on slip and erosion potential, rock type, soil type and slope. These maps show that the majority of the subdivision area is flat and steepens (up to 25 degrees but averages around 15) as it approaches the gully. The slip and erosion potential are rated

[1] Aokautere Ash in the Manawatu District, New Zealand, J. D. Cowie; Victoria University of Wellington, New Zealand, Department of Scientific and Industrial Research, Soil Bureau, Palmerston North Published online: 21 Dec 2011.

as negligible on the flat but slight in the surrounding gullies. The rock type has been classified as loose sedimentary units with overlying silts, clays and sands. The near surface soil profile is recognised as Perch-Gley Pallic which occurs in sites that are typically periodically saturated in winter and spring and dry out in the summer. The presence of perched water tables on impermeable subsurface layers in such soils is not uncommon[2]. Perch Gley Pallic Soils[3] have slow permeability with limited rooting depth, and medium to high bulk density. They are susceptible to erosion because of high potential for slaking and dispersion. Soils have medium to high nutrient content (except for sulphur), high base saturation, low concentrations of secondary oxides, and low organic matter contents.

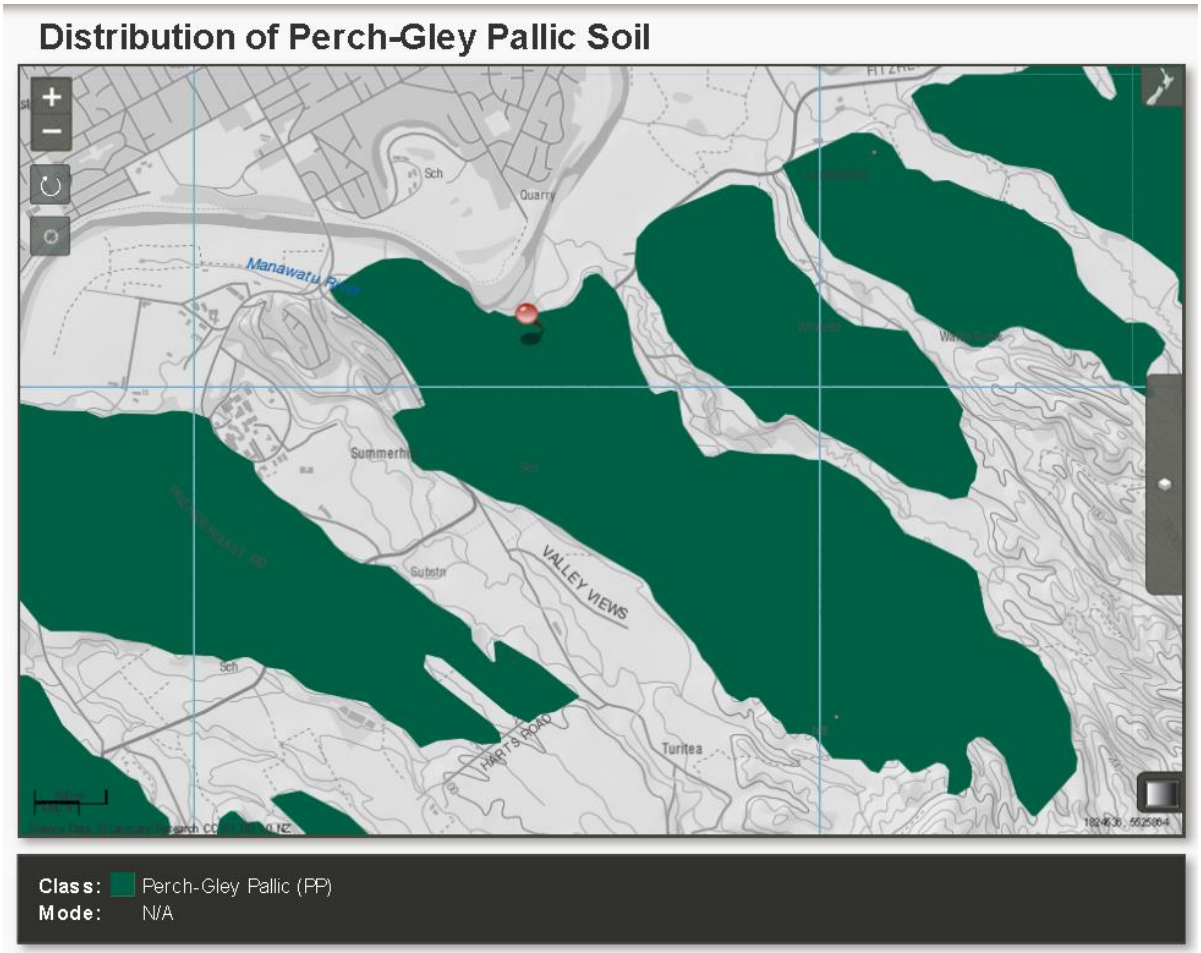


FIGURE 5. S MAP CLASSIFICATION – PERCH-GLEY PALLIC

The detailed soil profile study by Cowie[1] was on a site close to that of the subdivision (within ca. 2.5km). It suggests that the soil profile can be characterised as: a layer of Aokautere loess greater than 2m thick, overlying an approx. 3m thick layer of plastic clay with concretions, followed by a layer of dune sand. The source data for this profile in comparison with the site location is shown in Figure 5 below.

Cowie[1] states that the Aokautere Ash is sometimes seen as a marker at mid depth in an approximately 2m thick surface layer of loess. The ash layer where visible is usually characterised by

[2] Soil Science – Sustainable production and environmental protection, R McLaren and K Cameron, Second Edition, 1996

[3] http://soils.landcareresearch.co.nz/contents/SoilNames_NZSoilClassification_SoilOrders.aspx?currentPage=SoilNames_NZSoilClassification_SoilOrders%26

sand to silt sized pumaceous material. In the immediate area of the subdivision Cowie reported the loess layer has been measured at 2.1m bgl, with the centrally located ash layer at 0.13m thick, refer to soil profile number 4 in Figure 5.

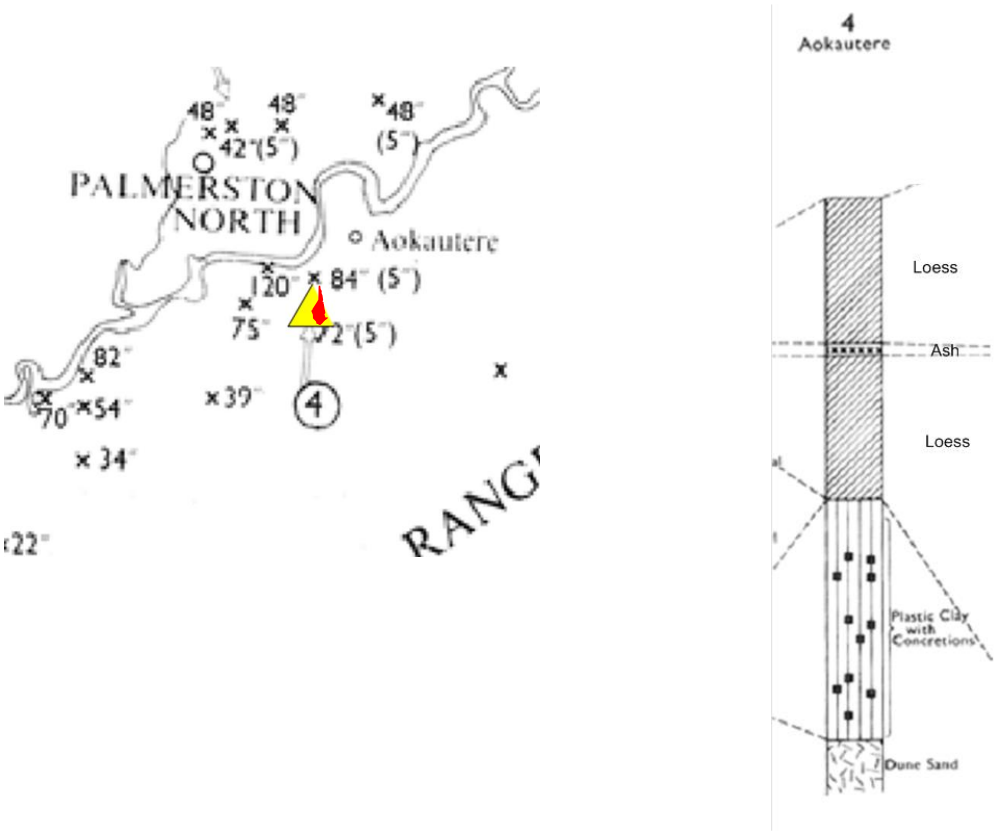


FIGURE 6: SHOWS A STRATIGRAPHIC PROFILE FROM COWIE[3] (RIGHT) WITH A MAP (LEFT) SHOWING THE LOCATIONS OF FULL PROFILES (NUMBER WITH CIRCLE AROUND IT), LAYERS OF THICKNESS IN INCHES (TWO NUMBERS NEXT TO CROSS) AND THE COMPARATIVE LOCATION OF THE SUBDIVISION (INDICATED IN YELLOW / RED).

Napier[4] noted the Geological Map of NZ Sheet 11 as showing the substrata of the Aokautere Terraces comprising gravels, sands, and silts with or without pumice bands either in marine sequences or in much dissected high terraces.

A further geotechnical assessment report by Opus International Consultants[5] provided a much more detailed investigation into site soil parameters, albeit on the northern side of Aokautere Drive 1km NW of the centre of the stage 6C subdivision. The Opus report draws on two previous geotechnical investigations in the Cashmere Drive subdivision; Tonkin and Taylor 2002, and Opus 2004. The extent of the site works across all three reports includes: 25 test pits, 14 hand auger holes and 2 deeper boreholes. From the site investigations the strata are summarised as:

- 0.35-0.5m medium brown clayey silt topsoil,
- 0.30-1.9m residual soil very stiff yellow brown clayey silt
- 1.80-5.0m hard grey / mottled yellow brown clayey silt
- >5m dense marine sands

[4] Slope Stability Assessment – Woodgate Subdivision Kimber Properties, David Napier and Associates, February 2004.

[5] Cashmere Drive Subdivision, Stages 5D, 5A, 5B & 5C, Opus International Consultants 2006.

Groundwater in Opus' borehole 1 was not located until 17m depth.

The Opus report[4] noted several landslide scraps are evident on the site slopes but the identified landslides were shallow and not expected to create hazards for the earthworks. Opus analysed the stability of the site slopes and concluded that the site had adequate stability for the proposed development.

The existing information summarised above is generally consistent and allows some conclusions to be drawn for the site investigation and survey:

- The soil strata consist of clayey silts above sands.
- Soil is described as of Pallic stratification which typically means the soils are often saturated in winter and spring months but dry in the summer, presence of perched water tables could be common.
- Bed rock may be located quite deep into the strata and river gravels are to be expected above the bedrock.
- An intermittent layer of Aokautere Ash could be present in some locations.
- The silty clays can be susceptible to slaking and dispersion.
- There is a slight slip and erosion potential recognised for the steeper areas of the site.

2.5 HISTORICAL SITE-SPECIFIC INVESTIGATIONS

The primary site investigations were undertaken on the 2nd of December 2013. In consideration of the pre-existing information, it comprised:

- 6 test pits excavated to a depth of ~4.5m (locations are shown in Figure 6),
- In-situ undrained shear strength testing using the Pilcon shear vane in the cut faces of the test pits,
- In-situ undrained shear strength testing using the Scala penetrometer in the base of the test pits
- Visual inspection of slopes for evidence of erosion or slippage.
- Soil samples taken for laboratory assessment of soil moisture content, slaking potential, compaction testing and plasticity index derivation.

The test pit location and original site contours are shown in figure 7 below.

FIGURE 7: TEST PIT LOCATIONS STAGE 6.1C INVESTIGATIONS

The cut face soil profiles in the 6 pits are shown in Figure below. The thin Aokautere Ash layer was not visually apparent; however, the soil profile in the pits was generally consistent with Cowies'[3] stratigraphic assessment, refer to Figure 6. The presence of perched water tables was not apparent in any of the pits.

FIGURE 8: SOIL PROFILE APPEARANCE IN TEST PITS, FROM TOP LEFT, CLOCKWISE: PIT NUMBERS; 1, 2, 3, 4, 5 AND 6.

The in-situ undrained shear strength testing was undertaken using the Pilcon shear vane and Scala penetrometer. These two methods of testing were to obtain an undrained shear strength cohesion value which can be used directly for soil slip analysis. The use of the penetrometer extended the soil strength assessment to a depth in some holes (where soil conditions permitted) of >5m below terrace / ground level. Test results for both of these in-situ testing methods are given in FIGURE 9 below. Note that in the preceding week to the site investigation a total of 35.8 mm of rainfall fell spread over five days[6] so it can be assumed that the surface soils were relatively wet at the time of in-situ testing.

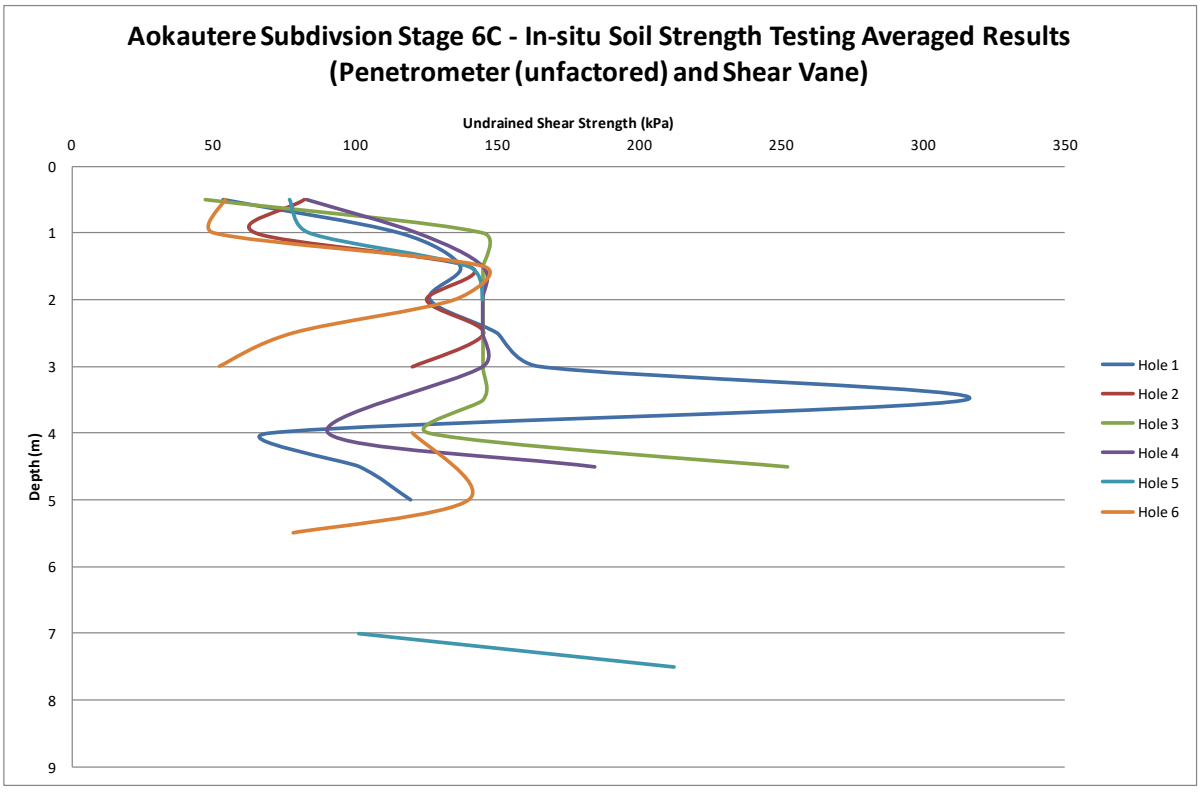


FIGURE 9: AVERAGED UNDRAINED SHEAR STRENGTH RESULTS FROM THE PENETROMETER AND SHEAR VANE IN-SITU TESTING.

The above graph shows that at the time of testing cohesive undrained soil shear strength is relatively consistent from 1.5-3.0m, remaining at around 150kPa. Although there appears to be a decline in

[6] Cliflo Climate Database, NIWA, http://cliflo.niwa.co.nz/pls/niwp/wstn.update_stn_query, accessed 18 December 2013.

soil strength at 4m this is expected considering the method of soil testing employed, in that, the strength at this depth changes from shear vane to penetrometer testing. Comparing the results here to the conservative assumptions made by Napier[2] the soil strength parameters found were significantly in excess of those conservatively assumed by Napier.

Testing to derive an angle of friction for the gravel and sand layers was not undertaken.

In addition to the test pit observations and in-situ testing, a visual inspection and walkover survey was completed of the main gully and tributary gullies. During this inspection there were no signs of either current or historic slope failures present on neither the western face of the main gully or in the tributary gullies. Slope stability in respect to visual observations is further discussed in the 2014 report which compares historic aerial imagery from 1968 to 2013.

3.0 FIELD INVESTIGATIONS AND CROSSING DESIGN

3.1 CROSSING DESIGN OVERVIEW

The geometric design of the crossing has been prepared by Pirie Consultants Ltd and is shown in figure 10 below. It comprises a smooth compound (horizontal and vertical), curve dipping into the gully and rising on the eastern side to continue the horizontal curve to the south, with a branch road T'ing off to the north to service the main terrace.

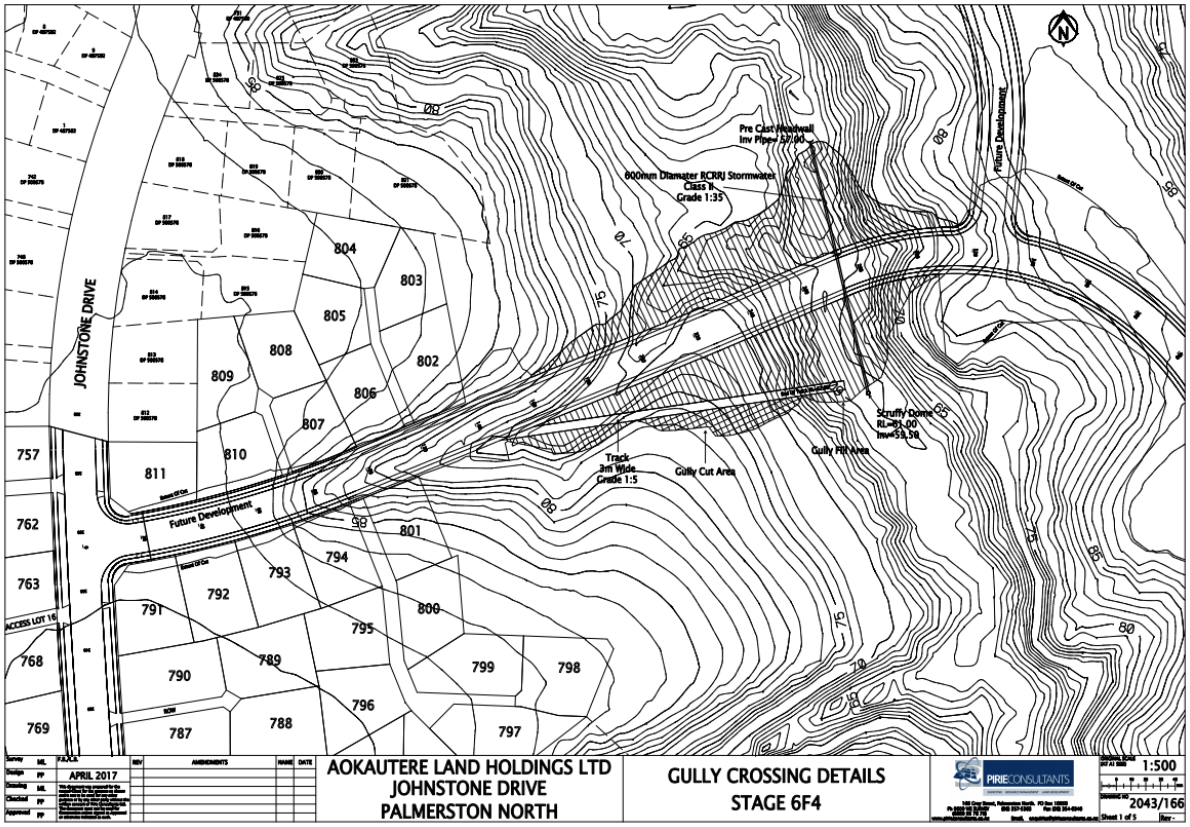


FIGURE 10: PROPOSED GULLY CROSSING GEOMETRY

The further considerations based around this general concept are.

- Base conditions and site preparation, (as determined from CPT testing and previous test pitting – sections 3.2 and 2.5 respectively)
- Embankment slope and construction methodology, (as currently based on previously measured soil characteristics and strengths, - section 3.3 - to be refined with shear box testing and possible incorporation of geogrid strengthening)
- Culvert size and temporary impoundment depth, (as identified in section 3.4)

-

3.2 CPT TESTING

14 CPT tests were undertaken on the Aokautere subdivision during early 2021. Of these, 6 tests, (test numbers 2-7) are within the footprint of the proposed Gully Crossing. These tests are supported by surveyed cross sections, 2,3, and 4) as shown in Figure 11 below. Results of the 14 tests were consistent with the soil profiles found and assumed in the original subdivision geotechnical report and provide confidence that the readings found at the test points can be transferred to adjacent sites at the same topography.

FIGURE 11: TEST LOCATIONS AND CROSS SECTIONS, REFER APPENDICES A AND B

The CPT test results for tests 2-7 and the cross-section plans are shown in the Appendices to this report.

The test data was then used to inform the embankment design for the crossing, especially with respect to; liquefaction potential, stability against slope / foundation failure, possibility of lateral spreading, and anticipated settlement of foundation soils.

The CPT soil data which is shown in Appendix A shows the predicted type of soils encountered during the testing. This correlates to the soils found on site, silty clays over sands at approximately 5m BGL. The test data was also used in conjunction with C-Liq and CPeT-IT software to calculate likely liquefaction risk and settlement of the foundation soils. Ground strength parameters were also input to the slope stability analysis.

Results of the analysis of the CPR test data were:

- there is no excessively; soft, liquefaction, or deformation prone material under the proposed crossing footprint.

- the crossing earthworks can be completed with basic benching and localised surface compaction of the existing ground, followed by application of the fill material at appropriate moisture content and compactive effort.
- Foundation settlement is expected to be under 100mm much of which will occur during the crossing construction, especially if this is undertake over a construction season and pore pressures are able to equalise.
- Using the site soils for embankment construction without geosynthetic modification, failure surfaces are expected to occur within the embankment and not the foundations.

3.3 EMBANKMENT SLOPE DESIGN

Analysis was undertaken using GeoStudio version 8.15, and Slope/W software using the Morgenstern-Price method of analysis. Assumed soil parameters were.

Assumptions:

Gully bank 16m in Height

Silt assumptions friction angle 33 degrees, cohesion 5KPa

Results:

Factor of Safety

Seismic: 1

Static: 1.8

At a slope of 2.5(H):1(V)

Failure planes do not cross the base of the slope. Therefore, the critical element is the slope itself (not the soil below the slope) therefore it is critical to determine the soil properties for the embankment in order to undertake a more thorough assessment for final design.

Further considerations:

- Part of the gully to be used as detention pond. Final development plans required to determine SW runoff and ultimately detention volumes required (in order to determine water height in detention pond) so that a seepage assessment can be undertaken for the slope.
- Shear-box or triaxial testing to be undertaken to determine the actual properties of the soil to optimize the required slope face angle as well as to determine how it will behave in submerged conditions.
- Final roadway cross sections required to determine the loaded dimension on the embankment and determine the final embankment width.
- The slope face must be protected against erosion and piping effects. This can either be accomplished by using geosynthetics or constructing a soil/granular filter over the embankment.
- A key in for the embankment is to be constructed by nominally removing the top 1m of overburden soils under the road width, with a further 0.5m cut out to the extent of the fill.

The keyed in section will be constructed from compacted in situ materials but will contain "blind" drainage pathways leading to the downstream bed to ensure subsoil moisture content is controlled.

Analytical results of the embankment strength are shown pictorially in Figure 12 below.

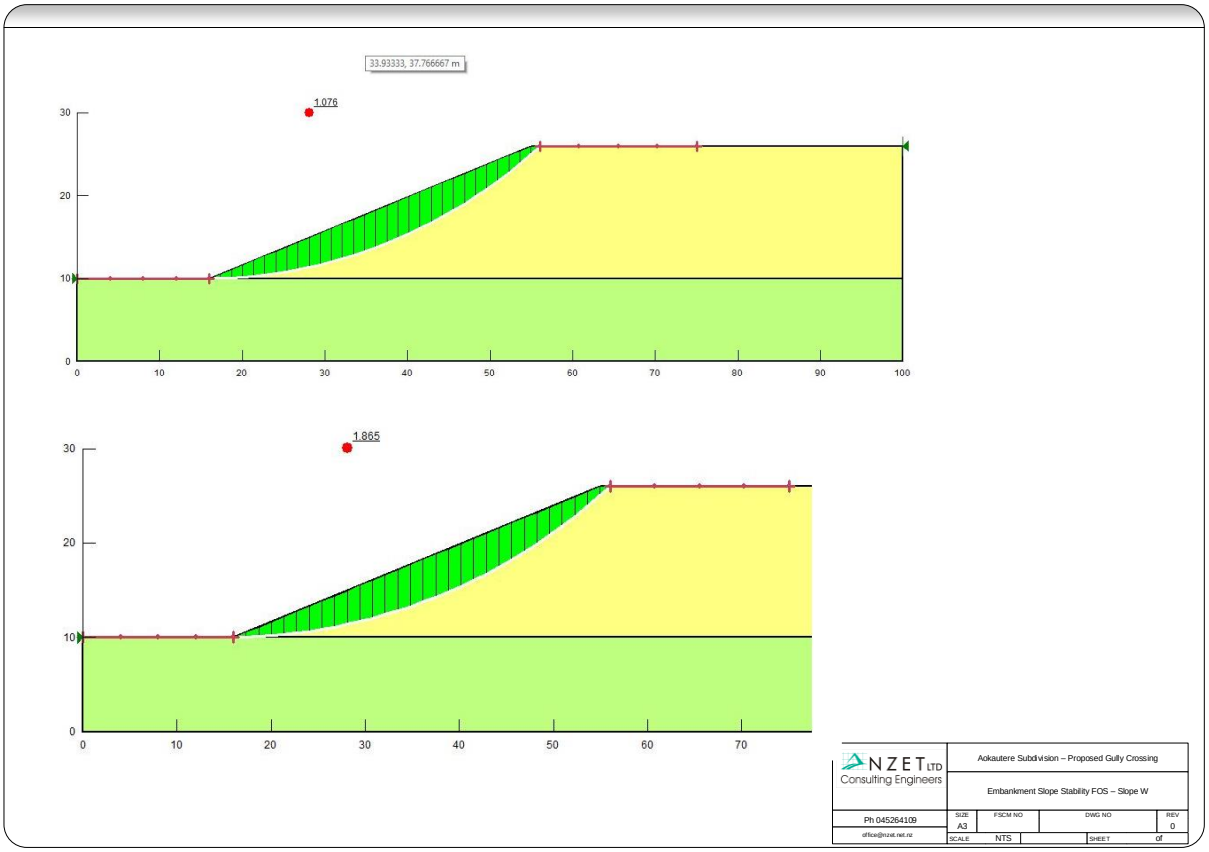


FIGURE 12. SLOPE/W MODELLING RESULTS

3.4 HYDROLOGICAL DESIGN

As stated in section 1.2, part of the rationale for locating the crossing embankment as shown is to provide a temporary hydrological impoundment for storm flows. The basis for sizing this impoundment, is suggested to be the residual flow which will discharge during a 0.1% (100-year AEP), event for the upstream catchment. Designing for this as a residual flow will establish hydrological "neutrality" under such conditions. Given the available storage volume, however, a higher or lower intensity event can be selected at council's discretion.

Based on these parameters, the catchment characteristics predevelopment are shown in figure 13 below.

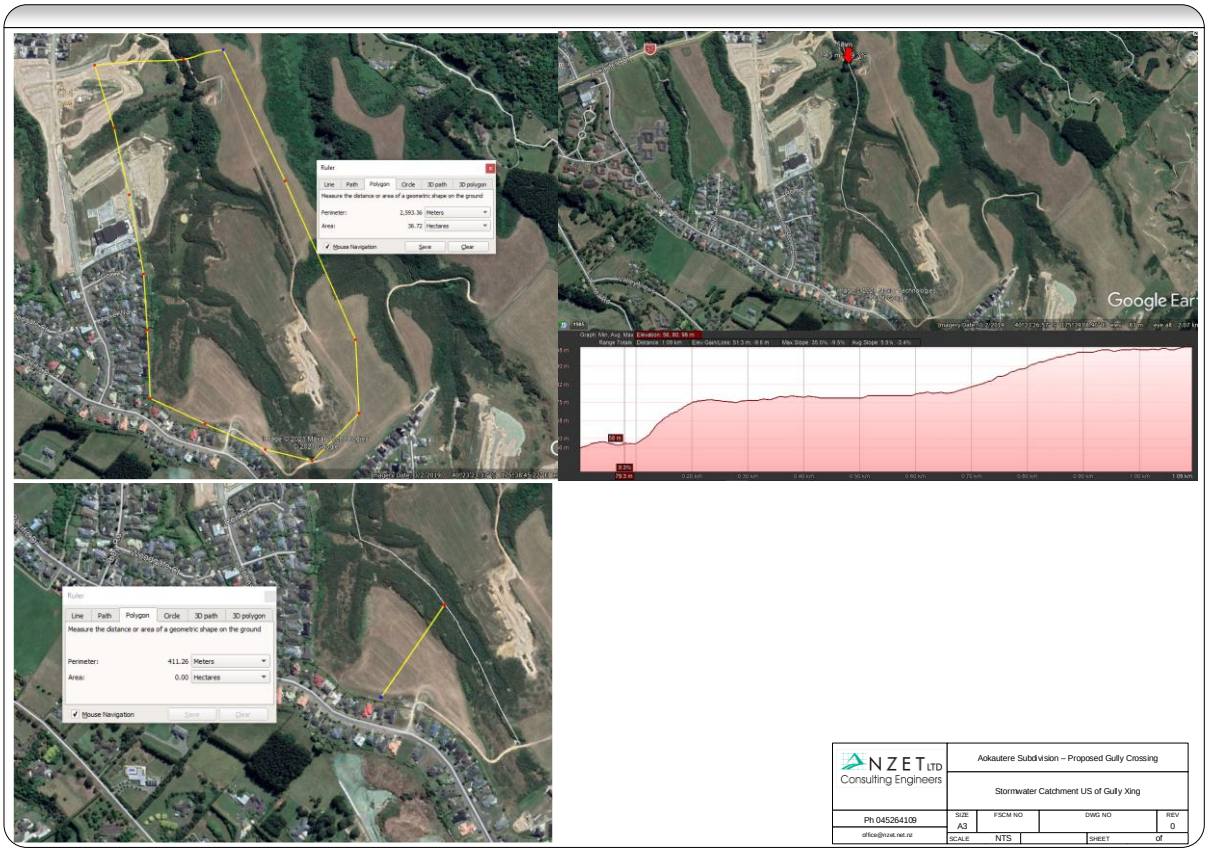


FIGURE 13. CATCHMENT CHARACTERISTICS PRE-DEVELOPMENT.

The assessed catchment area is 36.7Ha and with the measured grades and surface roughness, the calculated time of concentration is 60 mins and the peak flow under the design storm, 1.4m3/s. This is then set as the nominal maximum flow from the impounded water. Assuming post development this increases due to 40% of the catchment being impervious, (a conservatively high consumption), then the peak 1 hour flow would increase to 2.8m3/s, and there would be some 2500m3 of water impounded, over an estimated area of 1500m2. Assuming a maximum water depth of 2.5m over the culvert invert, a 600mm diameter discharge pipe would restrict the flow to the desired maximum.

2.5m is an acceptable maximum depth for a short duration, and a protected additional inlet to the main culvert at that height, plus a higher-level emergency culvert and spillway, would be provided in the final installation.

The design calculations and assumptions are detailed in figure 14 below.

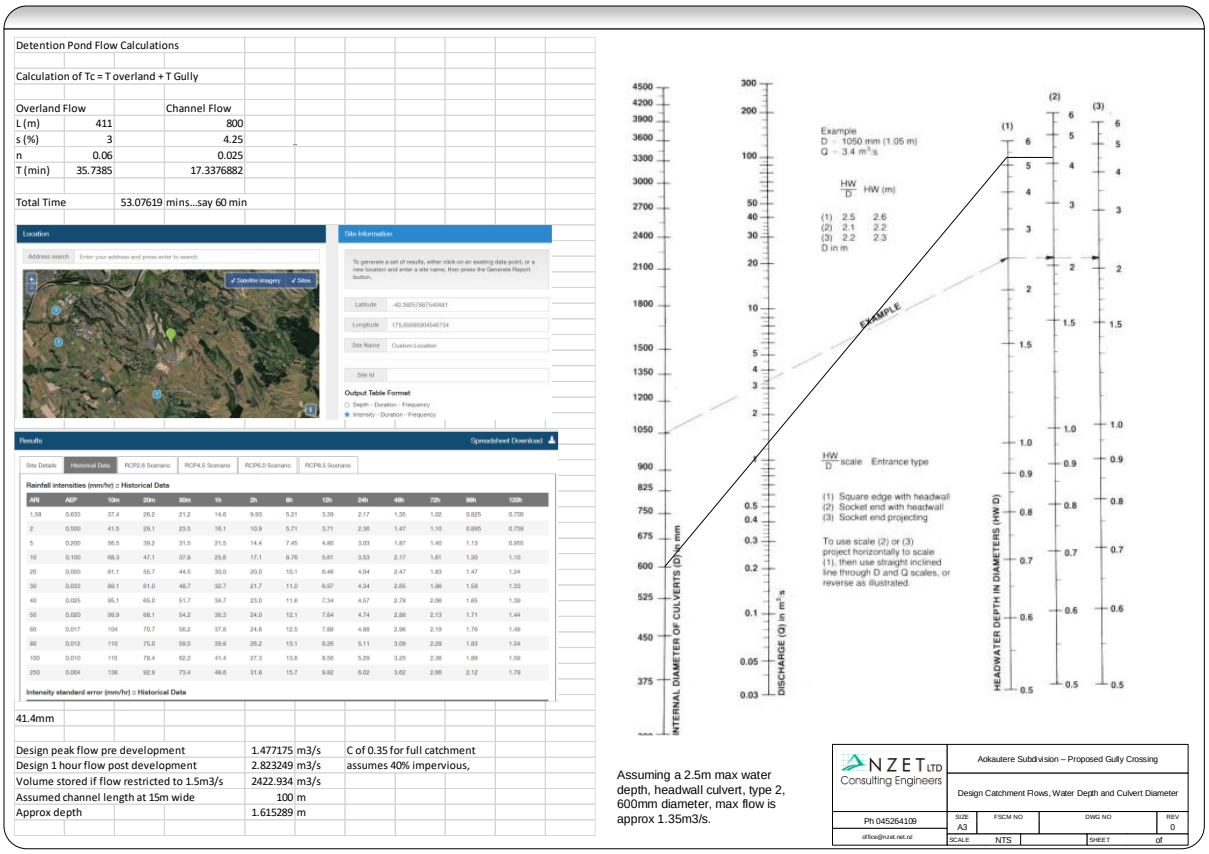


FIGURE 14 DESIGN FLOWS AND CULVERT SIZING

The short-term storage capacity available in the temporary ponding area behind the embankment is shown in figure 15 below. The retained volumes at different water depths are:

RL 61 1.5m deep 650 m³

RL 62 2.5m deep 2730 m³

RL 63 3.5m deep 6070 m³

RL 64 4.5m deep 10780 m³

The proposed inlet to the culvert under the dam will have a headwall with scruffy dome above to address any blockages which occur at the culvert inlet. Further, to ensure a base culvert full or partial blockage does not result in a longer-term impoundment, it is proposed to locate a secondary culvert through the embankment above the determined maximum height at approx 4m upstream water depth. This will discharge through the embankment core and onto a lined spillway on then downstream side which will direct any discharged flows clear of the embankment toe. Both the overflow spillway and the main underflow culvert will discharge into a modified section of stream bed covered in large riprap to provide energy dissipation.

Construction of the lower culvert is expected to comprise high strength concrete pipe set in a concrete trench. Although this method of construction will be sensitive to sigfncint deflection created loads, it will be accessible and amenable to insitu repair using grouting techniques readily

available. For the upper pipe, being more readily accessible, standard high strength concrete pipe conventionally trenched, (construct trench in compacted embankment) is proposed.

The face of the embankment which will be briefly submerged during larger storm events will also be provided with a low permeability cover, either using natural materials or geosynthetics.

Pond depths for various retained volumes are shown in figure 15 below. Note that the maximum depth under normal operations (and that only very infrequently), is the inner dark blue area and the maximum m depth under outlet blockage conditions proposed to be restricted to the inner dark red area.

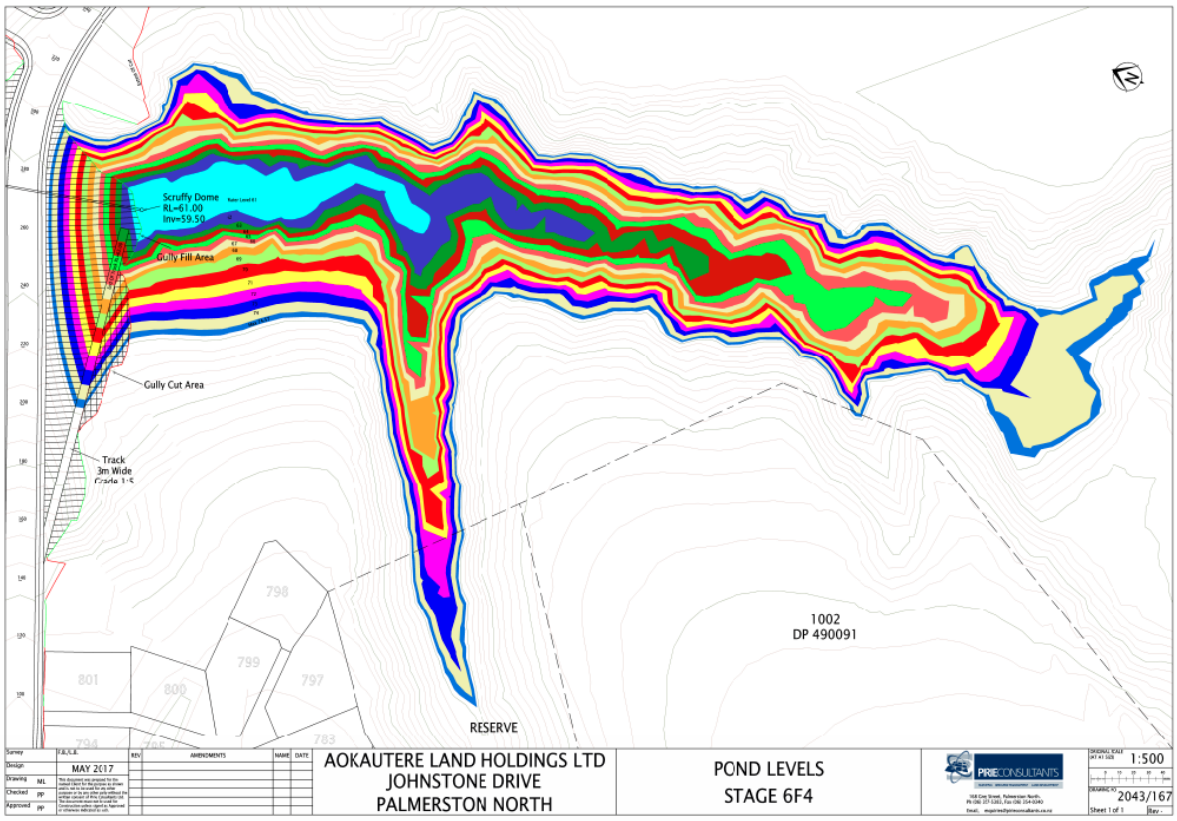


FIGURE 15: TEMPORARILY RETAINED WATER VOLUMES AT DIFFERENT DEPTHS

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

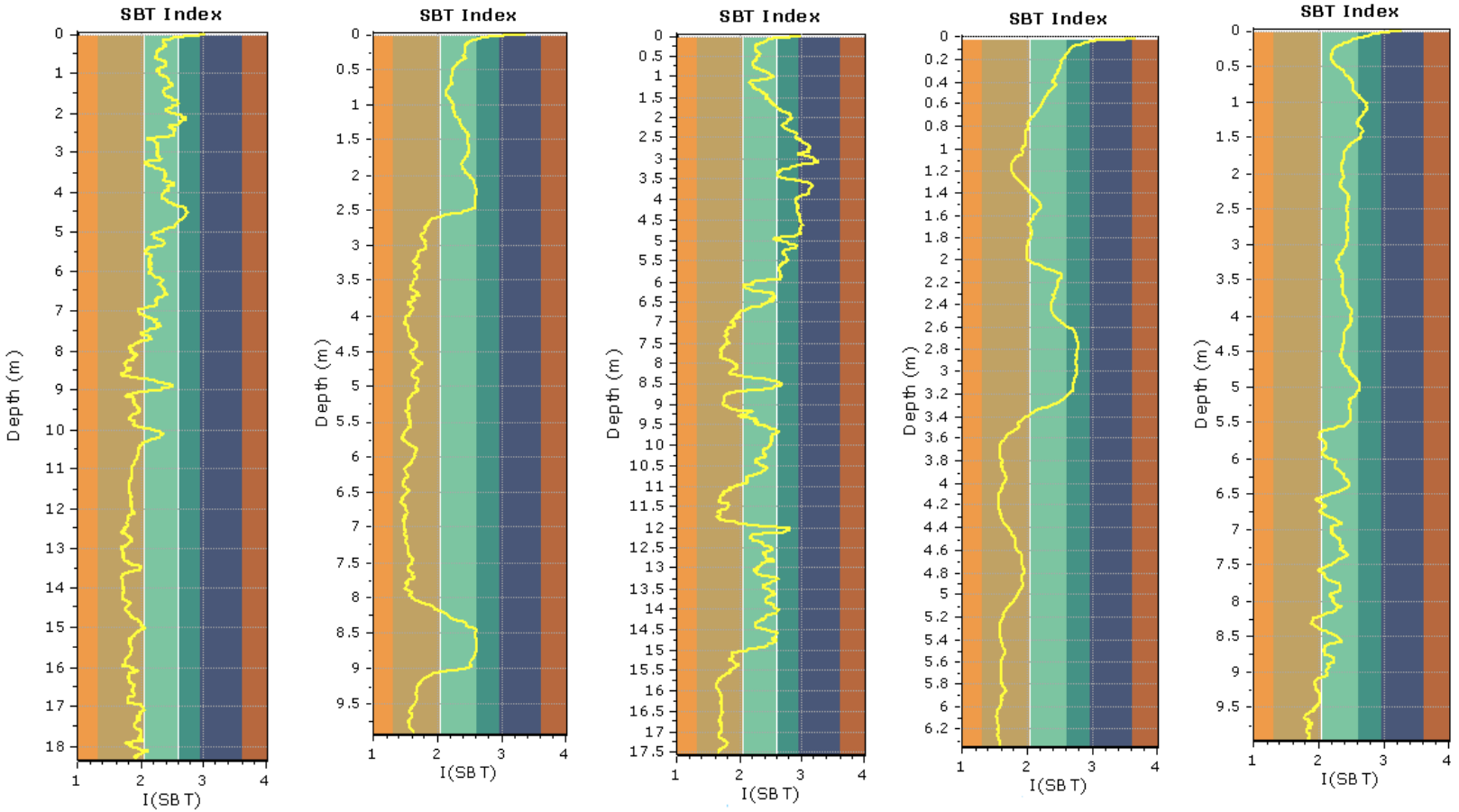
The siting and geotechnical investigations conducted to support the proposed Gully Crossing concluded the following:

- The proposed loaction is the most suitable to service the proposed future subdivision expansion.
- The site is 8.2km and 9.6km from the active Wellington and Northern Ohariu Faults respectively.
- The sites' liquefaction potential is not currently rated by the PNCC but is located near to 'moderate' liquefaction prone areas as indicated on the relevant GNS map. For the site itself, groundwater levels are not anticipated to occur substantially above the adjacent gully floors and therefor liquefaction risk is likely to be nil to low, especially given the results of the CPT and C-Liq assessments.
- Based on the measured site data and the area where the site is located the Subsoil Class is rated as D under NZS1170:2002
- The site soils, based on test pitting and CPT results are well compacted clayey sands to silty sands to clean sands with light gravel content.
- The surveyed cross sections and design plans for the gully crossing are currently based on a maximum embankment height of 16m, and a 2.5:1 embankment slope. This may be modified following specific testing of the site soils in the detailed design phase.
- Further detailed sampling and laboratory testing of the proposed soils to be used for gully construction will confirm the final design specifics.
- The main culvert size at the base of the embankment of 600mm diameter will restrict post development flows to approx predevelopment levels. The installation of an emergency overflow pipe and spillway at 4m above the embankment base, in addition to the usual elevated scruffy dome protected inlet on the outlet will provide a superior level of protection against excessive short term water levels.
- The use of the embankment as a short-term detention dam will alleviate existing and future impacts of urbanisation and associated elevated runoff flows within the catchment.

4.2 RECOMMENDATIONS

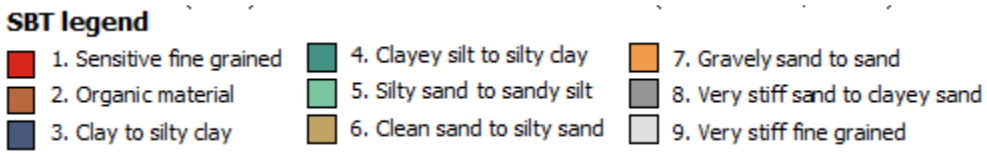
That approval be given in principle subject to final design details being presented for the gully crossing as proposed and justified in this report.

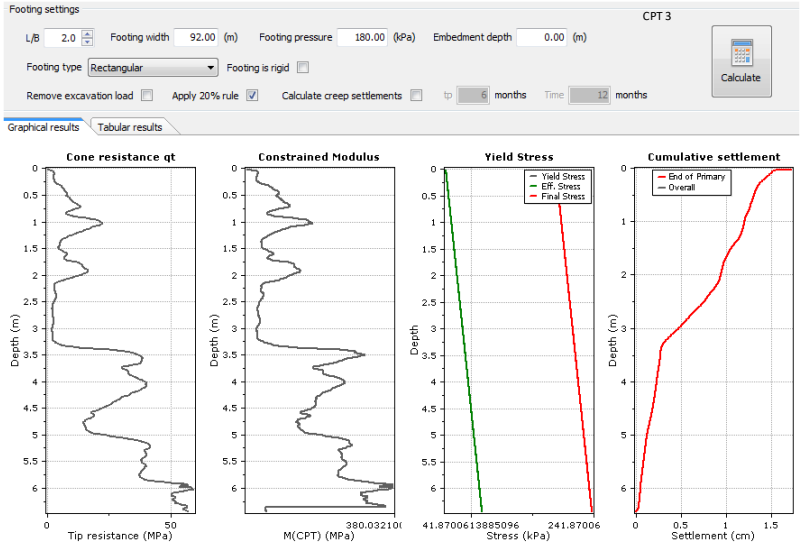
APPENDIX A: CPT RESULTS AND INTERPRETATION

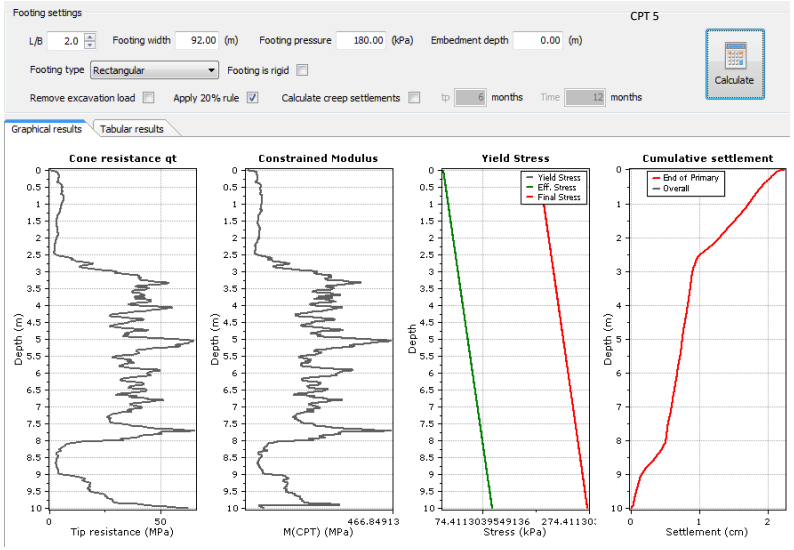


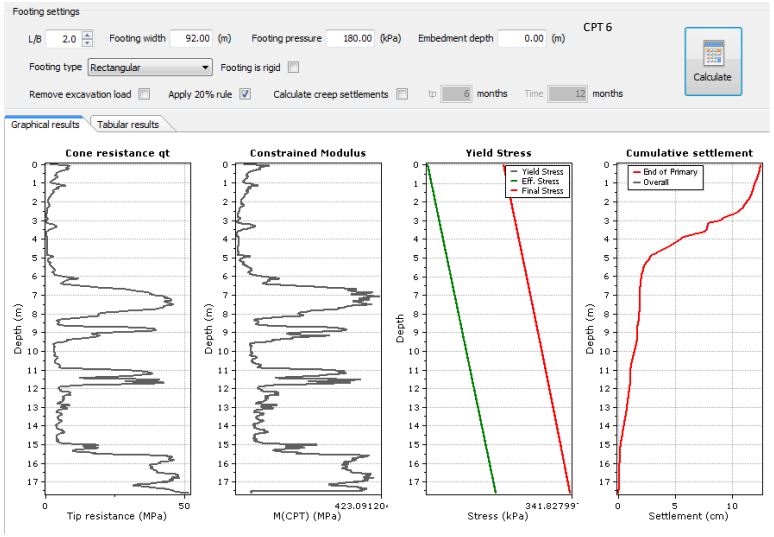
CPT 2 CPT 3 CPT 5 CPT 6 CPT 7

A1 -Estimated soil type

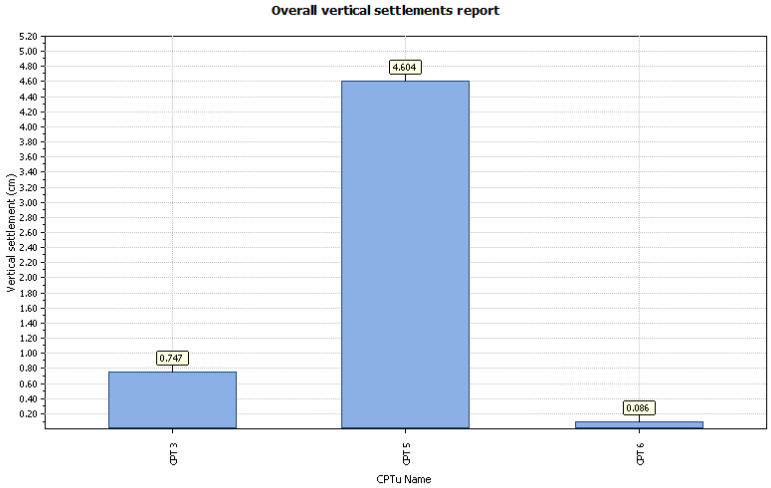


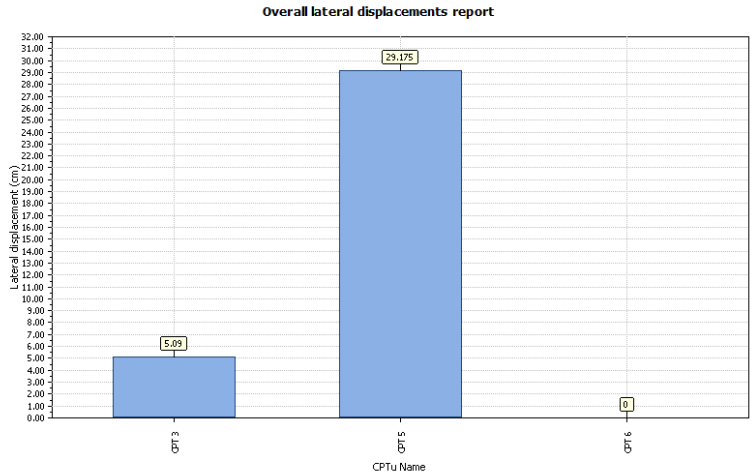




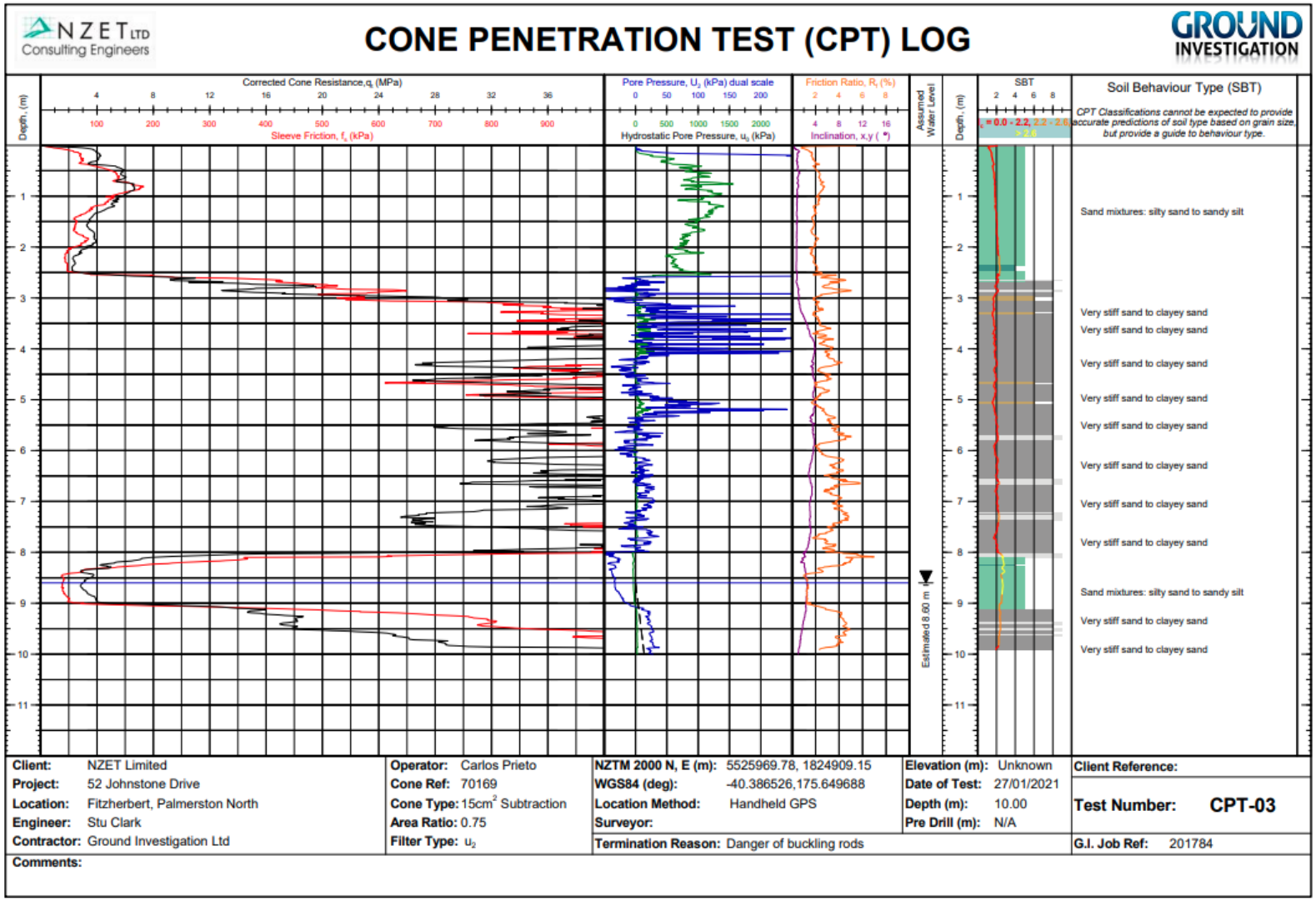


A2-Settlement

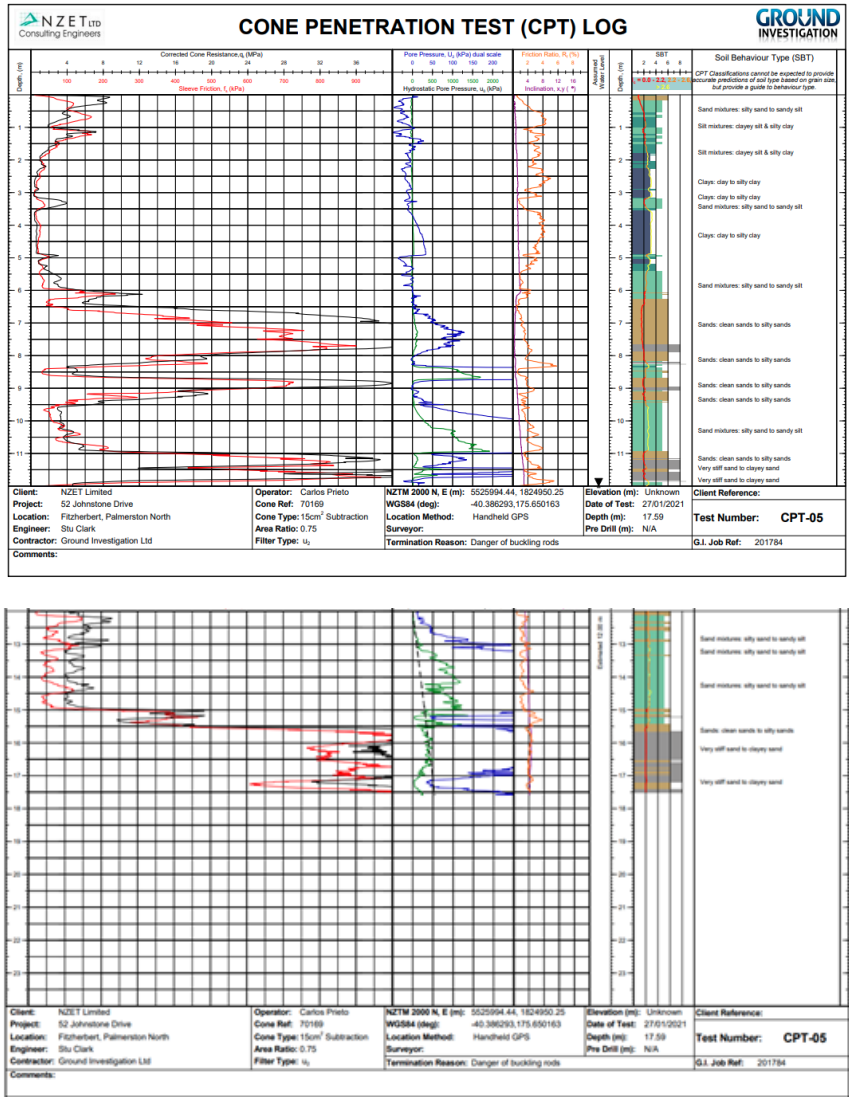




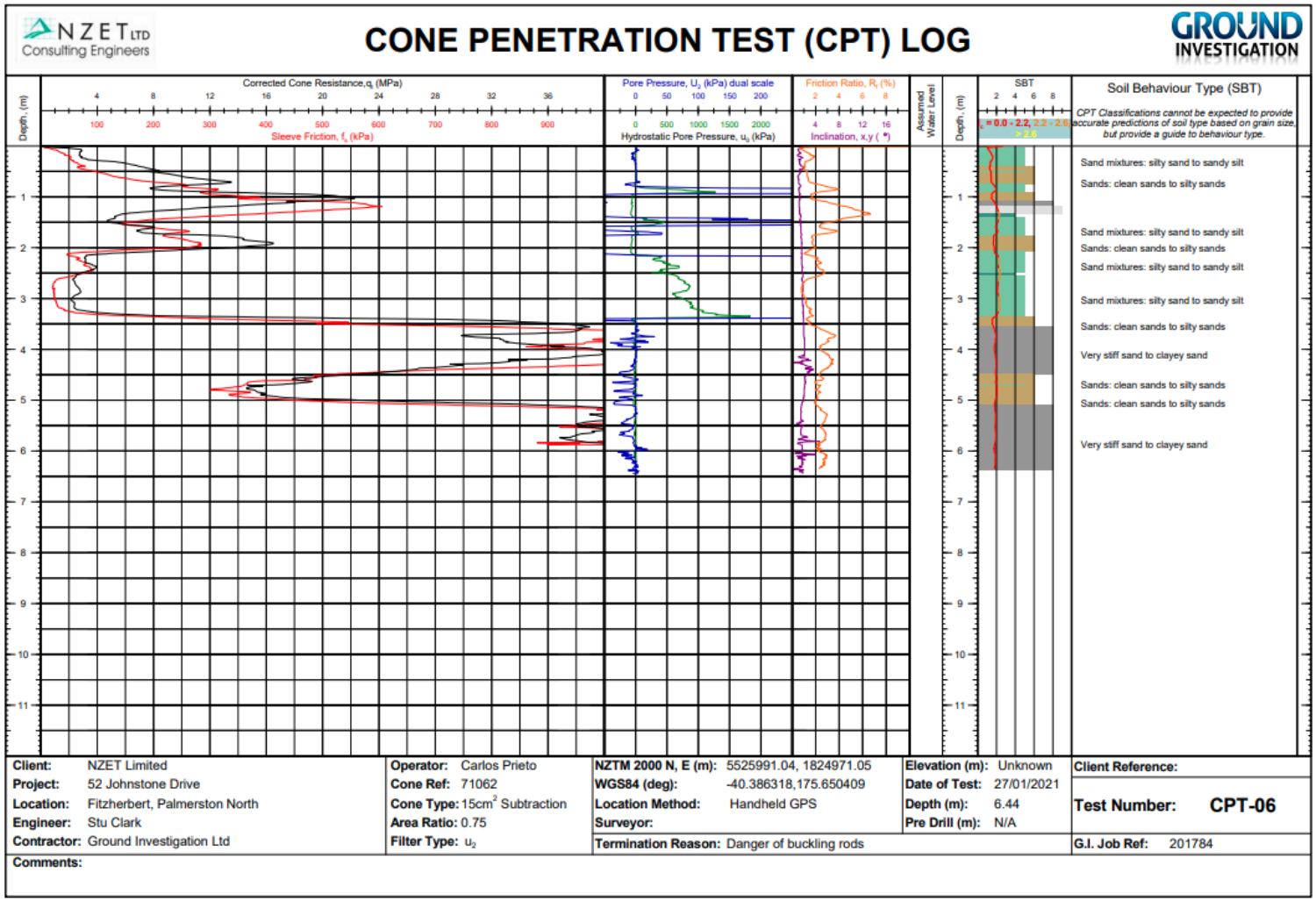
A3- Foundation soil displacements Mag 7, 0.35g no surcharge



A4- CPT Log Hole 3



A5-CPT log Hole 5


NZET LTD
Consulting Engineers
CONE PENETRATION TEST (CPT) LOG
GROUND INVESTIGATION
Corrected Cone Resistance,q_c (MPa)
Sleeve Friction, f_s (kPa)
Pore Pressure, U_2 (kPa) dual scale
Hydrostatic Pore Pressure, u_0 (kPa)
Friction Ratio, R_f (%)
Inclination, x,y (°)
Assumed Water Level
Depth, (m)
SBT
Soil Behaviour Type (SBT)
CPT Classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.
Sand mixtures: silty sand to sandy silt
Sands: clean sands to silty sands
Sand mixtures: silty sand to sandy silt
Sands: clean sands to silty sands
Sand mixtures: silty sand to sandy silt
Sand mixtures: silty sand to sandy silt
Sands: clean sands to silty sands
Very stiff sand to clayey sand
Sands: clean sands to silty sands
Sands: clean sands to silty sands
Very stiff sand to clayey sand
Client: NZET Limited
Project: 52 Johnstone Drive
Location: Fitzherbert, Palmerston North
Engineer: Stu Clark
Contractor: Ground Investigation Ltd
Operator: Carlos Prieto
Cone Ref: 71062
Cone Type: 15cm² Subtraction
Area Ratio: 0.75
Filter Type: u2
NZTM 2000 N, E (m): 5525991.04, 1824971.05
WGS84 (deg): -40.386318,175.650409
Location Method: Handheld GPS
Surveyor:
Termination Reason: Danger of buckling rods
Elevation (m): Unknown
Date of Test: 27/01/2021
Depth (m): 6.44
Pre Drill (m): N/A
Client Reference:
Test Number: CPT-06
G.I. Job Ref: 201784
Comments:

A6-CPT Hole 6

APPENDIX B: SURVEYED CROSS SECTIONS

Our Ref: 2043 Stage 6G2 Consent Report.docx

5 July 2021

City Contact
P.N.C.C.
Private Bag
Palmerston Nth

Dear Sir,

Proposed Landuse Consent For Civil Construction (PN) Ltd
Johnstone Drive, Aokautere

1.0 Introduction

1.1 I forward plans and documents for your Council's consideration. Payment for the application deposit of $2700 will be made into Council's bank account.

1.2 It is considered that the application can be processed as a non-notified activity as there are not any affected parties.

2.0 Development Proposal

2.1 My Client wishes to construct a large fill across the Johnstone Drive Gully so as to provide for future access to their property when the land is rezoned Residential in the future.

2.2 The fill will also act as a detention dam for all stormwater runoff for the future development of the surrounding land and the upstream catchment.

2.3 The fill has been designed to provide for a future road, a sewage pumping station and access to the inlet of the culvert under the fill.

2.4 The fill within the gully is over an area of 8,500m², being a length of 120m, with a maximum width of 100m and height of 13.3m. The total amount of fill required is 51,000m³. All material for the construction of the fill is to be obtained from the eastern side of the Johnstone Drive Gully. This will involve the reshaping of the nearby ridge and lowering this by a maximum height of approximately 3.6m at the centreline, covering an area of 27,000m². The total area of land that is to be disturbed by the earthworks is 35,500m².

2.5 A 600mm diameter culvert is to be placed in the stream bed to ensure that there is continuous flow of water in the base of the gully. This pipe is able to carry the normal flow generated by a two year return rainfall event. A high level entry at the inlet is proposed to maintain flow should the primary inlet become obstructed. The fill will act as a detention dam for rainfall events that are greater than 2 years return. All water will be held by the dam and dissipate through the 600mm diameter pipe. A spillway is not being provided as any rainfall event will not generate sufficient runoff to overtop the fill.

2.6 The sides of the fill are to be planted in native vegetation commensurate with the existing native regrowth that has occurred within the gully and the nearby Council reserves.

3.0 Planning Requirements

3.1 The proposed earthworks are considered to be a Restricted Discretionary Activity in accordance with Rule 6.3.7.1 as there is not compliance with Performance Standards of R6.3.6.1(a).
The land is zoned Rural and is within the Aokautere Rural Residential Area.

3.2 Performance Conditions R6.3.6.1(a) are unable to be complied with as follows:

i. The construction of the fill will involve more than 1000m³ of material being disturbed within a 12 month period.
ii. The location where the earthworks are occurring is not within the Tararua Landscape Protection Area.
iii. The fill will raise the ground level by more than 1.5m and the excavated land will be lowered by more than 1.5m.
iv. All earthworks will not be within 3m of any property boundary.

3.3 Matters of assessment as specified by Rule 6.3.7.1 are:

- Landscape and visual impact.
- Effects upon adjoining properties including amenity values.
- Impacts upon flood plains and flood flows.
- Increase on hazard risk and effects on land stability.
- Effects of erosion and sedimentation.
- Effects on overland flow paths.

These matters are discussed in the Assessment of Effects part of this application.

3.4 The location where the earthworks are occurring is not within any areas defined as being affected by Section 22 Natural Hazards of the District Plan. In particular, the areas where the filling and excavation occurring is not within any Flood Protection Zone or Food Prone Areas Zone.

3.5 The location where the earthworks are occurring is within the area defined as the Negligible Liquefaction Zone as shown on Map 22.6.2 of Section 22 Natural Hazards of the District Plan.

3.6 The location where the earthworks are occurring is not within the Aokautere Development Area and consequently not within any land zoned Limited Developable Area.

3.7 In association with this application, a Landuse Consent application is also being applied to Horizons Regional Council as the proposed earthworks do not comply with the Permitted Rules of the One Plan and are deemed to be affected by the following rules:

- Earthworks, being Rule 13-2 Large-scale land disturbance, a Controlled Activity.
- Work in the bed of a river, being Rule 17-23 as there is not compliance with Rules 17.7 and 17.10, a Discretionary Activity.

4.0 Legal Description

4.1 The property is described as Lot 695 DP 509873, contained in RT 968449 having an area of 42.7321ha.

4.2 The title also contains three other parcels of land which are unaffected by the earthworks. The total area of the title is 49.5879ha.

4.3 The title is subject to various easements however only an easement relating to right to convey stormwater is affected by the proposed earthworks, Easement N DP 550078.

5.0 National Environmental Standards

5.1 The property is not a HAIL site nor is there any likely form of contamination therefore a NES consent is not required.

5.2 The proposed earthworks do not contravene the National Policy Statement for Freshwater Management 2020 as there is full compliance with the Resource Management National Environmental Standards for Freshwater Regulations 2020.

6.0 Assessment of Effects

6.1 Matters of assessment as specified by Rule 6.3.7.1 are detailed as follows.

6.1.1 Landscape and visual impact.

The gully crossing is located within the Johnstone Drive Gully with the maximum height of the fill being 10m below the top of the gully. This gully is a deeply incised feature that extends the full length of the property generally in a north south direction. The gully crossing will not be visible from any adjoining property, being entirely contained within the gully itself. The planting of the batter slopes of the fill with native vegetation ensures that the earthworks will blend into the existing native regrowth vegetation. The attached plans provide details of the embankment from various viewpoints both within and outside the gully.

The area of excavation from where the fill material is to be obtained is to be topsoiled and reinstated to pasture for continued rural use until development occurs in the future. The future reinstated landscape will result in little if any discernible difference from that presently occurring.

It is considered that the construction of the fill and the excavation of the material will have little landscape or visual adverse effects.

6.1.2 Effects upon adjoining properties including amenity values.

The centre of the Johnstone Drive Gully is located approximately 100m from the nearest residential property. This property is a rear site being accessed from Johnstone Drive. The property itself and all other nearby properties do not have a view into the gully or the position of the gully crossing as their views are screened by high close boarded fences and/or blocked by the topography of the gully. The construction of the gully crossing and excavation of the required material does not create any adverse effects upon any adjoining property.

6.1.3 Impacts upon flood plains and flood flows.

The gully crossing is not within a flood plain or any flood flow. The structure enables the uninterrupted flow of water in the gully for all rainfall events of 2 years intensity but will act as a detention dam for larger storm events thereby significantly reducing the effects of storm flows on the downstream catchment and system. The creation of a detention dam limits the discharge downstream for all rainfall events exceeding 2 years. Refer to the report prepared by NZ Environmental Technologies Ltd.

6.1.4 Increase on hazard risk and effects on land stability.
The creation of the gully crossing will not increase any hazard risk or create an adverse effect upon any land instability but rather significantly reduce the effects and flooding risk on downstream properties and ensure the gully sides are stable in the position of the crossing. The removal of material on the adjacent ridge for the construction of the fill will reduce the present loading on the gully sides thereby reducing any existing land instability in that location. The construction of the gully crossing will be appropriately monitored and tested to ensure that the structure is property built and does not pose a risk of failure with the subsequent adverse effects on properties and structures downstream. Refer to the report prepared by NZ Environmental Technologies Ltd.

6.1.5 Effects of erosion and sedimentation.
The construction of the gully crossing and the excavation of the required material to build it is to occur in accordance with an approved Erosion and Sediment Control Plan (ESCP) to prevent erosion and subsequent sedimentation of the waterways in the Johnstone Drive Gully and the other nearby watercourses. All dust is to be controlled in accordance with the approved ESCP. Prior to construction beginning an ESCP is to be prepared and approved by both the PNCC and Horizons Regional Council covering all matters to ensure that earthworks are performed in a manner that does not cause any erosion or sedimentation.

6.1.6 Effects on overland flow paths.
The construction of the gully crossing will not affect any existing overland flow paths which are to continue as at present. Likewise, the excavation of material for the filling and subsequent reshaping of the land will not result in any changes to the existing overland flow paths.

6.2 The construction methodology is to be in accordance with standard earthworks requirements for the construction of large fills including the provision of monitoring and testing. All construction is to be in accordance with Council's engineering requirements and the specifications prepared by NZ Environmental Technologies Ltd.

6.3 The relevant Objectives and Policies of the District Plan are assessed as follows:

6.3.1 City View Objectives 1, 2, 3, 6, 10, 11, 17, 18, 19, 23 and 24.

- Objective 1
  The proposal is the initial stage of a development to provide for future residential growth in the locality. While the application is not for the construction of a new road, the proposed earthworks have been designed so that a road can be constructed on the gully crossing in the future.
- Objective 2
  The proposed earthworks include the necessary design information to enable the installation of services for the future residential development on the eastern side of the gully. This includes the relocation of the existing stormwater system that presently drains Johnstone Drive, thereby enabling the gully crossing to act as a detention dam for that part of the catchment.
- Objective 3
  The design of the gully crossing ensures that access and services are able to be provided to the future residential area. The reshaping of the ridge will not affect the ability for the provision of access and services for future development in the re-shaped area.
- Objective 6
  The land that the gully crossing will provide access to and which is to be zoned for residential development in the future is not Class I or II soils and is already zoned for non-productive rural purposes, being rural – residential land.

- Objective 10
  The gully crossing will enhance the visual appeal of the City by providing access across the Johnstone Drive Gully, thereby enabling development in the future of underused land and continuation of the environmental corridor linking the City at the Fitzherbert Avenue bridge over the Manawatu River to the Pahiatua Track. The planting of the slopes of the fill with native vegetation will ensure the earthworks are commensurate with the regenerating bush with the Johnstone Drive Gully.
- Objective 11
  The construction of the gully crossing will ensure a future roading design that enables a good urban design for the future residential area.
- Objective 17
  The natural feature of the Johnstone Drive Gully is preserved as much as possible as the size of the gully crossing is limited to the minimum possible for an appropriate roading system to gain access to the developable land on the east side of the gully. Planting of the batter slopes will further enhance the gully and the gully will continue to exist as it presently does. The re-shaping of the ridge will not result in any distinguishable change in the characteristics of the land.
- Objective 18
  While the Johnstone Drive Gully is not classified as an Outstanding Natural Feature or Landscape, it is considered that the gully is a feature worthy of preservation and enhancement. The provision of the gully crossing has been designed so that access and services are available to the land suitable for future development with little, if any, adverse impact.
- Objective 19
  The gully crossing and excavation of material for it does not result in the creation of or increase in any natural hazard. The creation of the gully crossing will reduce the effects on properties and structures downstream by the crossing acting as a retention dam; the fill material supporting the gully sides thereby reducing or eliminating the potential for land instability; and the excavation of material of the ridge thereby reducing the loading on the side slopes of the gullies.
- Objective 23
  The design of the gully crossing ensures that access and services are able to be provided to the future residential area. The reshaping of the ridge will not affect the ability for the provision of access and services for future development in the re-shaped area.
- Objective 24
  The design of the gully crossing provides access for all forms of transport including cycling and pedestrians.

6.3.2 Earthworks Objectives and Policies
Objective 1 and Policies 1.1, 1.2 and 1.4

- Objective 1
  The fill for the gully crossing and the reshaping of the land from where the material is acquired does not result in any adverse effects.
- Policy 1.1
  While the proposed earthworks will not create any adverse effects, the extent of the earthworks have been limited to the minimum possible to provide the required access and services for the future residential land.

- Policy 1.2
  The earthworks do not have any adverse effects on:
  - Natural Landform as the Johnstone Drive Gully is unaffected except where the crossing is occurring. The reshaping of the adjacent ridge will result in the same landform as at present but slightly lower thereby making the change indistinguishable once the reinstatement has been completed;
  - Landscape Values will not be unaffected but rather improved as the Johnstone Drive Gully will remain and the batter slopes of the crossing planted in native vegetation. There will not be any discernible change to the landscape from where the material is excavated from;
  - Visual Amenity Values will either be unchanged or enhanced as the Johnstone Drive Gully will remain and the batter slopes of the crossing planted in native vegetation. There will not be any discernible change to the landscape from where the material is excavated from;
  - Adjoining Properties will be unaffected as the earthworks are occurring on land well away from them. The closest properties are those within the adjoining Residential Zone which do not have a view of or into the gully;
  - Natural Hazards and Processes will either not be unaffected or reduced. The potential for land instability within the area of the crossing will be reduced or eliminated and the loadings on the gully side slopes will be reduced due to the removal of material above to enable the construction of the crossing. The gully crossing will act as a detention dam thereby reducing the effects of flooding for significant rainfall events on downstream properties and structures.
- Policy 1.4
  The earthworks will not increase the risk of natural hazards but rather reduce the potential for these to occur by reducing or eliminating the land instability of the gully slopes in the location of the gully crossing,

6.3.3 Natural Hazards Objectives and Policies

Objective 1 and Policy 1.1

The land where the earthworks are proposed is not identified as being affected by any natural hazard however the gully crossing is in a location that has the potential to be affected by natural events i.e. high rainfall and land instability. The gully crossing has been designed to ensure that the structure will remain stable for all expected natural events. Refer to the report prepared by NZ Environmental Technologies Ltd.

6.4 An assessment on relevant matters to Part 2 of the Resource Management Act is provided as follows:

6.4.1 The proposed subdivision is in accordance with s5 of the Act by:

- Enabling the development of the land in general accordance with the Objectives and Policies of the District Plan while not creating any adverse effects.
- Utilising land to enable access and services to be provided in the future for land that is to be re-zoned for residential development to provide lots for residential housing.
- The gully crossing can be achieved without impacting upon ecosystems, in particular water, soil and the surrounding natural environment.
- The earthworks can occur without creating any adverse effects.

6.4.2 There is full compliance with the relevant matters identified in s7 of the Act as:

(a) Kaitiakitanga.
The proposal is in accordance with an appropriate use of the land.

(aa) The ethic of stewardship.
The construction of the gully crossing will not result in any change in use of the remainder of the gully.

(b) The efficient use and management natural and physical resources.
The landuse is in accordance with the District Plan Policy to enable access and services for an orderly expansion of the City in the future.

(ba) The efficiency of the end use of energy.
Not applicable.

(c) The maintenance and enhancement of amenity values.
The proposal will not result in any changes to the existing amenity of the Johnstone Drive Gully, the surrounding landscape or adjoining properties.

(d) Intrinsic values of ecosystems.
The gully crossing will not affect the ecosystem of the Johnstone Drive Gully.

(f) Maintenance and enhancement of the quality of the environment.
The gully crossing will not affect the quality of the environment of the Johnstone Drive Gully or any adjoining land.

(g) Any finite characteristics of natural and physical resources.
The gully crossing will ensure the retention of the Johnstone Drive Gully in its present form both upstream and downstream.

(h) The protection of the habitat of trout and salmon.
Not applicable.

(i) The effects of climate change.
Not applicable.

(j) The benefits to be derived from the use and development of renewable energy.
Not applicable.

Overall the proposal achieves the sustainable management purposes of the Resource Management Act 1991.

7.0 Notification Assessment

7.1 An assessment of the need for notification of the application is required pursuant to s95A and s95B of the RMA 1991. The determination of any form of notification is based upon the steps as stipulated in s95A and s95B as detailed below.

7.2 The determination for notification pursuant to s95A RMA is as follows and is assessed in accordance with the information stated above.

- Step 1 *(If YES Notify or if NO go to Step 2)*
  Does the application meet any of the criteria setout in s95A(3)? **NO**
  The criteria of s95A(3), Step 1, are:
  (a) Has the applicant requested public notification? **NO**
  (b) Is public notification required under s95C? **NO**
  (c) Is the application made jointly with an application to exchange recreational reserve land under s15AA Reserves Act 1977? **NO**

- Step 2
  Does the application meet any of the criteria setout in s95A(5)? **YES**
  The criteria of s95A(5), Step 2, are:

(a) Is the application for a resource consent for 1 or more activities, and each activity is subject to a rule or national environmental standard that precludes public notification? **NO**

(b) Is the application for a resource consent for 1 or more of the following, but no other activities?

(i) A controlled activity? **NO**

(ii) Not applicable.

(iii) A restricted discretionary, discretionary or non-complying activity but only if the activity is a boundary activity? **NO**

(iv) Not applicable.

- Step 3 *(If YES Notify or if NO go to Step 4)*
  Does the application meet any of the criteria setout in s95A(8)? **NO**
  The criteria of s95A(8), Step 3, are:
  (a) Is the application for a resource consent for 1 or more activities, and any of those activities are subject to a rule or national environmental standard that requires public notification? **NO**
  (b) In accordance with s95D will the activity have or is likely to have adverse effects on the environment that are more than minor? **NO**

- Step 4 *(If YES Notify or if NO determine if limited notification applies)*
  Do special circumstances exist in relation to the application that warrant the application being publicly notified? **NO**
  It is considered that the construction of the gully crossing does not affect any adjoining properties, in particular the nearby residential properties, or any other person for the reasons stated above.

7.3 The determination for notification pursuant to s95B RMA is as follows and is assessed in accordance with the information stated above.

- Step 1 *(If YES Notify or if NO go to Step 2)*
  Does the application meet any of the criteria setout in s95B(2)? **NO**
  The criteria of s95B(2), Step 1, are:
  (a) Are there any affected protected customary rights groups? **NO**
  (b) Are there any affected customary marine title groups? **NO**

  Does the application meet any of the criteria setout in s95B(3)? **NO**
  The criteria of s95B(3), Step 1, are:
  (a) Is the proposed activity on or adjacent to, or may affect, land that is subject of a statutory acknowledgement made in accordance with an Act specified in Schedule 11? **NO**
  (b) Is there a person to whom statutory acknowledgement is made that is an affected person under s95E? **NO**

- Step 2 *(If YES go to Step 4 as Step 3 does not apply or if NO go to Step 3)*
  Does the application meet any of the criteria setout in s95B(6)? **NO**
  The criteria of s95B(6), Step 2, are:
  (a) Is the application for a resource consent for 1 or more activities, and any of those activities is subject to a rule or national environmental standard that precludes limited notification? **NO**
  (b) Is the application for a controlled activity (but no other activities) that requires a resource consent under a District Plan (other than a subdivision of land)?

- Step 3 *(If YES Notify or if NO go to Step 4)*
  Does the application meet any of the criteria setout in s95B(7) or (8)? **NO**
  The criteria of s95B(7), Step 3, is:
  Is the application for a resource consent for a boundary activity where the owner of the property with an infringed boundary is affected? **NO**
  The criteria of s95B(8), Step 3, is:
  Is the application for a resource consent for any other activity where there is a person who is determined to be affected because the adverse effects are minor or more than minor? **NO**

- Step 4 *(If YES Notify)*
  Do special circumstances exist in relation to the application that warrant the application being publicly notified? **NO**

7.4 In summary it has been determined that there are not any adverse effects, and if there were any then these would be less than minor and that accordingly any form of notification is not required.

8.0 Other Matters

8.1 The existing stormwater system installed for the recently completed Stage 6F7, Johnstone Drive, is to be relocated to the upstream side of the gully crossing so that all stormwater is discharged into the that part of the gully which will act as a detention dam. Details of the realigned system are shown on the accompanying plans. Upon completion the existing stormwater system is to be either abandoned or removed. The existing easement is to be cancelled and a new easement created for the realigned system.

8.2 As part of the engineering approval for the construction of the gully crossing, a building consent is to be applied for as the use of the crossing as a detention may result in the height of the water exceeding 4m thereby defining the crossing as a large dam under s7 of the Building Act 2004.

9.0 Conclusion

9.1 It is considered that Council can grant consent for the landuse as the proposal is in full compliance with the District Plan Objectives and Policies. Granting of the consent will not lead to an inconsistency in the administration of or loss of public confidence in the District Plan.

9.2 Appropriate conditions to be imposed for the land consent are considered to be as follows:

(1) The proposed earthworks must be carried out in general accordance with the application received by Council on the 5 July 2021 including of the plans by Pirie Consultants Ltd, Job N° 2043/215, Rev - stamped "Planning Approved" on the XX/XX/2021 and held on Council file LU XXXX.

(2) Prior to earthworks starting, the Applicant must comply with the following:
  (i) Submission of engineering plans in accordance with the Palmerston North Engineering Standards for Land Development (ESLD) prepared by a Chartered Professional Engineer or a Professional Surveyor with appropriate qualifications acceptable to Council. The plans must show all physical works including the construction of the realigned stormwater system from Johnstone Drive.
  (ii) The Engineering Plans must be approved by Council.
  (iii) The Consent Holder must appoint and have approved by Council a Technical Representative (being a Professional Surveyor or Chartered Professional Engineer) to monitor the construction of all approved works including the construction of the realigned stormwater system in accordance with level CM3 of IPENZ construction monitoring set out in Council's ESLD.

(iv) The Consent Holder must ensure that the appointed Technical Representative contacts Council at the joint inspection points in accordance with Clause 1.21 (ESLD) Construction Monitoring.
(v) No physical works can be carried out until the above has been approved by Council.

(3) Prior to earthworks starting, the Applicant must apply for and have approved a building consent for the construction of the fill across the Johnstone Drive Gully.

(4) Prior to earthworks starting, the Applicant must provide to and have approved by Council an Erosion and Sediment Control Plan.

(5) All earthworks must be performed in accordance with the report prepared by NZ Environmental Technologies Ltd.

(6) Prior to the issue of a code of completion certificate under the Building Act 2004, Consent Holder must provide a written statement from the approved Technical Representative (under condition 2) confirming that:
(i) The physical works have been completed in accordance with the engineering plans approved under Condition 2.
(ii) The physical works meet Council's Engineering Standards for Land Development 2015.
(iii) All requirements of Clause 1.31 of Council's Engineering Standards for Land Development 2015 have been provided to Council.

(7) Prior to the issue of a code of completion certificate under the Building Act 2004, Council requires a statement confirming that the earthworks have been satisfactorily completed. The statement shall be made in terms of NZS 4404:2010 Schedule 2A as per Appendix 7 to Council's Engineering Standards for Subdivision. The statement shall include any retaining structures and be accompanied by compaction test results for the area of fill.

(8) Prior to the issue of a code of completion certificate under the Building Act 2004, the batter slopes of the gully crossing must be topsoiled, grassed and planted with native vegetation to achieve a full cover within three (3) years.

(9) Prior to the issue of a code of completion certificate under the Building Act 2004, all excavated areas are to be topsoiled and grassed to achieve a minimum of 80% cover.

(10) Within 6 months of the completion of the realigned stormwater system, the Consent Holder must provide a new easement plan prepared to Council's satisfaction. Within two months of obtaining Council's satisfaction, the Consent Holder must ensure that the easement is shown on the current title. Council is to provide the necessary certification to enable the cancellation of the redundant easement.

9.3 I trust this is the information you require. Any queries please contact me.

Yours faithfully,

P. H. Pirie
Consulting Surveyor