BEFORE THE NEW PLYMOUTH DISTRICT COUNCIL

UNDER	the Resource Management Act 1991 ("RMA")
IN THE MATTER	of PC18/00049 being a request under section 73(2) of the Act by **HAREB INVESTMENTS LIMITED** to the **NEW PLYMOUTH DISTRICT COUNCIL** for a Private Plan Change to rezone 2 Johnston Street, Waitara from Rural (FUD) to Residential A and Open Space.

STATEMENT OF EVIDENCE MICHAEL DAVID MATANGI ON BEHALF OF HAREB INVESTMENTS LIMITED

Introduction

1. My name is Michael David Matangi, and I have a Diploma in Engineering (Civil) from NZIHT, and am a member of Engineering New Zealand (MengNZ).

2. I have 25 years' experience as a civil Engineering Consultant including work on Local Government roading, water stormwater and wastewater projects. The last 6 years I have worked as a part time consultant to NPDC Infrastructure and Subdivision Engineering Team, including assisting in the development of the most recent standards for Land Development and Infrastructure with local amendments for New Plymouth District Council (NPDC), South Taranaki District Council (STDC) and Stratford District Council (SDC).

3. I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court Practice Note 2014, and I agree to comply with it as if this hearing was before the Environment Court. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Background and Role

4. I was engaged by Landpro (New Plymouth) in July 2018 to advise and report on the engineering infrastructure and solutions for the subject development. I visited the site on 30 July 2018. I subsequently provided an engineering report dated 16 September 2019 to the applicant for a high-level analysis of sewer disposal, stormwater management and water supply. I subsequently provided a supplementary engineering report dated 21 January 2019; both reports were included in the plan change request application dated 13 March 2019. Additionally, I provided a supplementary email report to Graeme Pool of NPDC on 26 October 2020, a copy of which is attached as **Annexure A**. The issue of access from Raleigh Street excluded from my investigation and report and is addressed by Mark Georgeson of Stantec in his evidence.

Scope of Evidence

5. My evidence will address the following:

   (a) Stormwater Management;

   (b) Water Supply;

   (c) Waste Water Disposal

   (d) Compliance with NPDC infrastructure standards;

   (e) Response to Submissions;

   (f) Response to Cultural Impact Assessment

   (g) Conclusions

6. I have read the evidence prepared by the other witnesses presenting evidence on behalf of Hareb Investments Limited and have relied on such evidence in preparing this brief of evidence. I have also read the submissions lodged in relation to the application to the extent that they are relevant to my evidence.

Summary of Evidence

7. The key findings from my evidence are as follows:

   (a) That a hydraulically neutral stormwater system can be provided for the proposed development.

   (b) That water supply to NPDC and Fire Fighting Standards can be provided to the site.

   (c) That there is adequate capacity in the gravity waste water system from the proposed new development to the waste water pump station near the intersection of McNaughton Street and Queen Street.

Stormwater Management

8. The existing site consists of pasture covered land, sloping gently to a small central waterway which generally bisects the site, and drains from the southwest to the northeast end of the site.

9. The waterway which bisects the site commences at the southwestern end of the site, and drains to the northern end of the site.

10. Subsequently to the north of the site, stormwater drains through private land, NPDC road reserve land and parks reserve land, through a detention pond (on NPDC reserve land), and a combination of underground pipes, open drains, grassed paper roads, paved roadways, and discharges into the Waitara River. Consequently, the large majority of the original waterway has been built over by the downstream Waitara township.

11. 190m downstream of the proposed development is a similar bund and culvert as is being proposed for the proposed development, for access to a property off Ranfurly Street. Below is an aerial photo (Figure 1) and photograph (looking upstream from this culvert - Figure 2) looking back in the direction of the development (looking north to south), to give an example of the nature and impact a new bund and culvert would have.

Figure 1. Aerial photo of a recent culvert in the Mangaiti Stream providing access from Ranfurly Street

Figure 2. View of the Mangaiti Stream from the culvert shown in Figure 1 above towards the boundary of the proposed site.

12. The proposed development will result in a combination of road pavement, concrete footpath, grass berm and lawn, and roof surfaces.

13. A combination of on-site soakage, disposal to the existing stream (and the NPDC stormwater reticulation network downstream), and stormwater detention (in-stream culvert and bund) is proposed to be utilized for the development, resulting in a hydraulically neutral stormwater system.

14. Options for stormwater management are limited due to the semi-shallow water table, which will limit the extent (depth of soak holes) of on-site stormwater disposal. The ground contour and existing waterway surface on the subject land is ideal for stormwater management for a development, because:

- Although flat sites may be ideal for a house site, a large flat development area makes it difficult to get fall and drainage for stormwater systems. The gentle nature of the ground is flat enough for a residential property site, but has enough fall to enable a gravity stormwater system to function well.

- Most developments require some level of stormwater detention (a stormwater detention pond) to be hydraulically neutral. The

central waterway / gully provides the ideal location for stormwater detention with a culvert pipe.

15. Surface stormwater within the development would be collected via road sumps or low impact design options such as rain gardens (if required) in the road reserve, and drained to the central waterway via concrete pipe reticulation. Rain gardens would provide an increased level of treatment to improve water quality before stormwater is discharged into the waterway.

16. The existing natural waterway area is proposed to be retained, with a new bund and culvert constructed at the north end of the site to provide detention only in times of large storm events.

17. The culvert would be installed in the existing waterway at the existing stream bed level to maintain existing normal stream flow. The height of the bund will be designed to provide enough stormwater detention in times of flood.

18. It is intended that the stream level would not change due to the development in times of dry weather or normal rain events. During extreme rain events, the culvert pipe will ‘choke’ the peak flows to limit downstream flooding, and the waterway will fill until the peak of the storm event, and then the stream flow will return to normal again once the storm event subsides.

19. It should be noted that, in the original Civil infrastructure consulting report dated 5 March 2019, a large bund was shown within the report purely to demonstrate the large amount of stormwater that could potentially be detained in the stream area during a storm event.

20. The volume of stormwater which could be detained by a bund with a height of 2.25m is 1,416m3; this is roughly two times the volume of the total volume of stormwater runoff (including roofs and roading) which would be produced from the whole development.

21. The height of the bund (once a full design has been provided) would be significantly less than that shown in the Civil infrastructure consulting report dated 5 March 2019 report.

22. It is proposed that the culvert will be sized to limit the peak flow of stormwater from the development to a 10% AEP storm event, to maintain hydraulic neutrality.

23. Hydraulically neutral in terms of stormwater for a residential development generally means that:

- Peak stormwater flows from the development should not be greater than the peak stormwater flows before the development was constructed, and

- The development should not increase flooding or exacerbate problems at times of flooding in large storm events to any property upstream or downstream of the development.

The proposed development will be designed to satisfy both of these criteria.

Water

24. Hydraulic water modelling was carried out by Watershed Limited using an appropriate water model provided by NPDC.

25. The modelling has concluded that water can be provided to the development to comply with NPDC standards, and that minimum fire flows of FW2 (25 L/s) can be provided while maintaining minimum residual reticulation pressure.

26. The modelling confirmed that the level of fire flows available to the site are very close to FW3 (50 L/s), which is more than that required in the Land development and Infrastructure Standard, and the New Zealand Fire Service Firefighting Water Supplies Code of practice (SNZ PAS 4509:2008) for housing dwellings.

Waste Water

27. The existing gravity sewer reticulation from Raleigh Street to the Queen Street / McNaughton Street sewer pump station was analysed to check for sufficient pipe capacity to service the new development.

28. A conservative approach was adopted when calculating the sewer capacity, where sewage flows calculated are greater than would realistically occur. The calculations were made assuming:

- all existing properties currently serviced by the gravity sewer concerned are 450m2 in size (many of the existing lots are significantly larger than this), and

- all properties within the proposed development are 450m2 (many of the new lots within the proposed development will be larger than this).

29. Calculations confirm that the gravity sewer does have adequate capacity to accommodate sewage from the new development.

Compliance with NPDC infrastructure standards

30. It is proposed that all sewer, stormwater and water infrastructure be located either within NPDC road reserve land or Open Space / Parks / Stormwater reserve land, for ease of operation and maintenance.

31. All infrastructure will comply with the Land Development and Subdivision Infrastructure Standard.

Response to Submissions

32. I have reviewed all the submissions.

33. In terms of the stormwater, I do not believe the stormwater from this development will shorten the serviceable life of the downstream infrastructure, as the development is required to be hydraulically neutral.

34. It should be noted that this development is at the top of a tributary that ultimately drains into underground piped reticulation through residential land, which currently drains water from residential land and the road network.

35. Within the CIA provided, Tangata Whenua have recommended ***Redesign of proposed stormwater infrastructure and the policy***

and rule framework including but not limited prohibition of any structures within the channel and bed of the Mangaiti, to provisions controlling impervious surfaces and building footprints on sites, as well as engineering solutions to manage and treat stormwater on sites and roads prior to entering these tributaries (e.g. swale drains, tree bowls, Vortex separator).

36. The applicant has considered this recommendation and comments as follows:

- Impervious surfaces and building footprints are addressed via the existing site coverage rules in the Operative New Plymouth District Plan (ONPDP), and are further addressed at the time of building consent when it is necessary to demonstrate that stormwater from all surfaces can be managed appropriately within the subject site.

- The applicant has committed to use of low impact systems that offer treatment before discharge to the stream and included this in the proposed rule framework (proposed Rule OL60O). This is discussed further in Ms Hoopers planning evidence.

37. Other general issues raised in submissions regarding sewer and water supply and effects are, in my opinion, addressed in my evidence including my earlier reports, and in **Annexure A.**

Officers Report

38. I have reviewed the NPDC Officers Report and make the following comments:

39. <u>11.50-11.55 Stormwater</u>

40. 11.50 – Refer to my responses to the submissions above in paragraphs 8 to 23 and paragraphs 34 to 36.

41. 11.53 - Table 3.1 of the Civil Infrastructure Consulting report dated 21/10/2018 details standard runoff coefficients which were adopted from Table 1 of the New Zealand Building Code E1:VM1 standard. Until a final road layout design has been confirmed, more accurate

stormwater flows and volumes cannot be calculated, and it would be premature and inefficient to do so. I expect this would be required to be demonstrated at the time of approval of detailed design for the subdivision.

42. 11.54 – The existing stormwater flooding issues will not be exacerbated by this development, as the stormwater design will be hydraulically neutral. Stormwater quality can be addressed by low impact design (such as rain gardens) if required.

43. 11.55 – 11.56 – An online (within the riverbed) stormwater management solution is not typically problematic in terms of water quality. I believe a single online stormwater management structure within the waterway is a more attractive option to NPDC as minimising the number of detention areas reduces the cost of maintenance. Overall, while offline systems are possible, it is my opinion that online detention management is better in terms of operation, environmental impact and on-going maintenance costs.

44. Appendix 6 Council Technical Assessment Advice – the report recommends riparian planting. Riparian planting that did not root properly on the Armstrong Ave development contributed to siltation and dead vegetation within the stream bed and adjacent area. It is recommended that any riparian planting to take place within the waterway and adjacent areas to be carried out by suitably qualified persons, and be monitored to prevent damage to the stream bed and downstream waterway.

45. Appendix 6 Infrastructure Group Three Waters report – the report queries the management of surface stormwater runoff that currently drains along the west side of Raleigh Street adjacent to the proposed development area. It is proposed that all stormwater collected by the existing grass verge (or new treatment such as kerb and channel) will be drained to the central waterway within the development (via street sump or rain garden), as proposed with all other road surface stormwater within the development.

46. Appendix 6 Infrastructure Group Three Waters report – the report recommends a double ended water supply feed into the proposed

development area. I acknowledge this approach is best practice, and I can confirm at least two connections from the existing reticulation to the new reticulation within the proposed development will be proposed.

Response to Cultural Impact Assessment

47. I am aware of the concerns Iwi and Hapu have about the Armstrong Ave development. I was involved in the Armstrong Ave development in an engineering design approval role for Council (checking design calculations and that the engineering design drawings complied with Council standards). I could not agree more with Iwi that the earthworks and silt runoff issues into the stream were completely unacceptable. I attended a number of site meetings with Iwi and the Council planner, but my role within Council gave me no ability to enforce the corrective actions that were needed. I note that there are a number of differences between the two projects, most notably that the waterway at the Johnston Street development is ephemeral, and the waterway at Armstrong Ave was constant flowing and included a small offline sediment pond.

48. Prohibition of any stormwater structures in the waterway - is unable to be confirmed at the time of the plan change. An offline detention pond outside of the stream bed would be difficult if not impossible to get fall / drainage from all land within the development to one central pond. Multiple off-line ponds could be an option but there is the risk that this creates more issues than it addresses and it would make the system very complex. Culverts and bunds within waterways is very common practice throughout Taranaki for road construction, and to provide stormwater detention for development. I do not envisage that the presence of a bund and culvert within the existing waterway would have any detrimental effects to the waterway, fish life or surrounding environment, as is also discussed in Mr Bevers and Ms Hooper's evidence.

49. Impervious surfaces/building footprints - These are controlled within the existing planning framework, with restrictions on site coverage. This is discussed by Ms Hooper in her evidence. (in terms of impervious surfaces, there are already limits relating to building footprints/site coverage rules).

50. Engineering solutions to manage stormwater on sites and roads - the applicant is agreeable with consideration of these solutions, and Ms Hooper has reflected this in the planning framework proposed, as detailed in her evidence. I will comment that from an engineering perspective, these are feasible, but need to be designed with care. It also has to be considered that these structures are likely to be placed in areas of road to vest, or in the open space areas that will vest with the NPDC. NPDC may have further comment about whether they wish to have such structures in their roads to vest, and if so, the number and nature of such structures.

Conclusions

51. I believe that all infrastructure within the proposed development can satisfy the requirements detailed in the officer's report, the requirements of Council's Development Engineers, and those in the Land Development and Subdivision Infrastructure Standard (Local Amendments Version 3) based on NZS4404:2010.

52. On this basis, stormwater entering the waterway will have negligible effects on the water quantity, and I have identified potential for positive effects on the Norman Catchment if this is required.

Mike Matangi
9 November 2020

Annexure A

Copy of email dated 26 October 2020

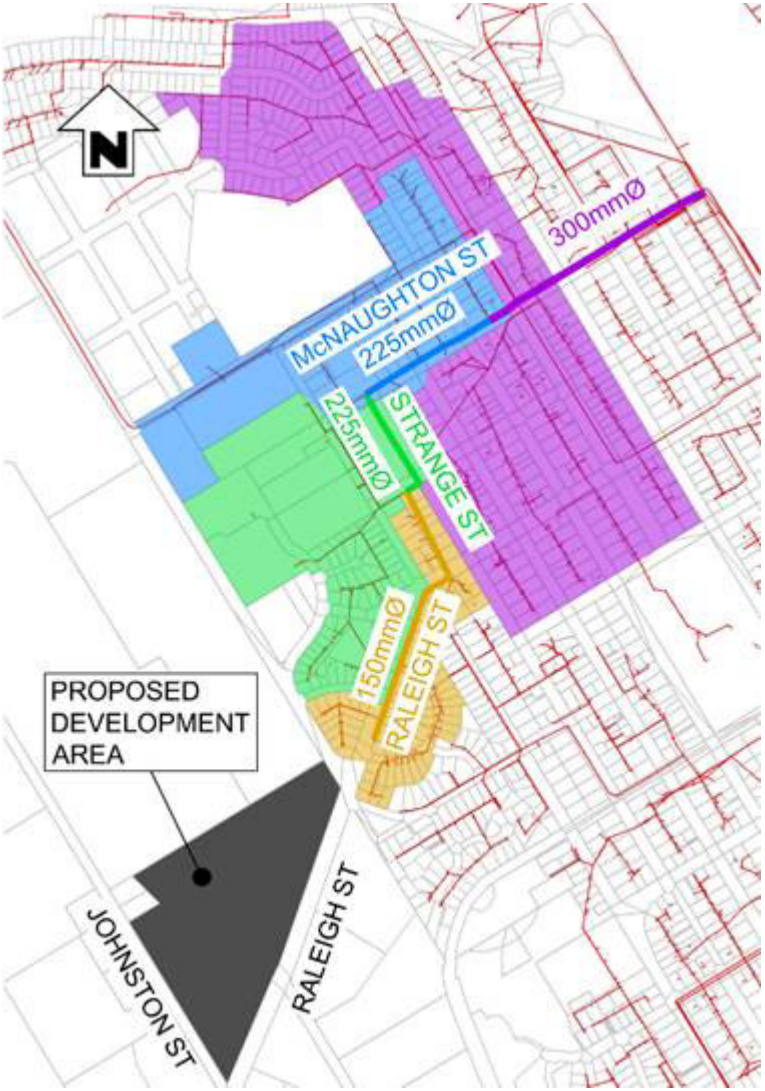
Michael Matangi

From: Michael Matangi
Sent: Monday, October 26, 2020 2:09 PM
To: Graeme Pool; Mark Hall
Cc: Kathryn Hooper; Matthew Hareb
Subject: Raleigh Street Development - Water and Wastewater Queries

Hi Graeme,

Below are responses to your queries regarding water supply and wastewater disposal for the proposed Raleigh St / Johnston St development.

WASTEWATER
With regard to the capacity of the 300mm dia sewer pipe on McNaughton St, I began creating a SSA model, and added the catchment that contributes to the 300mm dia sewer main on McNaughton St.



In calculating the catchment to add to the 300 dia sewer main (the purple shaded area above), I decided to begin with the previously adopted conservative approach of assuming:

- 70% of the land being developed (to allow for road reserve) over the entire area
- 450m2 lot sizes for the new development, and for all existing reticulated land.

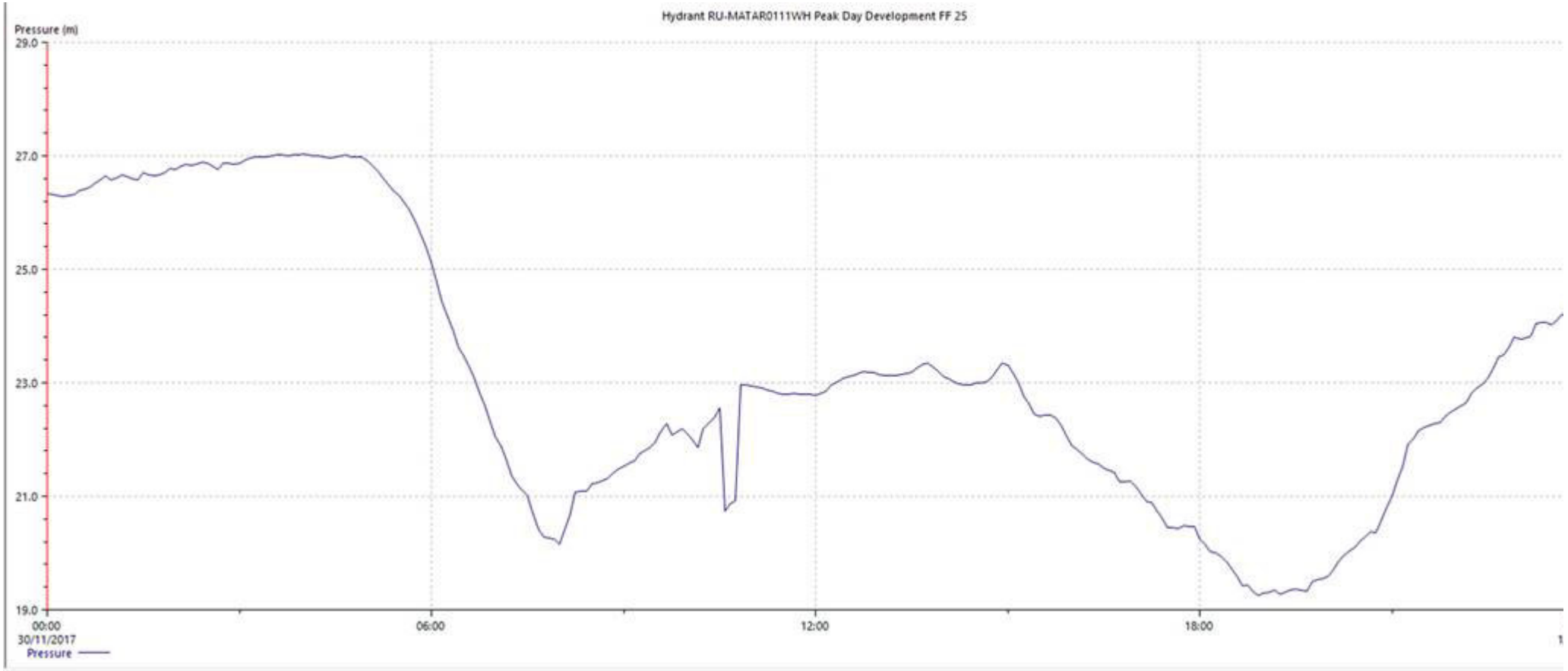
As per the approach in my previous reports, the available capacity of each pipe is as follows:

Pipe dia	Area (ha)	Total Area Served (ha)	Location	Min Lot Size (m2)	70% Of land Area (ha)	Max No. of properties served	Peak Flow from properties (L/s)		US Pipe Invert (RL)	DS Pipe Invert (RL)	Length (m)	Slope %	Slope 1 in x	Max Flow (L/s)
150	7	7	Raleigh St	450	4.9	109	4.10		23.82	7.78	525	3.06	33	25
225	16.8	23.8	Strange St	450	16.66	370	13.93		7.78	6.8	225	0.44	230	32.5
225	15.5	39.3	McNaughton (Broadway)	450	27.51	611	23.00		6.8	3.91	330	0.88	114	48
300	35.4	74.7	McNaughton (Browne)	450	52.29	1162	43.71		3.78	1.1	255	1.05	95	55

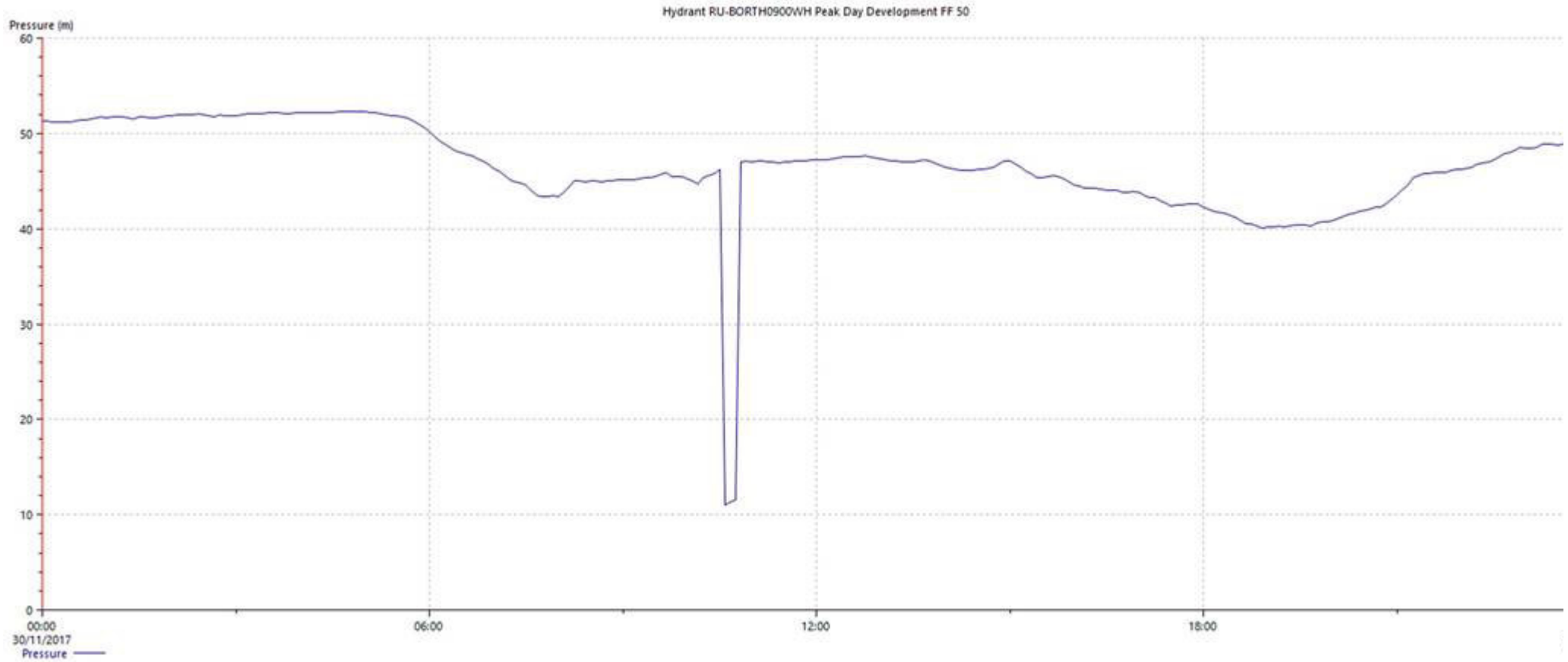
The values highlighted in blue above show the maximum developed PWWF for the existing developed and proposed development area at 43.7 L/s, with the capacity of the critical portion of the 300mm dia sewer pipe of 55 L/s. In conclusion, I believe this demonstrates with the most conservative of approaches to calculating the sewer capacity, there is adequate capacity in the gravity sewer main to the pump station.

WATER

In the 25 l/s FF scenario (fighting fire at Raleigh Street Development) the lowest pressure occurs at node RU-MATAR0111WE. This is along Matarikoriko Rd, outside the township proper, but still in the Waitara Pressure Zone. As you will see below, the low pressure is actually a result of evening demand, and not the fire flow demand at around 10:30am



In the 50 l/s scenario node RU-BORTH0900WE records the lowest pressure. This is very close to the development, but has a slightly higher elevation – therefore results in a lower pressure, as shown below.



The model runs indicate that 9 hydrants in the zone fail to provide 12.5 l/s while maintain greater than 10m pressure. The addition of the Raleigh Street Development demands doesn't change this number (i.e. remains at 9). The addition of the Raleigh Street Development demands does however reduce the available flow at hydrants by an average of 1.6 l/s, and a maximum of 4.5 l/s (RU-WAIT10053WH) which is located close to the site.

Therefore, we believe there is adequate pressure for firefighting for FW2 (and in reality FW3) for the higher elevation land at the proposed development.

Does this satisfy your queries regarding these issues?

Regards

Michael Matangi
Director, MEngNZ

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