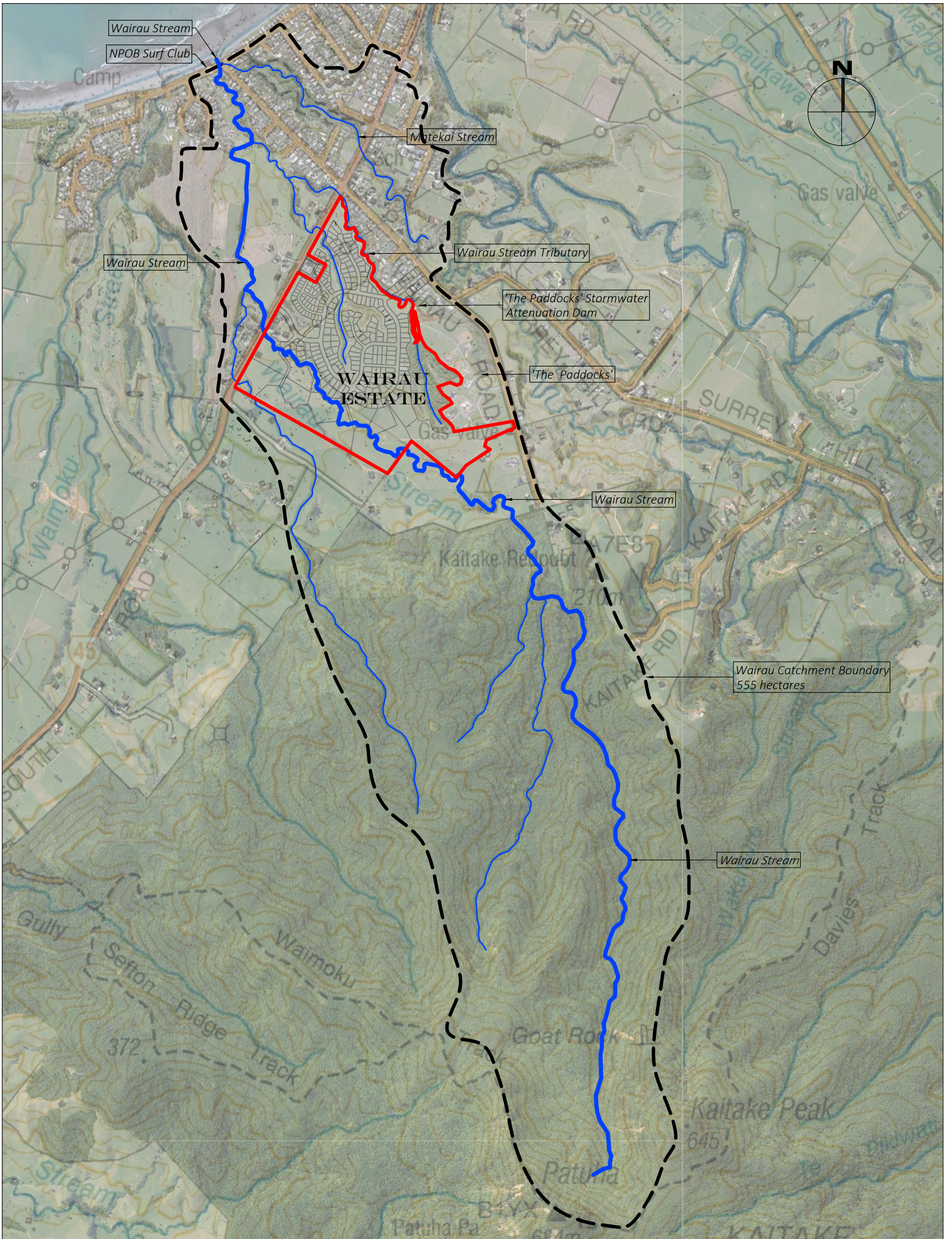



APPENDIX I

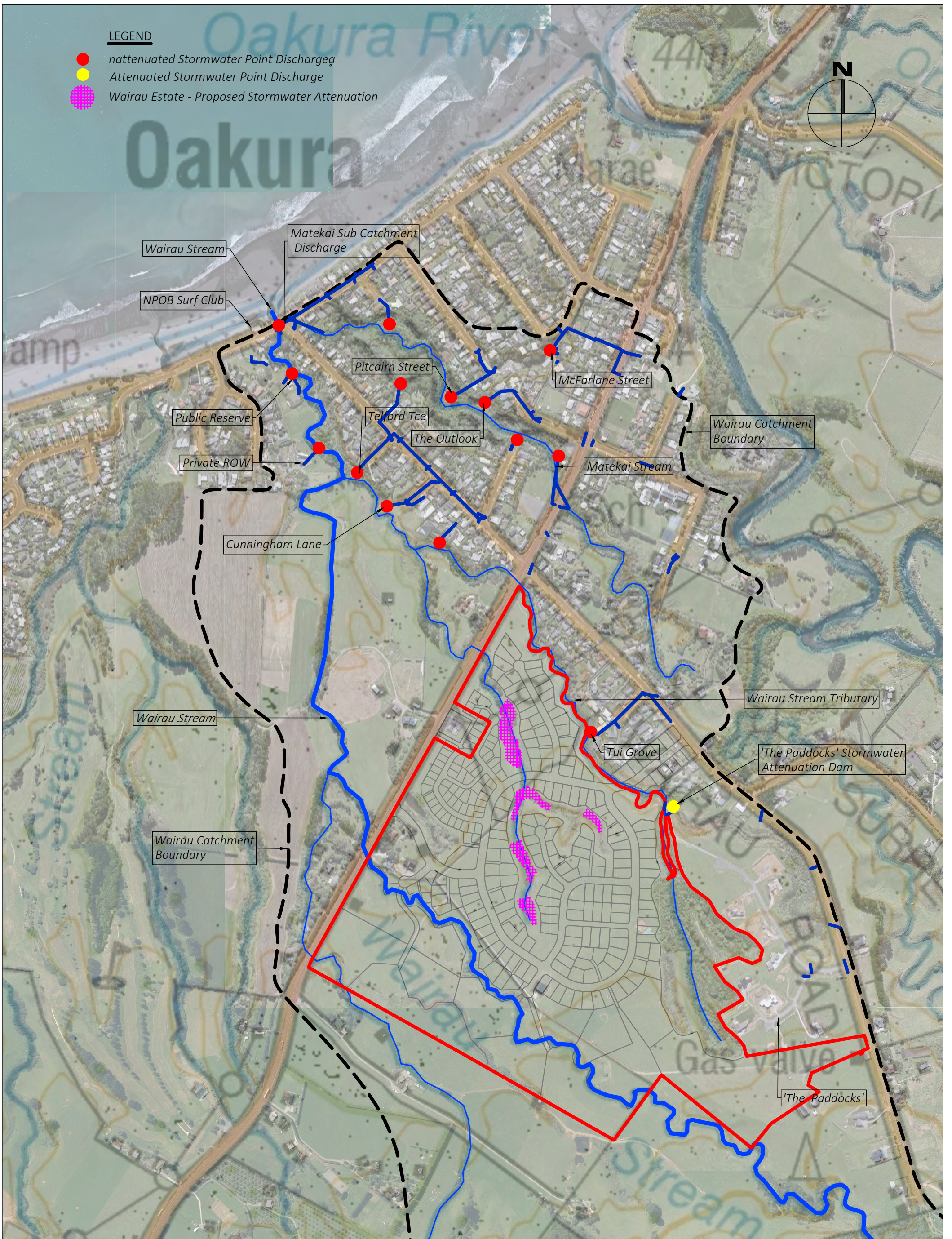
STORMWATER CATCHMENTS




 <p>28A Manadon Street PO Box 116 New Plymouth 4340 New Plymouth 06 758 5342 Hawera 06 278 4456 www.mckinlaysurveyors.co.nz</p>	TITLE WAIRAU ESTATE - Private Plan Change 48 Wairau Stormwater Catchment		RECORD OF TITLE	
	APPLICANT Oakura Farm Park Limited		TERRITORIAL AUTHORITY New Plymouth District Council	
	DATE 04/06/19		JOB No O-160109	
	SCALE 1:15,000@A3		DWG No CAT_01	
This plan is prepared only for the purpose of obtaining a Resource Consent pursuant to the Resource Management Act 1991. It must not be used for any other purpose. Areas and dimensions are approximate only and are subject to change on final field survey.			SHEET OF 1 1	

LEGEND

- nattenuated Stormwater Point Discharge
- Attenuated Stormwater Point Discharge
- Wairau Estate - Proposed Stormwater Attenuation

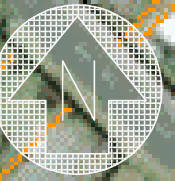


	28A Manadon Street PO Box 116 New Plymouth 4340 New Plymouth 06 758 5342 Hawera 06 278 4456 www.mckinlaysurveyors.co.nz	TITLE WAIRAU ESTATE - Private Plan Change 48 Wairau Stormwater Catchment	RECORD OF TITLE	
	APPLICANT Oakura Farm Park Limited	TERRITORIAL AUTHORITY New Plymouth District Council	TOTAL AREA	JOB No O-160109
		DATE 04/06/19	DWG No CAT_02	
		SCALE 1:7,500@A3	SHEET 1	OF 1

This plan is prepared only for the purpose of obtaining a Resource Consent pursuant to the Resource Management Act 1991. It must not be used for any other purpose. Areas and dimensions are approximate only and are subject to change on final field survey.

APPENDIX II

JSL PLANS – HOLDOM



CUMMINGHAM LANE

Proposed Reserve area/Recreational area

Possible future urban development

25/08/10	4	Through road			
18/08/10	3	Walkways as discussed with engineer	KP		
02/06/10	2	Contours from topographic survey	KP		
15/03/10	1		KP		
DATE	REV	REV RECORD	BY	CHD	VER APP

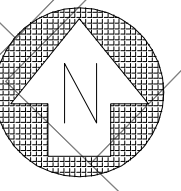


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 f 06 759 0905
 e info@juffermans.co.nz

Client **HOLDOM**
 Address **Oakura**

Sheet Title
PROPOSED SUBDIVISION OF Lot 2 DP 16742 & PT Section 3 Oakura DIST

Scale **H 1:2000**
 Drawing No. **10003-01 V4**
 Date **25/08/10** Job No. **10003** Sheet No. **01**
 A3 REV. **4**



FOOT BRIDGE

TELFORD TERRACE

NEW LOCAL ROAD

STREAM RE-ALIGNMENT A

CUNNINGHAM LANE

CULVERT C

EXISTING STREAM TO BE RE-ALIGNED

CULVERT A

STREAM RE-ALIGNMENT B

EXISTING STREAM TO BE RE-ALIGNED

NEW COLLECTOR ROAD

WAIRAU STREAM TRIBUTARY

CULVERT B

WAIRAU STREAM

PONDING AREA
RL 44 (1.17ha)

17/07/12	1								
DATE	REV	REV RECORD							

Scale (A3) H 1:1250	Drawing No. 10003 V7	A3
Date 17/7/12	Job No. 10003	Sheet No. 01
BY	CHD	VER
APP		
		1

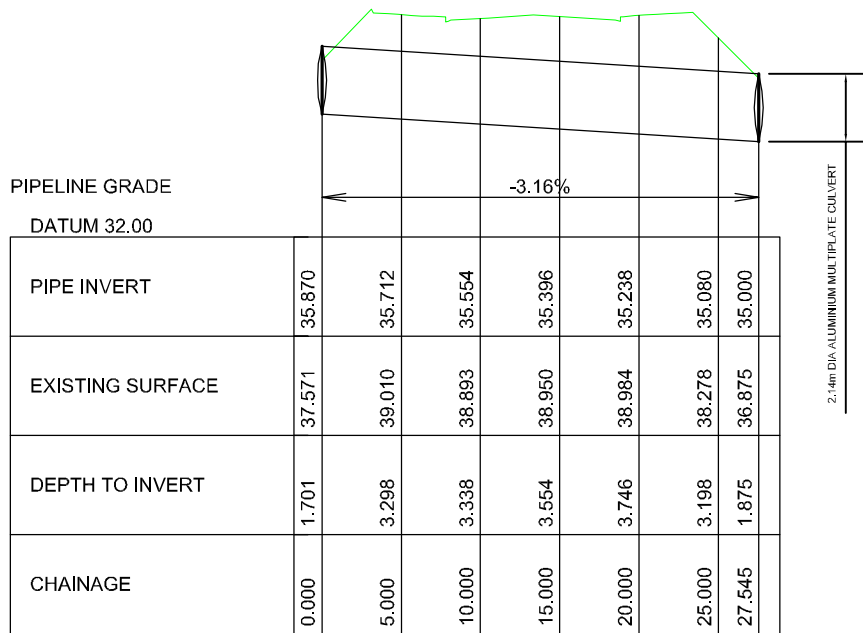


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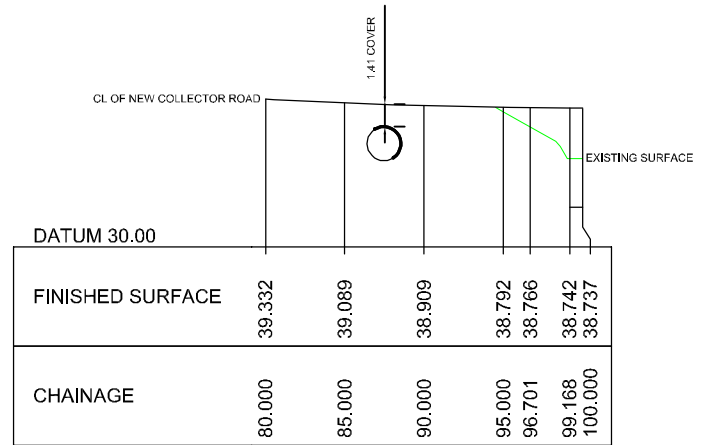
Sheet Title
**STRUCTURES OVER AND IN WATERWAYS AND
 STREAM RE-ALIGNMENTS**
 Address
 1234 South Road, Oakura

Client
 Holdom

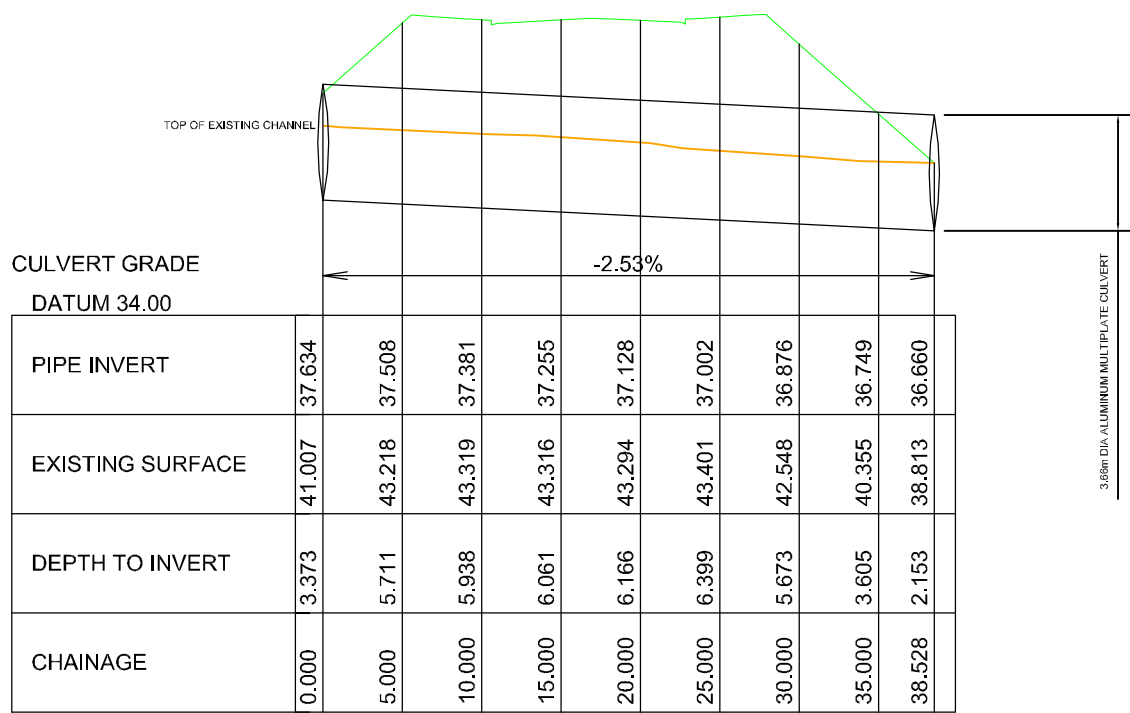
Scale (A3)
 H 1:1250
 Drawing No.
 10003 V7
 Date
 17/7/12
 Job No.
 10003
 Sheet No.
 01



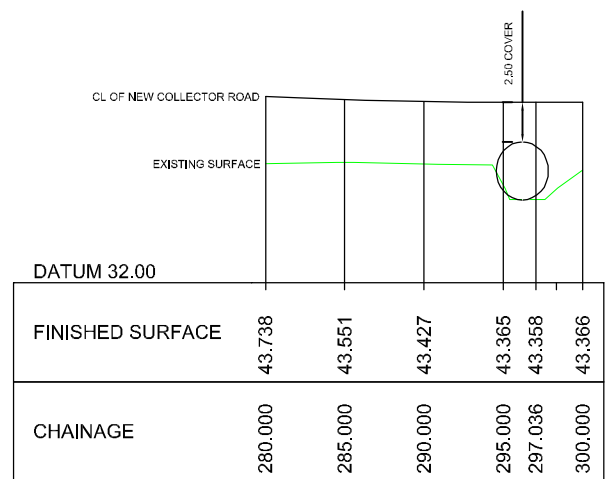
CULVERT A- LONGSECTION
SCALE: Hz 1:500
V 1:250



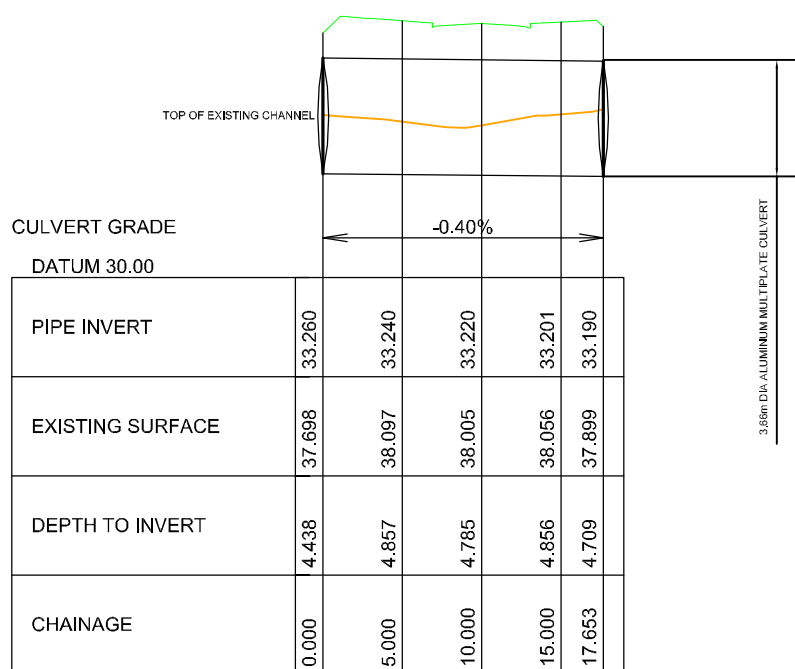
CULVERT A- CROSS SECTION
SCALE: Hz 1:500
V 1:500



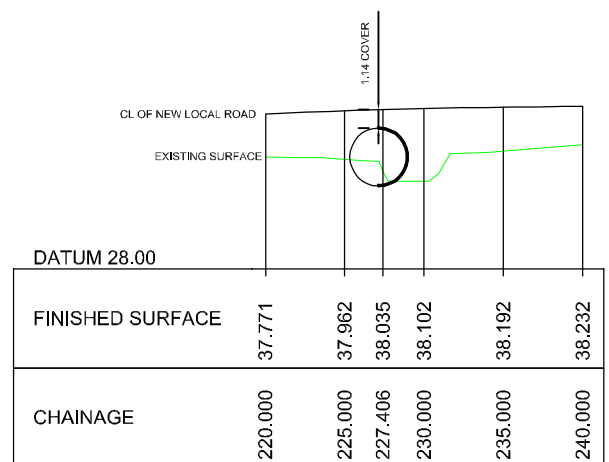
CULVERT B- LONG SECTION
SCALE: Hz 1:500
V 1:250



CULVERT B- CROSS SECTION
SCALE: Hz 1:500
V 1:500



CULVERT C- LONG SECTION
SCALE: Hz 1:500
V 1:250



CULVERT C- CROSS SECTION
SCALE: Hz 1:500
V 1:500

Note: Areas and Dimensions are subject to survey

03/02/12	1								
DATE	REV	REV RECORD		BY	CHD	VER	APP		



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Sheet Title
CULVERT LONG AND CROSS SECTIONS
Address
CUNNINGHAM LANE, OAKURA
Client
HOLDOM

Scale
AS SHOWN
Drawing No.
10003-V7
Date
03/02/2012
Job No.
10003
Sheet No.
01
A3
REV.
1

APPENDIX III WAIRAU ESTATE ACCESS CULVERT CALCULATIONS



Date	7/6/2019	Job No.	2351
By	K Jansen	Page No.	
Doc No.	CAL-2351-01		

STORMWATER CALCULATION WAIRAU ESTATE _ OAKURA

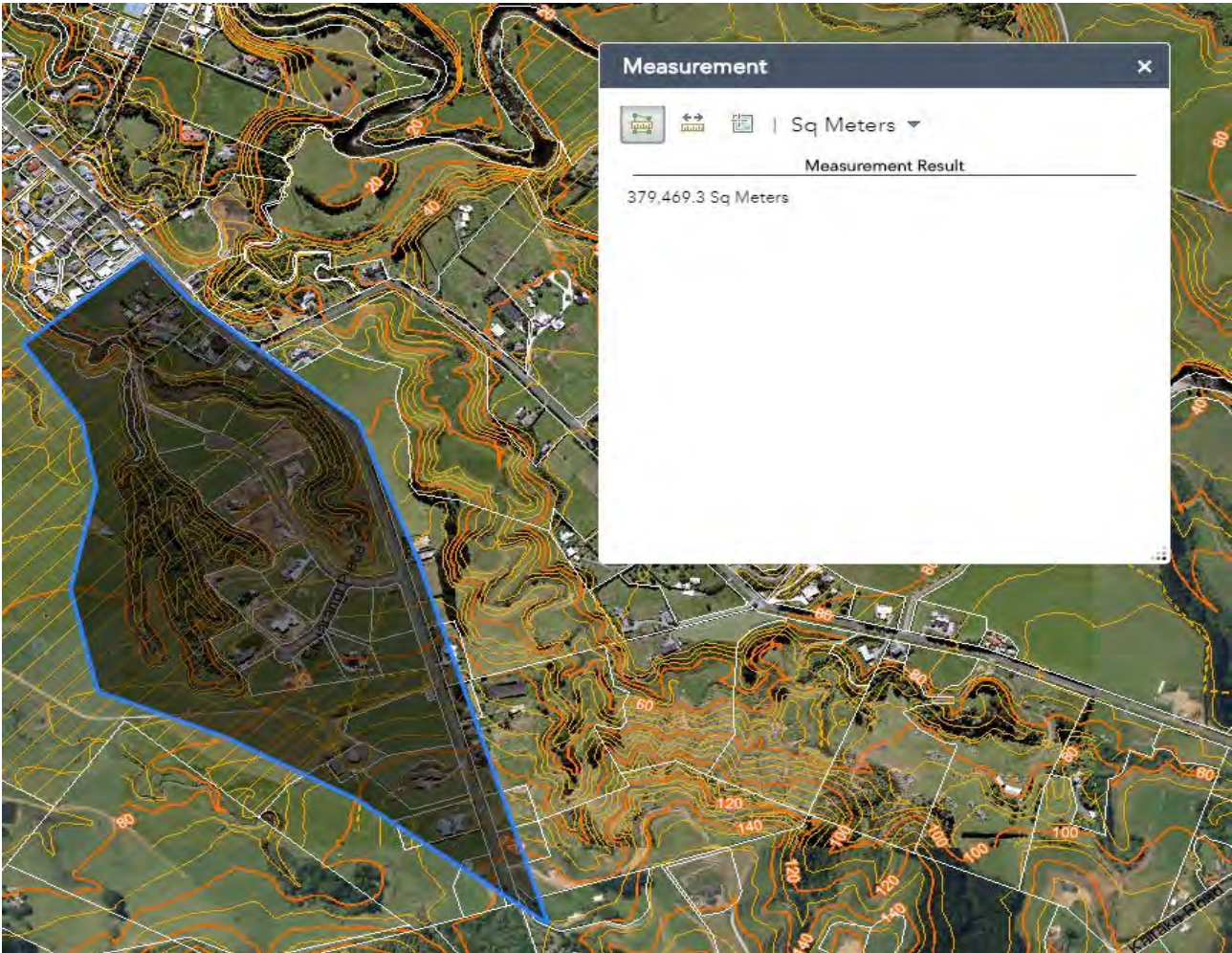
General Stream Characteristics

Stream Name

Catchment Area (A) Ha

Runoff Coefficient

Catchment Map

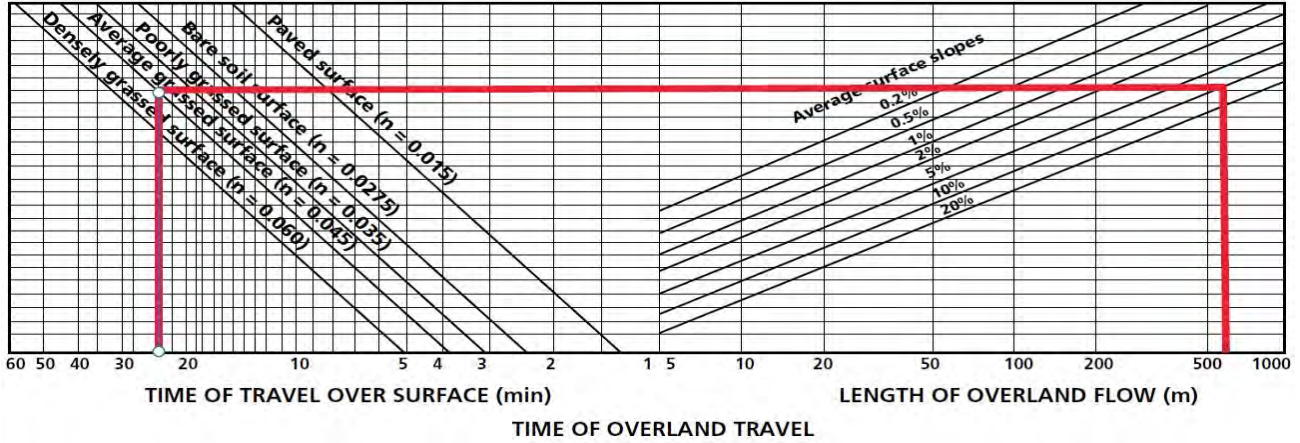




Date	7/6/2019	Job No.	2351
By	K Jansen	Page No.	
Doc No.	CAL-2351-01		

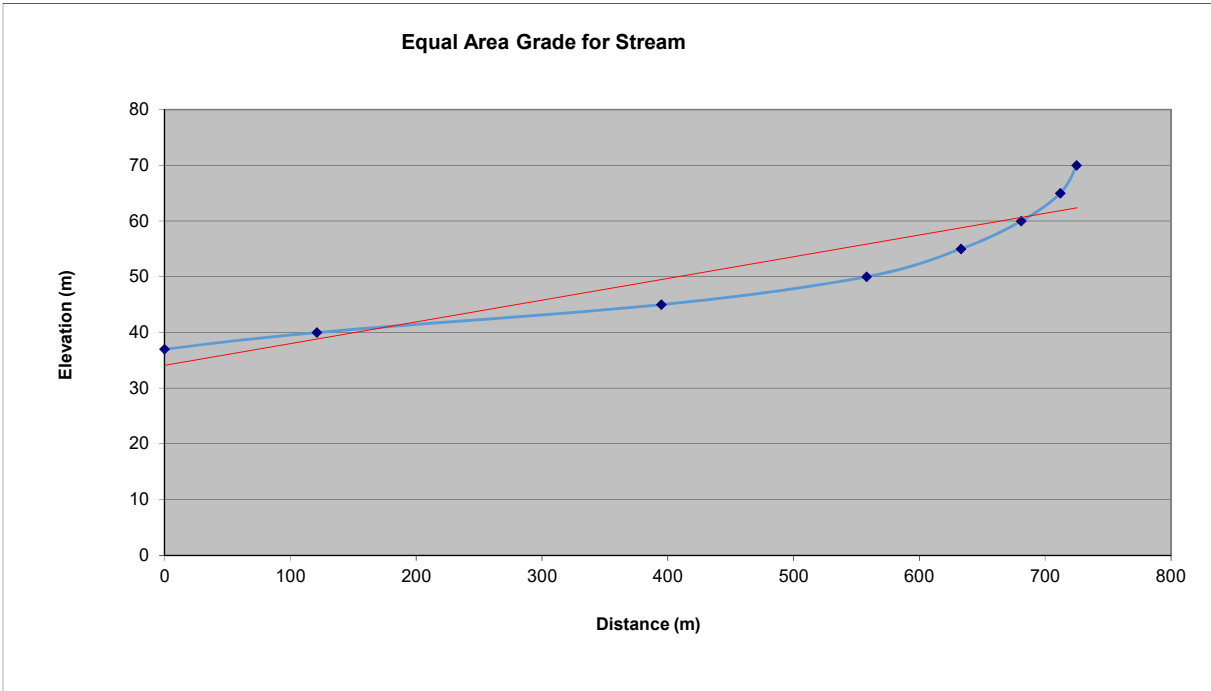
STORMWATER CALCULATION WAIRAU ESTATE _ OAKURA

Overland Flow



Equal Area Stream Gradient

Elevation	distance between contours	Total rise	Stream length	area under graph	Accumulated area	Average slope	
37	0	0	0	0	0	0	37
40	121	3	121	181.5	181.5	0.024793388	
45	274	8	395	1507	1688.5	0.021643967	
50	163	13	558	1711.5	3400	0.021839391	
55	75	18	633	1162.5	4562.5	0.022773273	
60	48	23	681	984	5546.5	0.023919648	
65	31	28	712	790.5	6337	0.025000789	
70	13	33	725	396.5	6733.5	0.025620927	
		-37	725	0	6733.5	0.025620927	55.57517241



AVERAGE SLOPE = 0.026 m/m



Date	7/6/2019	Job No.	2351
By	K Jansen	Page No.	
Doc No.	CAL-2351-01		

STORMWATER CALCULATION WAIRAU ESTATE _ OAKURA

Time of Concentration

Ramser-Kirpich Method		US Soil Conservation		Bransby-Williams		Rural Catchments	
Length (m)	725.00	Length (km)	0.73	Length (km)	0.73	Length (km)	0.73
$L^{0.77}$	159.39	L^3	0.38	$L^{1.2}$	0.68	42.05	
RL top	70.00	Height diff	33.00	Area(km ²)	0.38	Area(km ²)	0.38
RL bott	37.00	$0.87L^3$	0.33	$A^{0.1}$	0.91	$A^{0.1}$	0.91
RL diff	33.00	$0.87L^3/H$	0.01	H	33.00	Slope (m/km)	256.21
Sa	0.03	T.O.C. (hrs)	0.17	$H^{0.2}$	2.01	EAS ^{0.2}	3.03
$Sa^{-0.385}$	4.10			T.O.C(hrs)	0.35	2.751584728	
T.O.C(min)	12.74	T.O.C(min)	10.21	T.O.C(min)	21.29	T.O.C(min)	15.28

AVERAGE T.O.C. (min) = 14.88

AVERAGE T.O.C. (min) = 11.06

EXCLUDING RURAL CATCHMENTS

SELECTED T.O.C. (min) = 30

Rainfall Intensity

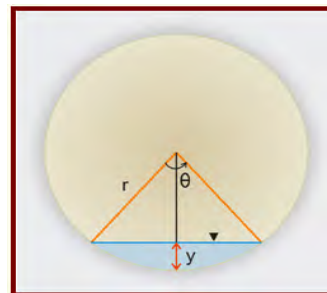
Source: HIRDS V3

ARI (years)	Rainfall Depth (mm)	Rainfall Intensity (mm/hr)	Flow (m ³ /s) $Q^* = CIA/360$
2	19.9	39.8	1.89
5	25.5	51	2.42
10	30.1	60.2	2.85
20	35.3	70.6	3.34
50	43.3	86.6	4.10
100	50.5	101	4.78

Culvert Design - Wairau Estate Bund Pipes

Pipe Diameter (D)	1.05	m
Flow Depth (y)	1	m
Bottom Slope (S)	1%	
Pipe Type	UPVC	
Manning's 'n'	0.013	
θ	5.40	rads
Flow Area (A)	0.85	m ²
Wetted Perimeter (P)	2.84	m
Hydraulic Radius (R)	0.30	m
Relative Depth (y/D)	0.95	
Froude Number	1.10	

Required Capacity (ARI)	10	
Discharge Demand (Q*)	2.85	
Discharge Capacity (Q)	2.933	m ³ /s
	Capacity OK	
Velocity (V)	3.45	m/s



$$Q = (1/n) A R^{2/3} S^{1/2}$$

$$V = Q / A$$

**APPENDIX IV NPDC PLANNERS REPORT – OAKURA REZONING PLAN
CHANGE - APPENDIX 7**

Appendix 7: Council Technical Assessment Advice

Content:

1. Council Technical Three Waters Advice

1A. Three Waters Technical Commentary – Plan Change 48 – Wairau Estate. New Plymouth District Council Three Waters Team. 19/12/2018.

1B. Three Waters Technical Commentary – Plan Change 48 – Wairau Estate. Addendum. New Plymouth District Council Three Waters Team. 31/05/2019.

2. Council Technical Landscape and Visual Impact Advice

2A. Wairau Estate, Oakura, Peer Review of Landscape and Visual Impact Assessment. Emma McRae. 13/02/2019.

2B. Comment on Bluemarble 'Response to Peer Review'. Emma McRae. 30/05/2019.

3. Council Technical Traffic Advice

3A. New Plymouth District Council Wairau Road Plan Change 48 Initial Check for Roading Matters. Graeme Doherty. 11/01/2019.

3B. New Plymouth District Council Wairau Road Plan Change 48 Initial Check for Roading Matters. Graeme Doherty. 28/05/2019.

4. Council Open Space and Parks Advice

4A. Plan Change 48: Parks and Open Space Planning considerations. New Plymouth District Council Parks and Open Spaces Team. 23/05/2019.

1. Council Technical Three Waters Advice

1A. Three Waters Technical Commentary – Plan Change 48
– Wairau Estate. New Plymouth District Council Three
Waters Team. 19/12/2018.



When replying please quote: ECM 7904729

19 December 2018

Boffa Miskell
Level 4
Huddart Parker Building
1 Post Office Square
WELLINGTON 6011

ATTENTION: Anna Steven

Dear Anna

THREE WATERS TECHNICAL COMMENTARY – PLAN CHANGE 48 – WAIRAU ESTATE

Please find below our response to your request for a technical commentary on Plan Change 48 – Wairau Estate Water, Wastewater and Stormwater services.

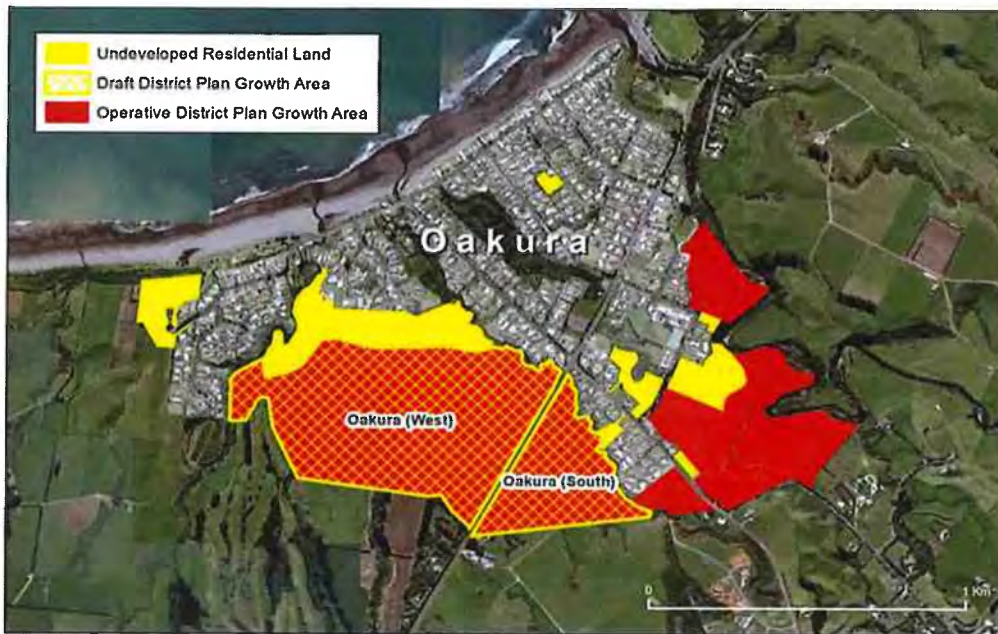
Growth Scenarios

There are areas of land within and around Oakura which are currently zoned residential but that are currently undeveloped. This includes areas of potential infill as well as greenfields areas. In addition large areas of land around Oakura have been identified as Draft District Plan Growth Area (Oakura (West FUD) and Oakura (South FUD)). Plan Change 48 proposes rezoning of Oakura South FUD and also incorporating an additional area of land outside the Draft District Plan Growth Areas adding an additional 248 sections.

The LTP and Infrastructure Strategy assumes 158 sections will be made available in Oakura south FUD in 2019/20 with further sections becoming available after 2028/29. The land availability is assumed to be that which is currently zoned residential or identified as Draft District Plan Future Growth (i.e. West FUD and South FUD) but does not include the areas identified by any private developers who are seeking private plan changes, i.e. if additional land is rezoned this is likely to have an impact of projected growth rates.

For planning purposes, growth in water and wastewater demand has been assumed to typically follow the increase in population based on StatsNZ's medium growth with high migration scenario. This means growth is a gradual annual increase spread out over the period in question. This is because council is unable to predict when any particular land owner is likely to develop existing zoned land or future potential rezoning.

A number of alternate scenarios have been considered, but ultimately the rate of population growth and the associated demand for Three Waters services cannot be easily predicted. Instead this report considers the cumulative demand that arises from land development, and the maximum population that can be serviced within the capacity of the existing water source, and existing or planned infrastructure.



For the purposes of this assessment it is assumed that the population served for water and wastewater are the same. It is also assumed that the resident population density is 2.28 persons per lot¹. The existing urban area, Undeveloped Residential Land and Draft District Plan Growth areas have been considered along with the additional land proposed by the applicant. For clarity the area shown in plain red above has not been considered as future growth, and no increase in lots within these areas has been included.

Water

Current Upgrades Included in the Infrastructure Plan

The Infrastructure plan upgrades have been based upon the latest projections provided by the NPDC planning team (these are regularly reviewed in light of actual development and as new information comes to hand such as revised population figures).

The current long plan includes the following:

1. Provision for a Water Treatment Plant upgrade at Oakura in response to the findings of the Havelock North Inquiry (this is based upon supplying the existing demand).
2. Provision for the construction of a new trunk water main, intended to service the previously identified future growth areas and to address the existing deficiency in firefighting provisions for the Oakura township.

The Infrastructure Strategy does not include any further infrastructure upgrades during the 30 year period.

¹ Source: Beca TM1.6 Demand Projections for Inglewood, Oakura and Okato Water Supplies

Existing Service Capacity

There are several parts of the existing water service infrastructure which could pose a potential limitation on the extent of development in Oakura. These must be reviewed to determine the impact of Plan Change 48.

Consented Abstraction Limit

Drinking water for Oakura is sourced from two bores. The consent allows for abstraction up to 35l/s from each bore or a combined abstraction of 43l/s between the bores. This allows a maximum abstraction of 3,715m³/day. However abstraction at these flow rates has not been tested and may not be sustainable.

WTP Capacity

The treatment plant is being upgraded to supply 3,500m³ per day.

Bore Pumps

One pump is installed in each of the bores. The pumps are of different sizes and result in different abstraction capacities. The maximum proven capacity of the bore pumps is 60m³/hr and 95m³/hr respectively giving a maximum potential capacity of 3840m³/day. The pumps are therefore sufficient to achieve the full consented abstraction and are not the limiting factor in meeting demand.

Reservoir Storage

The Oakura WTP has two reservoirs providing a total of 2,500m³ storage (each 1,250m³ in capacity). NPDC's standards require that 24 hours storage under average day demand or 8 hours at peak day demand is required to buffer daily variation in flow. This is to provide resilience in the event of interruptions to the water treatment processes and to provide a reserve for firefighting. This means that once the average day demand exceeds 2,500m³/day or peak day demand exceeds 7500m³/day then additional reservoir storage will be required.

Aquifer yield

Since at least 2010 the demand has not required pumping rates greater than 1,500m³/day in order to meet peak day demand. However, during bore commissioning, pumping tests were conducted taking water from both bores at combined rates of up to 2,506m³/day. The test data was analysed and the bore production reports indicated that *this* pumping rate was likely to be sustainable but higher rates were not and have not ever been fully assessed. NPDC is currently working on the consent renewal process for this water take, and further work will be undertaken to assess the sustainable yield of the bores and aquifer. This work is expected to take 2 – 3 years. Therefore we will not be able to confirm at this stage if higher flow rates are possible without more investigation work. The aquifer yield has been taken to be a maximum 2,506m³/day for the purposes of this assessment.

Reticulation Capacity / fire demands

The water reticulation in Oakura has been constructed over the last 60 years. During this time Oakura has increased in size and there is now significant additional land area identified as potential future urban development. As demand for water has increased the capacity of the water mains has been reached, and during peak summer demand some areas of Oakura have low pressures estimated to be below the agreed level of service. In addition, demand for firefighting has also been assessed and the majority of Oakura cannot be supplied with sufficient water to meet the target firefighting level of service (FW3). Consequently funding is

provided to design and construct a new trunk water main and additional reticulation upgrades to address these deficiencies. The design had been based upon the areas identified in the District Plan Growth areas (West FUD and South FUD), and to meet fire demand up to FW3 but not any land in addition to these FUD areas.

Impact of Plan Change 48

The provisions in the LTP above have been based upon the StatsNZ growth scenario assuming a gradual annual population increase. If this growth rate is accelerated or step changes in population connected occur due to large developments coming on to market then the need for upgrades may be brought forward.

Under the StatsNZ population growth scenario average day demand can be met within the existing capacity limitations, and peak day demand does not exceed any treatment limitation until 2046/47. At this point the projected abstraction exceeds the estimated aquifer yield, but further testing and analysis is being undertaken as part of the consent renewal process to better understand the ultimate aquifer yield. If it is proven that the aquifer has sufficient capacity peak day demand could be met within current consented abstraction through to 2064/65

An area of land in and around Oakura is already zoned residential. This land is expected to yield 127 infill lots and 175 new lots. As this land is already zoned NPDC has an obligation to provide services to this land.

Plan Change 48 seeks to rezone additional land identified by NPDC as South FUD plus an additional area. The applicant indicates an expected yield of 151 lots within South FUD and 248 lots within the additional area totalling 395 lots. Using an occupancy rate of 2.28 persons per lot, the peak day demand from the existing zoned undeveloped residential land and the South FUD is able to be met from the existing proven aquifer capacity. Rezoning of the additional 248 lots beyond South FUD increases the peak day demand above the proven aquifer capacity and there is no certainty that the demand could be met. The maximum number of additional lots which could be serviced in addition to the expected number of lots in the South FUD is 165, i.e. less than the 248 lots proposed. Also if South FUD and the extra 165 lots are approved, then rezoning of west FUD could not be supported as this would further increase peak day demand beyond the current proven aquifer capacity.

Further aquifer testing is planned. If the testing proves that the consented abstraction can be achieved sustainably, then it would be possible to rezone all of the FUD areas and the additional 248 lots and meet peak day demand within the current consented abstraction. However the aquifer capacity is currently not certain.

Reticulation capacity

The applicant's feasibility report states that the new trunk main has ample capacity to service the additional lots proposed by the plan change. The report appears to overlook the need for this trunk main to also supply the township and its fire demand.

The applicant's report states that a fire supply of FW2 can be provided. The NPDC target level of service is currently FW3 to address development permitted under current District Plan rules for residential areas. If the plan change is approved under the proposed district plan this concern would be alleviated.

Firefighting demand is assessed concurrent with 60% of the peak day demand. This proposed plan change increases the peak day demand due to additional sections. The overall increase in flow exacerbates any issues with pressure and has not been allowed for in the trunk main design. It is unclear in the applicant's report how this fire demand was assessed. It appears to have omitted demands other than from the proposed plan change area.

Water pressure is assumed by the applicant to be acceptable based on an elevation difference. This assessment does not take into account the friction losses within the reticulation. Friction losses increase exponentially with velocity and hence with demand and the proposed plan change increases the demand above that which was envisaged when the trunk main was designed. The plan change also proposes a greater number of lots at a higher elevation than envisaged in the currently defined South FUD area. Additional head loss due to the increased flow and lots at higher elevation are likely to lead to low pressure issues for some of the proposed plan change area.

The trunk main has been sized on the basis of meeting demand from the areas previously identified for future urban development and to meet fire demand in the existing township. The plan change proposes an additional 248 lots which were not considered in the trunk main design. The overall demand on the trunk main under peak flow and fire demands would need a detailed assessment to confirm the extent of potential pressure issues. The upper sections of the trunk main have already been constructed. Additional demand due to the extra lots proposed by the applicant may also result in capacity limitations which impact the ability to supply the land within West FUD. If the additional 248 lots are approved consideration of the total demand and capacity of the constructed trunk mains will need to be reconsidered and will be a factor in the decision on future rezoning of land identified as West FUD

Protection of aquifer recharge

Since the Havelock North campylobacter outbreak and the subsequent Inquiry there has been a significant increase in the consideration of risk arising from land use and a significant drive to improve the protection of source water. Ground water is particularly challenging, especially given the extents of the aquifer and its recharge path are generally poorly understood. However, it is considered that any activity which introduces potential pathogens into the soil and hence to the groundwater presents a risk of contamination. NPDC would therefore not support the use of septic tanks on any properties in the near vicinity of the bores. It is acknowledged that the latest revision of the applicant's report indicates that all lots will be connected to the reticulated sewer. NPDC supports this and would require that this become a condition if the plan change is approved

Wastewater

Currently planned upgrades

There are currently no upgrades planned for the Oakura sewer system.

There are no specific projects identified in the Infrastructure Strategy which relate to Oakura. However the Strategy includes a total budget of \$17.9M for overflow prevention over the 30 year period (this is across the whole district, not just Oakura). The only major project identified is Smart Rd sewerage, with a budget of \$12.5M. The remaining \$5.4M spend is not detailed in the Strategy.

Existing Service Capacity

The wastewater produced by residents of Oakura is collected by a reticulated sewer system which terminates at Shearer Reserve pumping station. From this facility sewage is pumped to Corbett Park Pump station, where the pressure is boosted to continue pumping through to the New Plymouth sewer reticulation and on to NP WWTP. The pump capacity at Corbett Park must match the pump capacity at Shearer Reserve to allow the pressure boosting and overall capacity to be maintained. The pump station has a capacity of 25 l/s per pump train.

Storage was constructed at Shearer Reserve to mitigate overflows in the event of service interruptions at Shearer Reserve or Corbett Park.

Infrastructure Capacity

Corbett Park pumps / rising mains

Four pumps are installed which operate as two in series pump trains to boost pressure by 140 – 160m. The series arrangement enables a combined flow of 25l/s to be pumped by one train with the second train providing redundancy. The design incorporated provision to install a third train, so that when flows increased two trains could operate in a duty / assist arrangement, with the third train providing 50% redundancy at ultimate development. Two rising mains were installed. The ultimate capacity of the pumps and rising mains is 50l/s.

Shearer Reserve pumps / rising mains

Two pumps are installed which pump sewage to Corbett Park booster pump station. Each pump enables a flow of 25l/s to be pumped with the second pump providing 100% redundancy. The design incorporated provision to install a third pump, so that when flows increased two could operate in a duty / assist arrangement, with the third pump providing 50% redundancy at ultimate development. Two rising mains were installed. The ultimate capacity of the pumps and rising mains is 50l/s

For the purposes of this assessment it has been assumed that once the flow exceeds pump capacity, this will trigger the upgrades at Shearer Reserve and Corbett Park to install the third pump sets.

Storage

Shearer Reserve was constructed with 500m³ of storage. This provides emergency storage in the event the pumps are unable to discharge to New Plymouth.

Reticulation Capacity

The Oakura Sewer scheme was designed between 2006 and 2008 and constructed in 2010. The design included an allowance for future growth. As a result sewers were designed with capacity to accommodate an increase in flow. In addition the NPDC Code of Practice sets a minimum size for public sewers. The capacity of a pipe is dependent on diameter and gradient. These factors combine so that the gravity sewers in Oakura typically have significant capacity to accommodate additional flows.

Impact of Plan Change 48

Under the StatsNZ population growth scenario peak dry weather flow can be met within the existing pump capacity limitations until 2054/55. Peak wet weather flow could be managed within the original design concept of diverting up to 12.5l/s to storage until 2041/42. At this point an upgrade to the pumping stations would need to be made and this would provide sufficient pumping capacity to meet wet weather demands through to 2064/65.

An area of land in and around Oakura is already zoned residential. This land is expected to yield 127 infill lots and 175 new lots. As this land is already zoned NPDC has an obligation to provide services to this land. The average dry weather flow and peak dry weather flow remain well within the capacity of the existing pump installation and peak wet weather flows would require buffering up to 9l/s in the emergency storage

Plan Change 48 seeks to rezone additional land identified by NPDC as South FUD plus an additional area. The applicant indicates an expected yield of 151 lots within South FUD and 248 additional lots totalling 395 lots. Using an occupancy rate of 2.28 persons per lot, the peak day dry weather flow from the existing zoned undeveloped residential land and the South FUD is able to be met within the existing installed pump capacity but peak wet weather flows will result in flow buffering requirement in excess of 12.5l/s.

Rezoning of the additional 248 lots beyond south FUD increases the peak dry weather flow to near the existing installed pump capacity and increases the peak wet weather flow to a point where a pump upgrade would be required.

The pump upgrades triggered by the additional lots provides sufficient additional capacity which would allow the rezoning of West FUD which would result in sewer demands which at the ultimate design capacity of the Oakura sewer scheme. If the additional 248 lots identified by the applicant were not rezoned, then the rezoning of West FUD would trigger the requirement for the pump upgrade

Reticulation capacity

The applicant has confirmed that there are no known reticulation capacity issues with this plan change.

Stormwater

Currently planned upgrades

There are currently no upgrades planned for the Oakura stormwater system.

Existing Service Capacity

A number of streams originating in the rural area, including the Kaitake ranges, drain through the urban area. Except for culverted road crossings these streams are generally retained as open channels. Stormwater services are currently provided by way of a piped reticulation system to collect stormwater from urban roads and to convey this through a piped network to existing streams.

Infrastructure Capacity

There are a small number of areas where stormwater capacity is limited, most notably in relation to the proposed plan change, the culvert beneath SH45 by Wairau Rd intersection is undersized causing a localised area to pond during heavy rain.

Impact of Plan Change 48

Urban development reduces permeable area and consequently increases the rate and volume of run off which drains to streams. This increases peak flow in the streams which can lead to increased flooding if channel capacity is limited and increased erosion of the stream bed and banks. NPDC promotes stormwater management to mitigate these impacts by requiring

individual lots to direct stormwater to ground water through soakage, and stormwater attenuation to control peak flow in the receiving environment

The applicant has identified that the ground conditions are suitable for soakage for stormwater disposal from individual lots. The applicant has also proposed retaining stream channels and identified a number of areas that could be utilised to provide stormwater attenuation.

The applicant has stated a total volume available has been indicated across a number of ponds in series. The total volume is not available for storage as flow cascades from one pond to the next. However based on the calculations provided the volume available in the downstream pond is sufficient to attenuate the flow. A suitable detail design is required from the applicant to mitigate the increase in runoff and associated peak flows.

Provided the attenuation required is provided within this development it is considered unlikely that properties located downstream of the State Highway crossing will be affected by any increased flooding from the Plan Change 48 area. The new development must be required to attenuate run off adequately to avoid this existing ponding upstream of the State Highway from being increased.

Whilst the attenuation can control peak flow it does result in a peak flow which will persist for longer as the additional stored volume of run off is drained from the pond over a longer period of time. The impacts of a longer peak flow on the existing stream bed and banks is unknown. The application must advise if this presents a risk of erosion.

Summary

The proposed plan change presents some risk to the ability of the Three Waters infrastructure to meet demand. Current infrastructure improvement plans have been based upon forecast growth based on the StatsNZ growth scenario based upon Stats NZ medium growth rates with high migration. This in turn has been based upon historical growth which has been limited by the actual availability of land for development. We believe this plan change will increase the rate of growth in this town and result in infrastructure improvements being needed faster than currently budgeted for.

The applicants sales projections are unknown and the assessment of impacts are based on assumed ultimate demand from the various areas of land identified for future development.

Water Supply

Known water supply limitation will be reached if proposed plan change 48 is approved. Average day water demand can continue to be met however known aquifer yield will be exceeded by peak day demand generated by the development of the existing zoned area and the applicants proposed additional development.

It is not known if the aquifer is capable of sustaining abstraction at a greater rate than the current known yield but NPDC are assessing this as part of the abstraction consent renewal process. This process is expected to take a further 2 – 3 years.

If the aquifer is unable to support abstraction greater than the currently proven 2506m³/day then the additional 248 lots cannot be fully developed and the future rezoning of West FUD cannot be supported.

Wastewater Supply

The wastewater system in Oakura is able to accommodate the additional demand generated by the development of the existing zoned residential land and the development proposed by the applicant. In order to fully service the additional 248 lots, an upgrade to the existing pump stations at Shearer Reserve and Corbett Park will be required. This upgrade will require installation of a third pump at Shearer Reserve and a third train at Corbett Park along with an electrical upgrade to the main transformer. Once these upgrades are completed, then the pump stations would have sufficient capacity to support the future development of West FUD

Proposed plan change 48 includes some larger lifestyle blocks which would have sufficient land area to consider wastewater disposal by septic tank rather than to reticulated sewer. The applicant has accepted that this would be inappropriate given the lots are situated above the Oakura water supply groundwater aquifer, and has proposed that these lots be provided with reticulated sewer connections. If approved, the plan change should include a condition which requires all lots to be connected to the reticulated sewer.

Stormwater

The applicant has identified that the ground conditions are suitable for individual lots to dispose of stormwater to soakage. The applicant has also proposed retaining stream channels and identified a number of areas that could be utilised to provide stormwater attenuation. These requirements should be a condition of any plan change and suitable detail design is required from the applicant to mitigate the increase in runoff and associated peak flows.

Whilst the attenuation can control peak flow it does result in a peak flow which will persist for longer as the additional stored volume of run off is drained from the pond over a longer period of time. The impacts of a longer peak flow on the existing stream bed and banks is unknown and the applicant should be required to present further information on the risk of erosion.

Yours faithfully



Mark Hall
MANAGER THREE WATERS

1B. Three Waters Technical Commentary – Plan Change 48
– Wairau Estate. Addendum. New Plymouth District
Council Three Waters Team. 31/05/2019.

Anna Stevens

From: Mark Hall <Mark.Hall@npdc.govt.nz>
Sent: Friday, 31 May 2019 4:49 PM
To: Anna Stevens
Cc: Hamish Wesley; Graeme Pool
Subject: Addendum to Three Waters Technical Commentary Plan Change 48 Wairau Estate

Hi Anna

Since the Three Waters Technical Commentary on Plan Change 48 was issued on 19 December 2018, the estimates for the number of lots which can be developed in existing residentially zoned land and the South FUD have been modified as below:

- Number of lots in existing vacant residential zone land has reduced from 175 to 158
- Number of lots in South FUD land has reduced from 151 to 117 (we note that this number is different and less than the number in the application).

This proposes less lots than previous estimates. However the number of lots is still higher than the capacity of our water supply.

The limiting factor for the water supply is the aquifer yield. This limits total residential lots to 1,279 lots. Provided development occurs in a logical manner then it doesn't matter where these lots are placed so long as the total is limited to 1,279.

Mark Hall

Manager Three Waters

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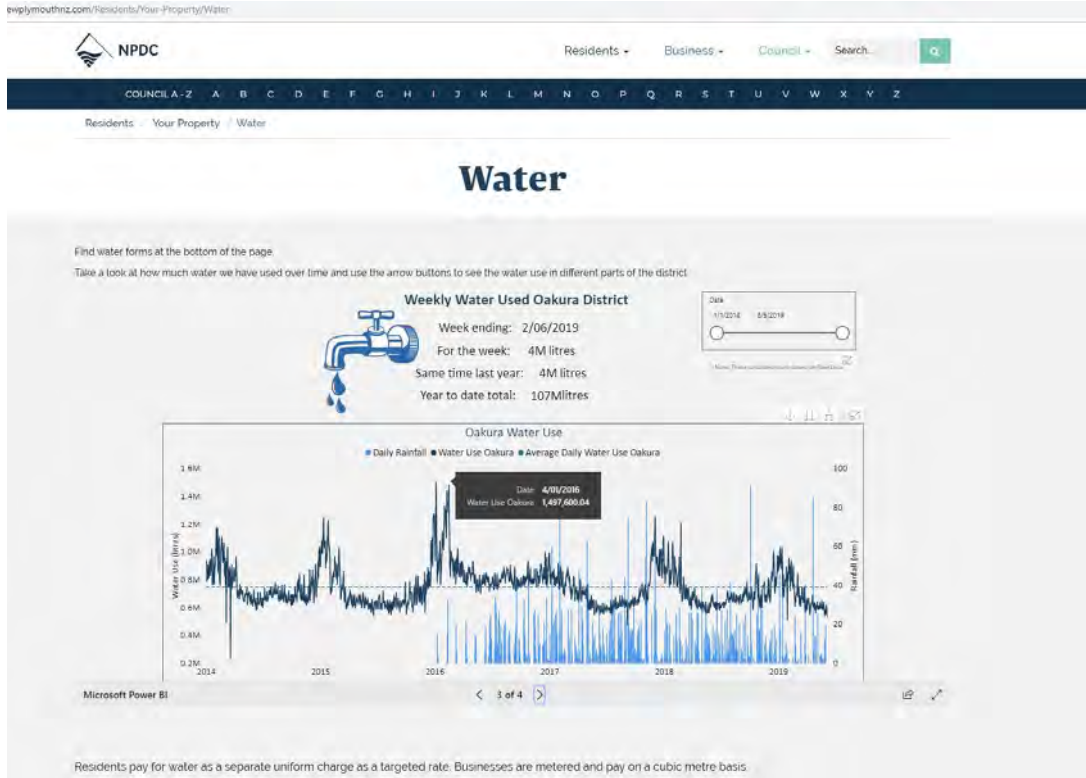
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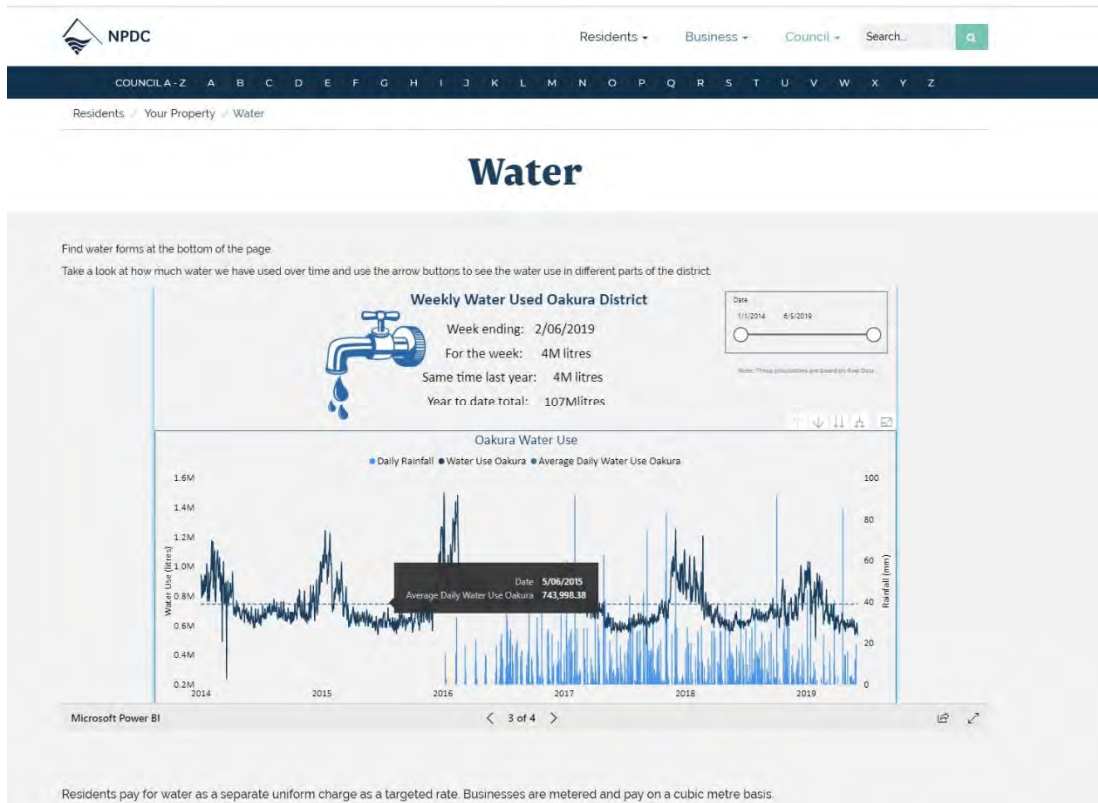
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APPENDIX V OAKURA WATER USAGE



OAKURA MAXIMUM WATER USAGE



OAKURA AVERAGE WATER USAGE