Finance/Performance Committee Meeting

Order Paper

Thursday, 28 June 2018, 9.30 am

Council Chamber, Rangitīkei District Council
46 High Street, Marton

Website: www.rangitikei.govt.nz **Email: info@rangitikei.govt.nz**

Telephone: 06 327-0099 Facsimile: 06 327-6970

Chair
Cr Nigel Belsham

Deputy Chair
Cr Lynne Sheridan

Membership
Councillors Cath Ash, Dean McManaway, Graeme Platt, Ruth Rainey and Dave Wilson
His Worship the Mayor, Andy Watson (ex-officio)

Please Note: Items in this agenda may be subject to amendments or withdrawal at the meeting. It is recommended therefore that items not be reported upon until after adoption by the Council. Reporters who do not attend the meeting are requested to seek confirmation of the agenda material or proceedings of the meeting from the Chief Executive prior to any media reports being filed.

Rangitīkei District Council

Finance and Performance Committee Meeting

Agenda – Thursday 28 June 2018 – 9:30 AM

Contents

Committee The quorum for the Finance and Performance Committee is 4

Council's Standing Orders (adopted 3 November 2016) 10.2 provide: The quorum for Council committees and sub-committees is as for Council, i.e. half the number of members if the number of members (including vacancies) is even or a majority if the number of members is odd.

1 Welcome

2 Council Prayer

3 Apologies/Leave of Absence

4 Members' Conflict of Interest

Members are reminded of their obligation to declare any conflicts of interest they might have in respect of items on this agenda.

5 Confirmation of order of business

That, taking into account the explanation provided why the item is not on the meeting agenda and why the discussion of the item cannot be delayed until a subsequent meeting, …… be dealt with as a late item at this meeting.

6 Chair's Report

A report is to be tabled at the meeting.

File ref: 3-CT-14-1

Recommendation:

That the Chair's Report to the Finance/Performance Committee meeting on 28 June 2018 be received.

7 Minutes of Previous Meeting

The minutes from the Finance/Performance Committee meeting held 31 May 2018 are attached.

Recommendation:

That the Minutes of the Finance/Performance Committee meeting held on 31 May 2018 be taken as read and verified as an accurate and correct record of the meeting.

8 Progress with strategic issues

Advocacy by His Worship the Mayor (including Ministerial discussions) has continued for unlocking the Māori land-locked land in the north of the District.

The Hunterville/Tutaenui rural water pre-feasibility study is complete.

Progress continues with the proposed new civic/community centres in Bulls and Marton.

Consideration was given by the Policy/Planning Committee's meeting on 13 July 2017 to services provided by information centres (with a further report to Council's meeting on 27 July 2017).

Two workshop discussions have been held on economic development and District promotion and a potential budget envelope identified. A draft policy on using the legislative provisions for development agreements to incentivise housing and other developments was considered at the Finance/Performance Committee's October meeting and a revised draft considered at meeting in January 2018. A further workshop session will be held on 19 July 2018. Priorities for economic development were one of the key choices in the Consultation Document for the 2018-28 Long Term Plan. The Government's Provincial Growth Fund (announced in February 2018) is a potentially significant mechanism to stimulate development and growth in the Rangitīkei.

Council submitted to the Horizons Regional Council long-term plan supporting the proposed establishment of a regional facilities fund. However, there were varying responses from other councils so the proposal will not proceed.

In March 2018, Chorus advised an accelerated timetable for the roll-out of fibre in Rātana/Whangaehu, Marton, Mangaweka, Hunterville, Taihape and Bulls, to be completed by June 2022.

Rates modelling is part of the new financial modelling software which has been used as the basis of preparing the financial statements for the 2018-28 Long Term Plan.

The review of the revenue and financing policy is complete and included in the draft Long term Plan – analysis of all expenditure activities has now been undertaken in Council workshops.

Impact of forestry on roading has been considered in the roading asset management plan and in developing the Traffic and Parking Bylaw.

The Independent Assessment Board released its report on the Council's operations under the Local Government Excellence Programme. Actions to effect the suggested improvements are in progress.

MW LASS collaboration has been used to provide insurance cover for below-ground infrastructure assets from 1 July 2017

Staff are continuing to manage the Rangitīkei.com website.

9 Monthly financial report

A memorandum is attached.

File ref: 5 FR-4-1

Recommendation:

That the 'Financial Highlights and Commentary – May 2018' to the Finance/Performance Committee on 28 June 2018, be received.

10 EECA audit of power use

A memorandum is attached.

Recommendation:

That the report ' EECA Energy Audits HRWS, Marton Swim Centre, MWWTP and TWWTP' be received.

11 Update from Subdivision Group

A verbal update will be provided.

12 Late Items

13 Future Items for the Agenda

14 Next Meeting

Thursday, 26 July 2018, 9.30 am

15 Meeting Closed

Attachment 1

Rangitīkei District Council

Finance and Performance Committee Meeting

Minutes – Thursday 31 May 2018 – 9:30 AM

RANGITIKEI DISTRICT COUNCIL

Contents

Present:	Cr Nigel Belsham Cr Cath Ash Cr Dean McManaway Cr Graeme Platt Cr Ruth Rainey Cr Lynne Sheridan Cr David Wilson His Worship the Mayor, Andy Watson
Also Present:	Cr Richard Aslett Cr Jane Dunn Cr Angus Gordon
In attendance:	Mr Ross McNeil, Chief Executive Mr Michael Hodder, Community & Regulatory Services Group Manager Mr George McIrvine, Finance & Business Support Group Manager Mr Ashley Dahl, Financial Services Team Leader Ms Nardia Gower, Governance Administrator
Tabled Documents	**Item 7** Chair's Report Item 10 Nine month Statement of Performance

1 Welcome

The meeting started at 9:35 and the Chair welcomed everyone to the meeting.

2 Council Prayer

Cr Rainey read the Council Prayer.

3 Apologies/Leave of Absence

Nil

4 Members' Conflict of Interest

Members were reminded of their obligation to declare any conflicts of interest they might have in respect of items on this agenda.

There were no declared conflicts of interest

5 Confirmation of order of business

There was no scheduled change to the order of business.

6 Minutes of Previous Meeting

Resolved minute number 18/FPE/103 File Ref

That the Minutes of the Finance/Performance Committee meeting held on 26 April 2018 be taken as read and verified as an accurate and correct record of the meeting.

His Worship the Mayor / Cr Wilson. Carried

7 Chair's Report

The Chair took his tabled report as read highlighting the last paragraph and noting the last attachment in the order paper: an invite to the Local Government Funding Agency Shareholder Borrower Day which the Chair and Mr McIrvine will be attending. This invite is open to all Committee members.

Resolved minute number 18/FPE/104 File Ref 3-CT-14-1

That the Chair's Report to the Finance/Performance Committee meeting on 31 May 2018 be received

Cr Belsham / Cr McManaway. Carried

8 Progress with strategic issues

The Committee noted the commentary in the agenda.

9 Financial Highlights and Commentary – April 2018

Mr McIrvine spoke to the report. The main points discussed were:

Staff will take the carry forwards as near as possible to the end of the financial year for more accurate carry forwards amounts.

Replanting logged land is influenced by New Zealand's Emissions Trading Scheme. There are Government directed thresholds on the size of area of that requires replanting following harvest to avoid payment of New Zealand Units. The Council-owned logged area at Duddings Lake falls below that threshold. The harvested site of Marton B & C Dams is over the threshold and has a planting programme drafted to address the requirements under the scheme.

The Ministry of Health is providing councils with information pertaining to PFAS contamination to land and water. With regards to the observed contamination of the Bulls water supply, advice from the Ministry of Health has confirmed these low levels present no public health risk. Interim guidelines have been developed which set maximum levels for the presence of PFAS in drinking water. However, one Committee member noted that these levels set by New Zealand are lower than the international levels deemed safe. PFAS tests that are used in the United States of America differ from that currently used by New Zealand specialists.

It was noted that it is premature to speculate on having to find an alternate water source for Bulls as the investigation process on the source of the PFAS contamination is incomplete. Should an alternative water source be required, Council will be given options to work through.

The work completed by the Hunterville Community Trust on that town's swimming pool was commended; they raised $160,000 in the last three years. Included in the upgrade is a filtration system, with suitable buildings for chemical storage. Next on the list is an upgrade to the changing room. Council staff have been working with the Trust to meet the health and safety requirement for storing and managing hazardous chemicals used in the pool.

His Worship the Mayor noted the recent major slip on Pohonui Rd was of a similar scale to the 2015 slip. The Committee discussed potential reasons and responsibility for land slips, noting the 'spray and pray' method of farming as one possible contributing factor, and suggesting further discussions with Horizons on the matter.

The $33,000 committed expenditure to date on the Mangaweka toilets was queried, looking for clarification how that related to the project budget. It was noted that the resource consent will probably go to a hearing due to an objection.

The reported purchase price of 7 King St shows the GST exclusive amount. The full purchase price will be reflected in next month's report.

Undertaking **Subject**

That the Assets/Infrastructure Committee be informed on how repairing the slip-damaged Pohonui Road will be funded.

Undertaking **Subject**

That the Assets/Infrastructure Committee be provided with a breakdown of expenditure on the Mangaweka Village toilet project.

Resolved minute number **18/FPE/105** **File Ref** **5 FR-4-1**

That the 'Financial Highlights and Commentary – April 2018' to the Finance/Performance Committee on 31 May 2018, be received.

Cr Sheridan / Cr McManaway. Carried

10 Nine Month Statement of performance

Mr Hodder spoke to the tabled report.

A discussion took place on how progress with other projects is to be shown alongside progress with the projects set out in the Annual Plan. The Statement of Performance reports on actual spend covering all expenditure in those activities but the report only addresses projects set out in the Annual Plan, so ignores other projects undertaken during the year. Re-prioritised and additional projects are signalled to Council through the monthly reports to the Assets/Infrastructure Committee.

The Chief Executive noted a conundrum: the day that Council adopts the annual plan is the only day the budget is accurate in terms of specified projects. The quarterly reports are, by default, 2 months old. To address this, the mechanism to report on capital works is through Assets/Infrastructure reports, which results in a double reporting issue.

The report only shows water contamination that government prescribed to report against. Other forms of water contamination can be flagged in the full year report.

Potential reasons for the increased percentage in both waste to landfill and waste diverted to landfill were discussed as being difficult to determine. The increase in landfill tonnage may be partly caused by the turnover of properties and the clearing out typically associated with such sales. Out-of-District people may also be going to Rangitikei's waste transfer stations. The 16% diversion target was set prior to the addition of the green waste collection service.

Discussion took place on how the performance framework was set. Some of the measures are 'mandatory' (i.e. set by the Government, but the others are at Council's discretion. Changing the latter is feasible although that needs to be balanced against the advantage of having year-on-year comparisons. It was suggested additional measures that track specific activities within libraries would be more useful from a service planning perspective than the current door count reporting.

Undertaking **Subject**

That the Assets/Infrastructure Committee be informed of all stormwater projects undertaken during the year compared with what was specified in the 2017/18 Annual Plan. (This will clarify the meaning of the 8% achievement in the nine-month Statement of Service Performance.)

Undertaking **Subject**

That the Solid Waste Officer collate anecdotal information on the use of transfer stations by out of district users and provide to the Assets/Infrastructure Committee.

Resolved minute number **18/FPE/106** **File Ref**

That the 'Nine Month Statement of Service Performance' report to the 31 May Finance/Performance meeting be received

Cr Sheridan / Cr Rainey., Carried

Cr Ash left at 10.05 – 10.09 am
Cr McManaway left at 10:16, returned 10:17 am
Cr Dunn arrived at 10:22 am
Cr Gordon left at 10:36, returned 10:38 am

11 EECA audit of power use

The draft reports on (Marton Swim Centre, Marton Wastewater Treatment Plant, Taihape Wastewater Treatment Plant, Hunterville Rural Water Supply) have been received for comment by relevant staff. A commentary and specific recommendations will be provided to the committees June meeting.

A verbal update on the Hunterville Rural Water Supply noted that the main issues causing power usage were constant water leaks. New lines have been installed and recently switched on. A drop in water pump usage has already been noted, which will in turn reduce the electricity cost.

Further electricity reductions have confirmed the course of action adopted in redesigning the pump stations. Mr van Bussel will attend the June Finance/Performance meeting.

Cr Aslett arrived at 10.39 am.

12 Questions put at previous meetings for Council advice or action:

The Committee noted the commentary in the agenda.

13 Update on subdivision working group

One of the two potential subdivisions in Bredins Line (Marton) is being actioned, with eight sections as the initial stage. Issues arose due to the site having previously contained glasshouses; soil contamination testing is required and is underway. The site has potential for further subdivision based on the success of the initial stage.

The second subdivision on Bredins Line has not been progressed.

14 Late Items

Nil

15 Future Items for the Agenda

Nil

16 Next Meeting

Thursday, 28 June 2018, 9.30 am

17 Meeting Closed

10:46 am

Confirmed/Chair: _____

Date:

Attachment 2

MEMORANDUM

TO:	Council
FROM:	George McIrvine
DATE:	15/06/2018
SUBJECT:	**Financial Highlights and Commentary – May 2018**
FILE:	5-FR-4-1

Statement of Financial Performance:
Overall

1. Total Revenues are below budget by $669k YTD (Year to Date) contributing activities were;
    a. Community & Leisure Assets revenue below budget by $1.289M being funding not yet received.
    b. Community & Wellbeing revenue is below by $103k on budget.
    c. Other activities were up on budget by (net) $723k.

2. Total Rates Revenue overall is above budget with the net position being $392k. The Investment amount reflects the treatment in the prior period where the rates instalments were not apportioned on a monthly basis and an accrual is now completed.

3. Internals
    a. Both Recoveries and Charges are lower than budget by $758k. Activities contributing to this amount were Community and Leisure Assets , Water and Wastewater

4. Expenditures
    a. Overall expenditure is above budget by $136k contributing activities $50k and greater were;
    b. Community Leadership, below by $88k
    c. Community & Leisure Assets, below by $265k
    d. Water and Wastewater, below by $741k.
    e. Other activities, below budget totalled $220k
    f. Roading and Footpaths above budget by $822k. $143K is attributed to expenditure incurred for the Flood Damage April 2017 event.

5. Operating surplus
    a. Operating surplus is below budget by $414k.

6. Statement of Financial Position:
    a. Council continues to maintain a strong Current Asset position, the total is $2.412M higher than June 2017.

7. Non-Current Assets
    a. Fixed Assets
    b. Show a reduction in the balance of fixed assets by $9.11M which reflects 11 months depreciation provision on council assets.

8. Capital and Renewal
    a. Shows a $10.53M spend which will be capitalised at the end of the 2017-18 financial year into fixed assets.
    b. Current spending overall is tracking at 38% of the Full Year Budget after 11 months completion of the financial year.

9. Roading and Footpaths spend is tracking at 72% of the Full Year Budget. NB with year end imminent we have not included carry forwards and open purchase orders.

10. Water and Wastewater spend is tracking at 27% of the Full Year Budget.

11. Rates Debtors
    a. Rates debtors are shown per the 6 months overdue trend chart.

12. Treasury
    a. Funds held in May 2018 for immediate needs totalled $9.69M

13. $4.0M was placed on Term Deposit with Westpac per;
    a. Investment # 43 for $2.0M for 28 days at 2.21% maturing on 22/06/2018
    b. Investment # 44 for $1.0M for 180 days at 3.51% maturing on 24/10/2018
    c. Investment # 45 for $1.0M for 364 days at 3.49% maturing on 27/04/2019

14. Properties sold in the district to date 512 with a number pending for settlement at end of June 2018.

15. Future items

    a. Year end accounts plan and preparation is well advanced.

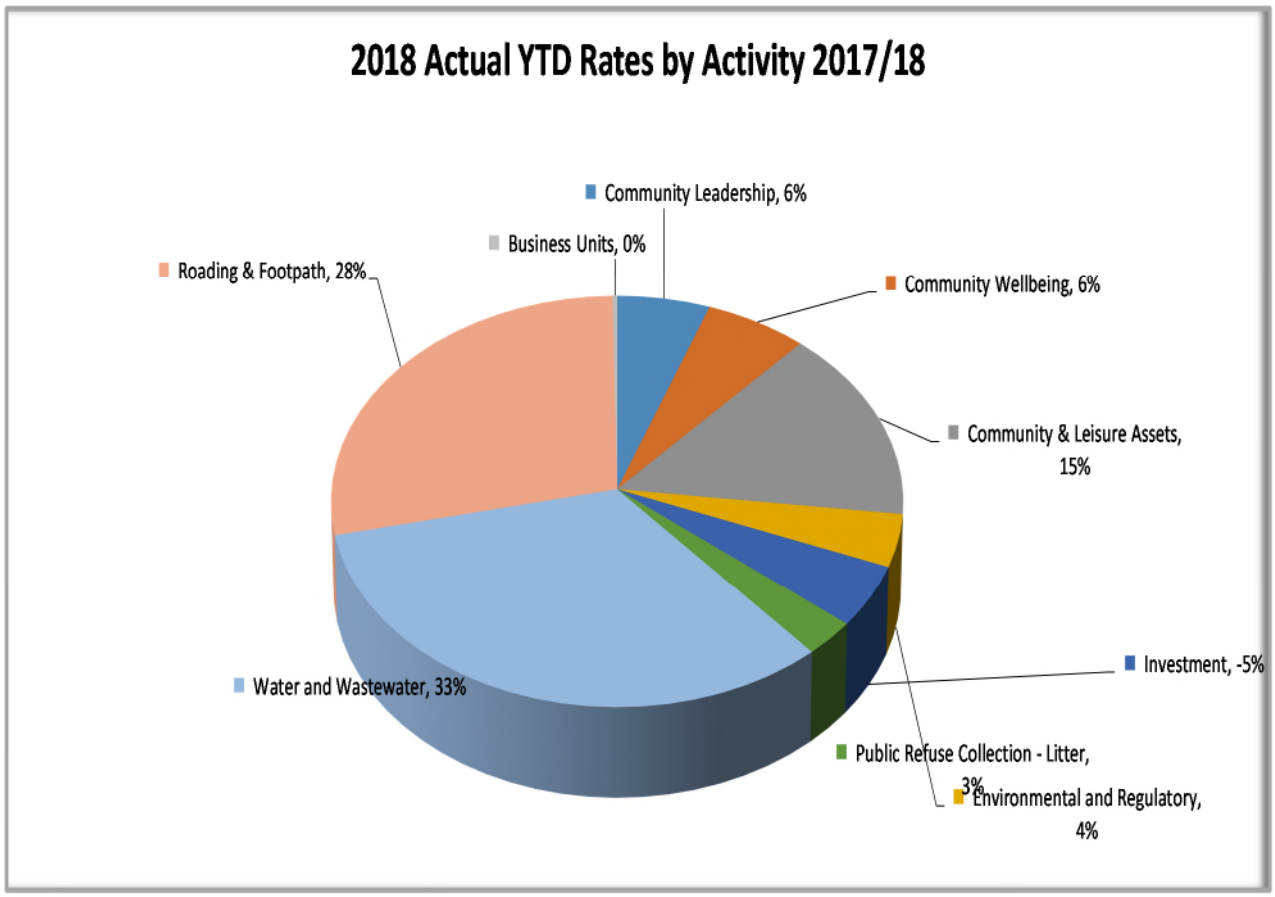
George McIrvine
Group Manager Finance & Business Support

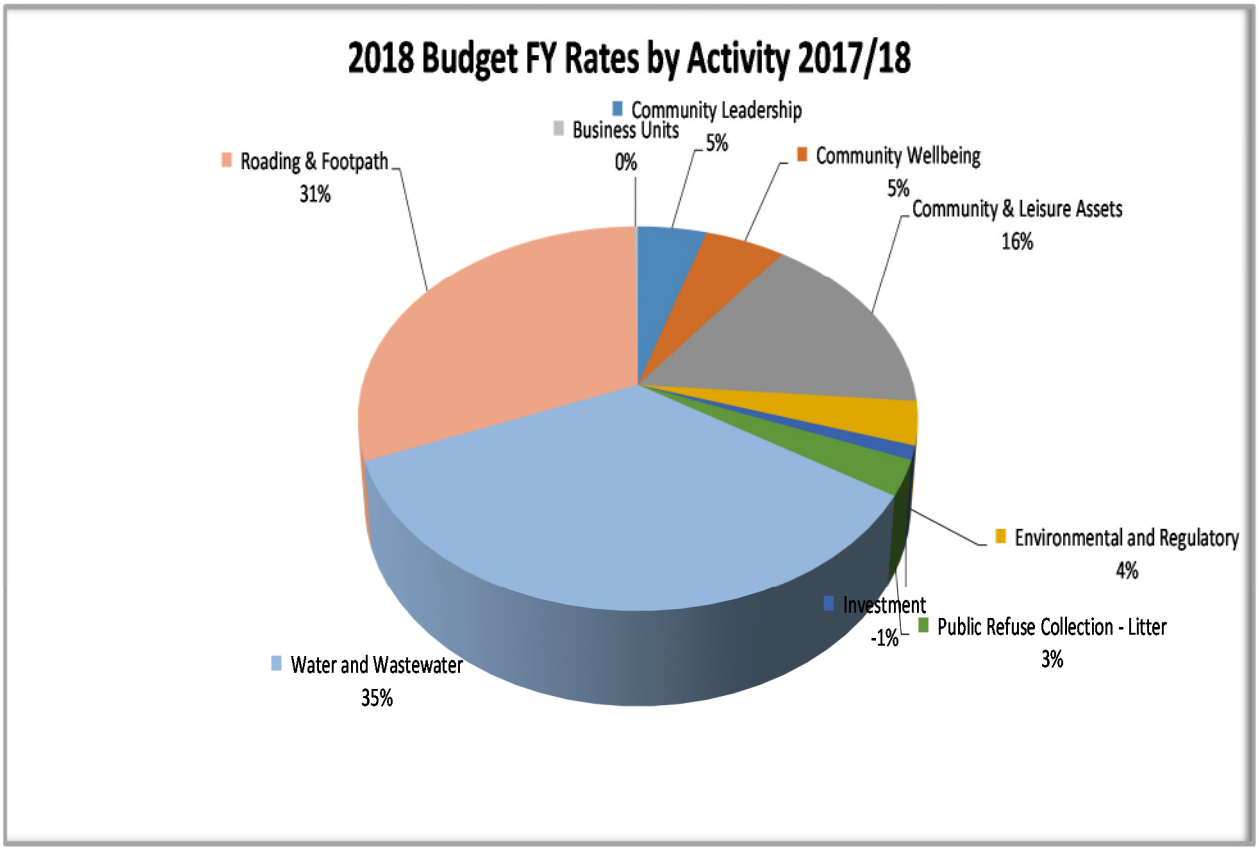
Rangitikei District Council
Statement of Financial Performance
For the 11 Months ended 31st May 2018

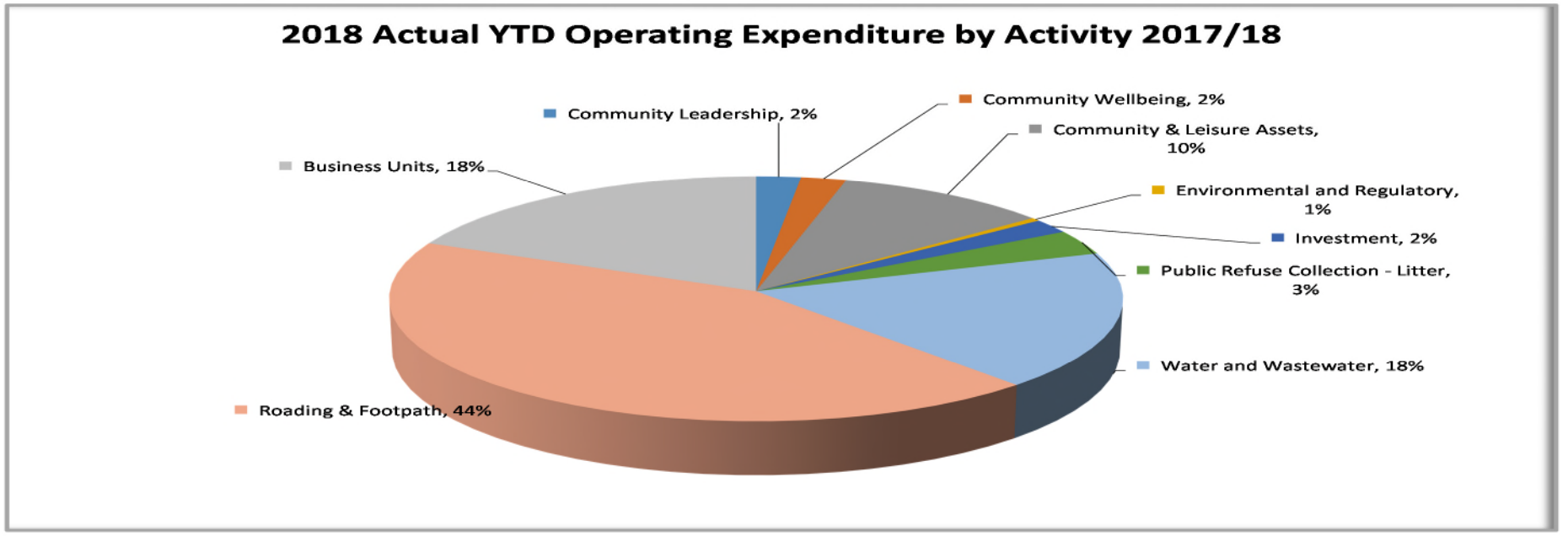
	2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY	2018 FY Bgt Remaining	2017 Actual YTD
	$000	$000	$000	$000	$000	$000
Community Leadership	2	0	2	0	0	39
Community Wellbeing	64	168	-103	183	15	110
Community & Leisure Assets	1,172	2,461	-1,289	2,685	224	724
Environmental and Regulatory	928	876	51	956	80	1,011
Investment	215	220	-5	240	20	203
Public Refuse Collection - Litter	481	403	78	440	37	461
Water and Wastewater	268	196	72	214	18	268
Roading & Footpath	8,122	7,613	509	8,306	692	10,139
Business Units	43	26	17	28	2	59
Total Revenue	**11,295**	**11,964**	**-669**	**13,052**	**1,088**	**13,014**
Community Leadership	1,226	942	284	1,028	86	1,230
Community Wellbeing	1,354	1,098	256	1,198	100	1,354
Community & Leisure Assets	3,360	3,225	134	3,518	293	3,360
Environmental and Regulatory	912	725	188	790	66	912
Investment	-1,073	-228	-844	-249	-21	-7
Public Refuse Collection - Litter	618	582	36	635	53	578
Water and Wastewater	7,215	6,939	276	7,570	631	7,543
Roading & Footpath	6,239	6,186	53	6,748	562	6,204
Business Units	61	53	8	57	5	61
Total Rates Revenue	**19,913**	**19,521**	**392**	**21,296**	**1,775**	**21,234**
Total Internal Recoveries	**6,826**	**7,584**	**-758**	**8,273**	**689**	**7,071**
Total Internal Charges	**6,826**	**7,584**	**-758**	**8,273**	**689**	**7,071**
Community Leadership	598	686	-88	748	62	659
Community Wellbeing	608	748	-141	816	68	691
Community & Leisure Assets	2,910	3,175	-265	3,464	289	2,161
Environmental and Regulatory	124	203	-79	221	18	166
Investment	540	-8	548	-9	-1	559
Public Refuse Collection - Litter	934	906	28	989	82	917
Water and Wastewater	5,239	5,980	-741	6,523	544	4,631
Roading & Footpath	12,496	11,674	822	12,735	1,061	10,371
Business Units	5,286	5,234	52	5,710	476	5,026
Total Expenses	**28,735**	**28,599**	**136**	**31,198**	**2,600**	**25,181**
NET SURPLUS	**2,473**	**2,887**	**-414**	**3,150**	**263**	**9,066**

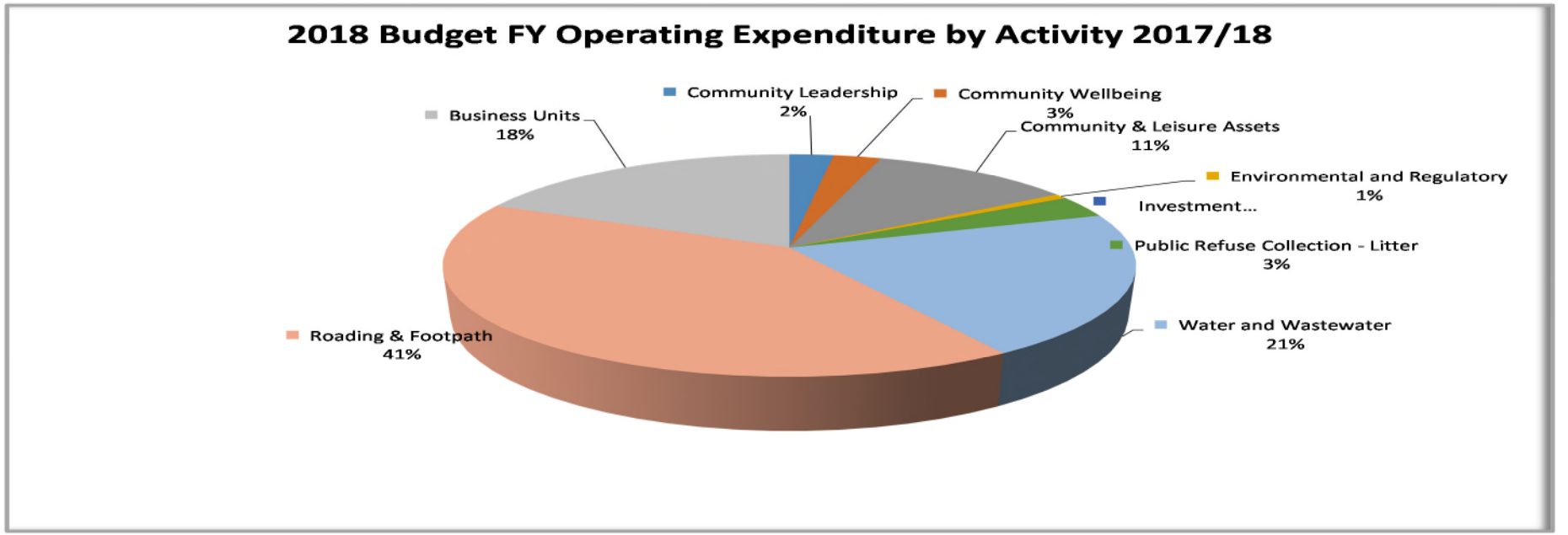
Rangitikei District Council
Statement of Financial Position
For the 11 Months ended 31st May 2018

	2018 Actuals YTD $000	2017 Actuals LY $000	2018 Movements $000
Equity			
Equity	494,647	492,235	2,412
TOTAL Equity	**494,647**	**492,235**	**2,412**
Current Assets			
Cash and Cash Equivalents	9,695	8,080	1,615
Accounts Receivable and Accruals	2,212	3,133	-921
Doubtful Debts Provision	417	417	0
Other	0	0	0
TOTAL Current Assets	**12,324**	**11,630**	**694**
Current Liabilities			
Accounts Payable and Accruals	2,907	4,460	-1,553
Employee Related Accruals	289	429	-140
GST Payable	349	-379	728
Other	540	551	-11
TOTAL Current Liabilities	**4,086**	**5,061**	**-975**
Working Capital	**8,238**	**6,569**	**1,669**
Non-Current Assets			
Fixed Assets	475,935	485,048	-9,113
Capital - New	466	0	466
Capital - Renewals	9,828	0	9,828
Other Financial Assets	324	1,076	-752
Other	0	0	0
TOTAL Non-Current Assets	**486,553**	**486,124**	**429**
Non-Current Liabilities			
External Loans	144	144	0
Other	0	314	-314
TOTAL Non-Current Liabilities	**144**	**458**	**-314**
Net Assets	**494,647**	**492,235**	**2,412**


2018 Actual YTD Rates by Activity 2017/18
Community Leadership, 6%
Business Units, 0%
Roading & Footpath, 28%
Community Wellbeing, 6%
Community & Leisure Assets, 15%
Investment, -5%
Water and Wastewater, 33%
Public Refuse Collection - Litter, 3%
Environmental and Regulatory, 4%


2018 Budget FY Rates by Activity 2017/18
Community Leadership
Business Units
0%
5%
Roading & Footpath
31%
Community Wellbeing
5%
Community & Leisure Assets
16%
Environmental and Regulatory
4%
Investment
-1%
Public Refuse Collection - Litter
3%
Water and Wastewater
35%


2018 Actual YTD Operating Expenditure by Activity 2017/18
Community Leadership, 2%
Community Wellbeing, 2%
Community & Leisure Assets, 10%
Business Units, 18%
Environmental and Regulatory, 1%
Investment, 2%
Public Refuse Collection - Litter, 3%
Water and Wastewater, 18%
Roading & Footpath, 44%

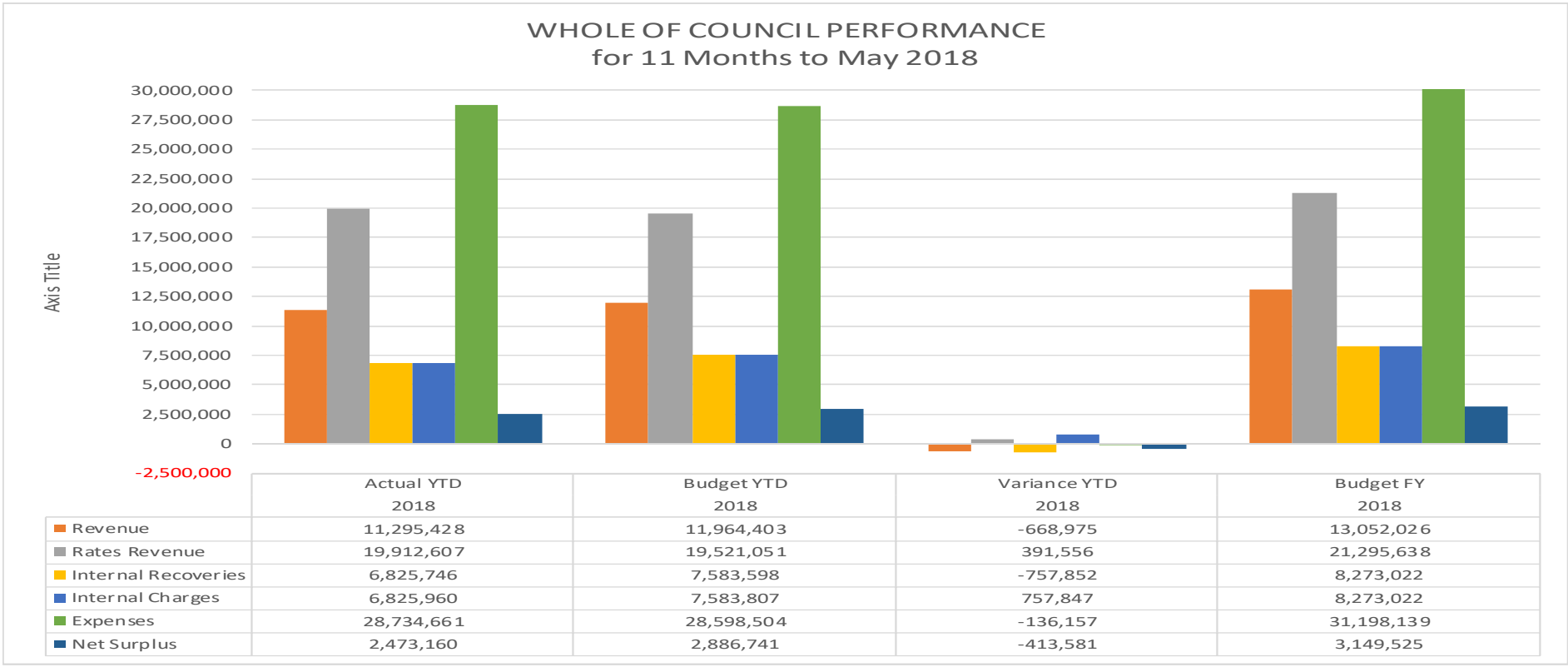

2018 Budget FY Operating Expenditure by Activity 2017/18
Community Leadership 2%
Community Wellbeing 3%
Business Units 18%
Community & Leisure Assets 11%
Environmental and Regulatory 1%
Investment...
Public Refuse Collection - Litter 3%
Roading & Footpath 41%
Water and Wastewater 21%

Rangitikei District Council
Strategic Perspective by Activity by Operating Results
For the 11 Months ended 31st May 2018

	2018 Actual YTD $000	2018 Budget YTD $000	2018 Budget FY $000
Business Units			
Assets Business Unit	-52	53	57
CEO Business Unit	-118	-0	-0
Customer Services Business Uni	-57	-0	0
Finance Business Unit	-135	0	-0
Regualatory Business Unit	-66	-0	-0
Business Units Total	**-428**	**52**	**57**
Community & Leisure Assets			
Cemetaries	87	82	89
Community Housing	-38	-247	-269
Domains	36	99	108
Forestry Investments	351	-16	-18
Halls	62	1,488	1,624
Libraries	120	-0	-0
Public Toilets	42	58	63
Real Estate	101	31	33
Swim Centres	20	60	65
Community & Leisure Assets Total	**782**	**1,553**	**1,694**
Community Leadership			
Council	146	-166	-181
Council Committees	-2	-11	-12
Elections	41	-0	-0
Ratana Community Board	-0	-2	-2
Taihape Community Board	7	-4	-4
Community & Leisure Assets Total	**192**	**-183**	**-199**
Community Wellbeing			
Civil Defence	-53	-5	-6
Community Awards	-2	-0	0
District Promotions	258	5	5
Information Centres	120	6	6
Rural Fire	-1	0	-0
Community Wellbeing Total	**321**	**6**	**6**
Environmental and Regulatory			
Building	215	-0	0
District Planning	82	84	91
Dog Control	5	-30	-33
Health	10	-17	-18
Resource Consents	64	0	-0
Stock Control	5	0	0
Environmental and Regulatory Total	**381**	**37**	**41**
Investment			
Investment	-1,397	0	0
Investment Total	**-1,397**	**0**	**0**
Public Refuse Collection - Litter			
Landfills and Waste Transfer S	125	-13	-15
Public Refuse Collection	-20	-12	-13
Waste Minimisation	-25	5	6
Public Refuse Collection - Litter Total	**81**	**-20**	**-22**
Roading & Footpath			
Non Subsidised Roading	467	93	101
Subsidised Roading	851	1,393	1,520
Roading & Footpath Total	**1,318**	**1,486**	**1,621**
Water and Wastewater			
Rural Water	-2	27	30
Stormwater	121	18	20
Wastewater	480	1	1
Water	625	-92	-100
Water and Wastewater Total	**1,223**	**-45**	**-49**
Grand Total	**2,473**	**2,887**	**3,150**

Rangitikei District Council
Activity Performance Report
For the 11 Months ended 31st May 2018

		2018 Actuals	2018 Budget	2018 Variance	2018 BudgetFY
		2018 Actual YTD	**2018 Budget YTD**	**2018 Variance YTD**	**2018 Budget FY**
Whole of Council	Revenue	11,295,428	11,964,403	-668,975	13,052,026
	Rates Revenue	19,912,607	19,521,051	391,556	21,295,638
	Internal Recoveries	6,825,746	7,583,598	-757,852	8,273,022
	Internal Charges	6,825,960	7,583,807	757,847	8,273,022
	Expenses	28,734,661	28,598,504	-136,157	31,198,139
	Net Surplus	**2,473,160**	**2,886,741**	**-413,581**	**3,149,525**



	Actual YTD 2018	Budget YTD 2018	Variance YTD 2018	Budget FY 2018
Revenue	11,295,428	11,964,403	-668,975	13,052,026
Rates Revenue	19,912,607	19,521,051	391,556	21,295,638
Internal Recoveries	6,825,746	7,583,598	-757,852	8,273,022
Internal Charges	6,825,960	7,583,807	757,847	8,273,022
Expenses	28,734,661	28,598,504	-136,157	31,198,139
Net Surplus	2,473,160	2,886,741	-413,581	3,149,525

Rangitikei District Council
Activity Performance Report
For the 11 Months ended 31st May 2018

		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
Community & Leisure Assets	Revenue	1,172,048	2,461,492	-1,289,444	2,685,259
	Rates Revenue	3,359,603	3,225,299	134,304	3,518,480
	Internal Recoveries	390,665	484,429	-93,764	528,467
	Internal Charges	1,229,569	1,442,716	213,147	1,573,844
	Expenses	2,910,469	3,175,348	264,879	3,463,993
	Net Surplus	**782,279**	**1,553,156**	**-770,877**	**1,694,369**
Cemetaries	Revenue	68,377	53,405	14,972	58,256
	Rates Revenue	131,613	182,160	-50,547	198,715
	Internal Charges	77,946	93,192	-15,246	101,657
	Internal Recoveries	0	0	0	0
	Expenses	34,616	60,643	26,027	66,159
	Net Surplus	**87,428**	**81,730**	**5,698**	**89,155**
Domains	Revenue	43,700	258,885	-215,185	282,425
	Rates Revenue	967,319	931,799	35,520	1,016,503
	Internal Charges	495,772	606,617	-110,845	661,763
	Internal Recoveries	390,665	484,429	93,764	528,467
	Expenses	870,408	969,925	99,517	1,058,116
	Net Surplus	**35,503**	**98,571**	**-63,068**	**107,516**
Forestry Investments	Revenue	472,848	0	472,848	0
	Rates Revenue	0	0	0	0
	Internal Charges	3,260	3,432	-172	3,736
	Internal Recoveries	0	0	0	0
	Expenses	118,545	13,035	-105,510	14,215
	Net Surplus	**351,043**	**-16,467**	**367,510**	**-17,951**
Halls	Revenue	73,642	1,574,804	-1,501,162	1,717,967
	Rates Revenue	430,892	339,911	90,981	370,806
	Internal Charges	42,644	49,500	-6,856	54,005
	Internal Recoveries	0	0	0	0
	Expenses	399,652	376,794	-22,858	411,028
	Net Surplus	**62,238**	**1,488,421**	**-1,426,183**	**1,623,740**
Libraries	Revenue	11,992	36,982	-24,990	40,344
	Rates Revenue	765,067	709,060	56,007	773,518
	Internal Charges	443,304	499,972	-56,668	545,419
	Internal Recoveries	0	0	0	0
	Expenses	213,585	246,092	32,507	268,446
	Net Surplus	**120,170**	**-22**	**120,192**	**-3**
Public Toilets	Revenue	0	91,663	-91,663	100,000
	Rates Revenue	208,725	202,895	5,830	221,334
	Internal Charges	30,521	34,430	-3,909	37,549
	Internal Recoveries	0	0	0	0
	Expenses	135,824	202,587	66,763	221,004
	Net Surplus	**42,381**	**57,541**	**-15,160**	**62,781**
Real Estate	Revenue	59,499	31,933	27,566	34,834
	Rates Revenue	107,026	93,093	13,933	101,558
	Internal Charges	16,660	18,524	-1,864	20,213
	Internal Recoveries	0	0	0	0
	Expenses	48,432	75,801	27,369	82,690
	Net Surplus	**101,433**	**30,701**	**70,732**	**33,489**
Swim Centres	Revenue	103,031	152,570	-49,539	166,433
	Rates Revenue	748,961	766,381	-17,420	836,046
	Internal Charges	60,236	69,388	-9,152	75,689
	Internal Recoveries	0	0	0	0
	Expenses	771,510	789,888	18,378	861,695
	Net Surplus	**20,246**	**59,675**	**-39,429**	**65,095**

Activity Performance Report continued

		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
Community Leadership	Revenue	1,500	0	1,500	0
	Rates Revenue	1,226,115	941,908	284,207	1,027,532
	Internal Recoveries	0	0	0	0
	Internal Charges	437,552	438,526	974	478,350
	Expenses	598,007	686,048	88,041	748,407
	Net Surplus	**192,057**	**-182,666**	**374,723**	**-199,225**
Council	Revenue	283	0	283	0
	Rates Revenue	982,796	740,223	242,573	807,512
	Internal Charges	314,688	317,075	-2,387	345,889
	Internal Recoveries	0	0	0	0
	Expenses	522,406	588,984	66,578	642,518
	Net Surplus	**145,985**	**-165,836**	**311,821**	**-180,895**
Council Committees	Revenue	0	0	0	0
	Rates Revenue	142,854	131,901	10,953	143,891
	Internal Charges	98,513	95,326	3,187	103,986
	Internal Recoveries	0	0	0	0
	Expenses	46,665	47,971	1,306	52,326
	Net Surplus	**-2,324**	**-11,396**	**9,072**	**-12,421**
Elections	Revenue	0	0	0	0
	Rates Revenue	44,138	13,959	30,179	15,233
	Internal Charges	2,978	3,201	-223	3,484
	Internal Recoveries	0	0	0	0
	Expenses	0	10,769	10,769	11,750
	Net Surplus	**41,160**	**-11**	**41,171**	**-1**
Ratana Community Board	Revenue	0	0	0	0
	Rates Revenue	14,203	13,585	618	14,821
	Internal Charges	5,079	5,478	-399	5,963
	Internal Recoveries	0	0	0	0
	Expenses	9,266	9,922	656	10,825
	Net Surplus	**-142**	**-1,815**	**1,674**	**-1,967**
Taihape Community Board	Revenue	1,217	0	1,217	0
	Rates Revenue	42,124	42,240	-116	46,075
	Internal Charges	16,294	17,446	-1,152	19,028
	Internal Recoveries	0	0	0	0
	Expenses	19,670	28,402	8,732	30,988
	Net Surplus	**7,378**	**-3,608**	**10,986**	**-3,941**

Activity Performance Report continued

		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
Community Wellbeing	Revenue	64,236	167,706	-103,470	182,942
	Rates Revenue	1,354,224	1,097,866	256,358	1,197,684
	Internal Recoveries	0	0	0	0
	Internal Charges	489,267	511,423	22,156	557,905
	Expenses	607,744	748,484	140,740	816,497
	Net Surplus	**321,450**	**5,665**	**315,785**	**6,224**
Civil Defence	Revenue	0	0	0	0
	Rates Revenue	104,424	166,804	-62,380	181,972
	Internal Charges	15,650	17,116	-1,466	18,679
	Internal Recoveries	0	0	0	0
	Expenses	141,907	154,858	12,951	168,925
	Net Surplus	**-53,133**	**-5,170**	**-47,963**	**-5,632**
Community Awards	Revenue	25,352	28,600	-3,248	31,199
	Rates Revenue	2,750	2,706	44	2,952
	Internal Charges	5,398	5,665	-267	6,179
	Internal Recoveries	0	0	0	0
	Expenses	24,592	25,652	1,060	27,972
	Net Surplus	**-1,888**	**-11**	**-1,877**	**0**
District Promotions	Revenue	18,076	116,325	-98,249	126,896
	Rates Revenue	684,142	537,405	146,737	586,264
	Internal Charges	162,470	161,535	935	176,213
	Internal Recoveries	0	0	0	0
	Expenses	282,164	487,201	205,037	531,495
	Net Surplus	**257,585**	**4,994**	**252,591**	**5,452**
Information Centres	Revenue	20,807	22,781	-1,974	24,847
	Rates Revenue	387,650	346,676	40,974	378,202
	Internal Charges	250,597	282,832	-32,235	308,539
	Internal Recoveries	0	0	0	0
	Expenses	37,857	80,773	42,916	88,105
	Net Surplus	**120,003**	**5,852**	**114,151**	**6,405**
Rural Fire	Revenue	1	0	1	0
	Rates Revenue	175,258	44,275	130,983	48,294
	Internal Charges	55,152	44,275	10,877	48,295
	Internal Recoveries	0	0	0	0
	Expenses	121,224	0	-121,224	0
	Net Surplus	**-1,116**	**0**	**-1,116**	**-1**

Activity Performance Report continued

		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
Environmental and Regulatory	Revenue	927,656	876,260	51,396	955,899
	Rates Revenue	912,386	724,504	187,882	790,359
	Internal Recoveries	0	0	0	0
	Internal Charges	1,335,401	1,360,678	25,277	1,484,380
	Expenses	123,811	202,862	79,051	221,278
	Net Surplus	**380,830**	**37,224**	**343,606**	**40,600**
Building	Revenue	311,967	263,307	48,660	287,249
	Rates Revenue	349,387	240,427	108,960	262,287
	Internal Charges	410,687	417,692	-7,005	455,664
	Internal Recoveries	0	0	0	0
	Expenses	36,103	86,064	49,961	93,871
	Net Surplus	**214,565**	**-22**	**214,587**	**1**
District Planning	Revenue	10	0	10	0
	Rates Revenue	212,290	196,339	15,951	214,182
	Internal Charges	91,157	90,013	1,144	98,196
	Internal Recoveries	0	0	0	0
	Expenses	39,351	22,715	-16,636	24,782
	Net Surplus	**81,793**	**83,611**	**-1,818**	**91,204**
Dog Control	Revenue	450,016	495,143	-45,127	540,159
	Rates Revenue	211,872	139,392	72,480	152,060
	Internal Charges	638,483	649,858	-11,375	708,938
	Internal Recoveries	0	0	0	0
	Expenses	18,076	14,520	-3,556	15,839
	Net Surplus	**5,329**	**-29,843**	**35,172**	**-32,558**
Health	Revenue	70,018	72,985	-2,967	79,612
	Rates Revenue	50,271	57,772	-7,501	63,025
	Internal Charges	100,153	107,415	-7,262	117,182
	Internal Recoveries	0	0	0	0
	Expenses	9,770	39,886	30,116	43,500
	Net Surplus	**10,366**	**-16,544**	**26,910**	**-18,045**
Resource Consents	Revenue	95,150	42,878	52,272	46,761
	Rates Revenue	45,616	50,369	-4,753	54,951
	Internal Charges	57,425	57,409	16	62,638
	Internal Recoveries	0	0	0	0
	Expenses	19,520	35,816	16,296	39,076
	Net Surplus	**63,822**	**22**	**63,800**	**-2**
Stock Control	Revenue	494	1,947	-1,453	2,118
	Rates Revenue	42,950	40,205	2,745	43,854
	Internal Charges	37,497	38,291	-794	41,762
	Internal Recoveries	0	0	0	0
	Expenses	992	3,861	2,870	4,210
	Net Surplus	**4,955**	**0**	**4,955**	**0**

Activity Performance Report continued

		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
Investment	Revenue	215,170	220,000	-4,830	240,000
	Rates Revenue	-1,072,519	-228,217	-844,302	-248,973
	Internal Recoveries	0	0	0	0
	Internal Charges	0	0	0	0
	Expenses	539,883	-8,261	-548,144	-8,992
	Net Surplus	**-1,397,232**	**44**	**-1,397,276**	**19**

		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
Public Refuse Collection - Litter	Revenue	481,497	403,348	78,149	440,017
	Rates Revenue	617,903	581,834	36,069	634,722
	Internal Recoveries	0	0	0	0
	Internal Charges	84,715	99,330	14,615	108,325
	Expenses	933,949	906,180	-27,769	988,518
	Net Surplus	**80,736**	**-20,328**	**101,064**	**-22,104**
Landfills and Waste Transfer S	Revenue	423,928	349,415	74,513	381,183
	Rates Revenue	527,278	480,997	46,281	524,722
	Internal Charges	62,865	73,931	-11,066	80,634
	Internal Recoveries	0	0	0	0
	Expenses	763,160	769,868	6,708	839,828
	Net Surplus	**125,182**	**-13,387**	**138,569**	**-14,557**
Public Refuse Collection	Revenue	0	0	0	0
	Rates Revenue	90,381	100,837	-10,456	110,000
	Internal Charges	12,569	14,630	-2,061	15,946
	Internal Recoveries	0	0	0	0
	Expenses	97,473	98,219	746	107,135
	Net Surplus	**-19,661**	**-12,012**	**-7,649**	**-13,081**
Waste Minimisation	Revenue	57,569	53,933	3,636	58,834
	Rates Revenue	244	0	244	0
	Internal Charges	9,281	10,769	-1,488	11,745
	Internal Recoveries	0	0	0	0
	Expenses	73,316	38,093	-35,223	41,555
	Net Surplus	**-24,785**	**5,071**	**-29,856**	**5,534**

Activity Performance Report continued

		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
Roading & Footpath	Revenue	8,122,323	7,613,474	508,849	8,305,610
	Rates Revenue	6,239,385	6,186,059	53,326	6,748,434
	Internal Recoveries	0	0	0	0
	Internal Charges	547,786	639,166	91,380	697,249
	Expenses	12,496,121	11,674,168	-821,953	12,735,435
	Net Surplus	**1,317,801**	**1,486,199**	**-168,398**	**1,621,360**
Non Subsidised Roading	Revenue	10,209	27,368	-17,159	29,859
	Rates Revenue	1,003,497	967,197	36,300	1,055,129
	Internal Charges	72,224	83,435	-11,211	91,003
	Internal Recoveries	0	0	0	0
	Expenses	474,493	818,367	343,874	892,755
	Net Surplus	**466,990**	**92,763**	**374,227**	**101,230**
Subsidised Roading	Revenue	8,112,114	7,586,106	526,008	8,275,751
	Rates Revenue	5,235,888	5,218,862	17,026	5,693,305
	Internal Charges	475,562	555,731	-80,169	606,246
	Internal Recoveries	0	0	0	0
	Expenses	12,021,628	10,855,801	-1,165,827	11,842,680
	Net Surplus	**850,812**	**1,393,436**	**-542,624**	**1,520,130**

Activity Performance Report continued

		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
Water and Wastewater	Revenue	267,616	196,020	71,596	213,829
	Rates Revenue	7,214,911	6,939,229	275,682	7,570,055
	Internal Recoveries	0	0	0	0
	Internal Charges	1,020,856	1,200,661	179,805	1,309,757
	Expenses	5,238,732	5,979,622	740,890	6,523,185
	Net Surplus	**1,222,939**	**-45,034**	**1,267,973**	**-49,058**
Rural Water	Revenue	870	10,516	-9,646	11,467
	Rates Revenue	715,447	689,568	25,879	752,256
	Internal Charges	82,865	94,798	-11,933	103,391
	Internal Recoveries	0	0	0	0
	Expenses	635,794	578,138	-57,656	630,687
	Net Surplus	**-2,342**	**27,148**	**-29,490**	**29,645**
Stormwater	Revenue	5,211	2,167	3,044	2,362
	Rates Revenue	529,638	506,165	23,473	552,176
	Internal Charges	80,176	93,643	-13,467	102,158
	Internal Recoveries	0	0	0	0
	Expenses	333,745	396,374	62,629	432,381
	Net Surplus	**120,928**	**18,315**	**102,613**	**19,999**
Wastewater	Revenue	188,144	183,337	4,807	200,000
	Rates Revenue	2,174,421	1,961,982	212,439	2,140,351
	Internal Charges	259,116	302,973	-43,857	330,506
	Internal Recoveries	0	0	0	0
	Expenses	1,623,686	1,841,114	217,428	2,008,506
	Net Surplus	**479,763**	**1,232**	**478,531**	**1,339**
Water	Revenue	73,391	0	73,391	0
	Rates Revenue	3,795,406	3,781,514	13,892	4,125,272
	Internal Charges	598,700	709,247	-110,547	773,702
	Internal Recoveries	0	0	0	0
	Expenses	2,645,507	3,163,996	518,489	3,451,611
	Net Surplus	**624,590**	**-91,729**	**716,319**	**-100,041**

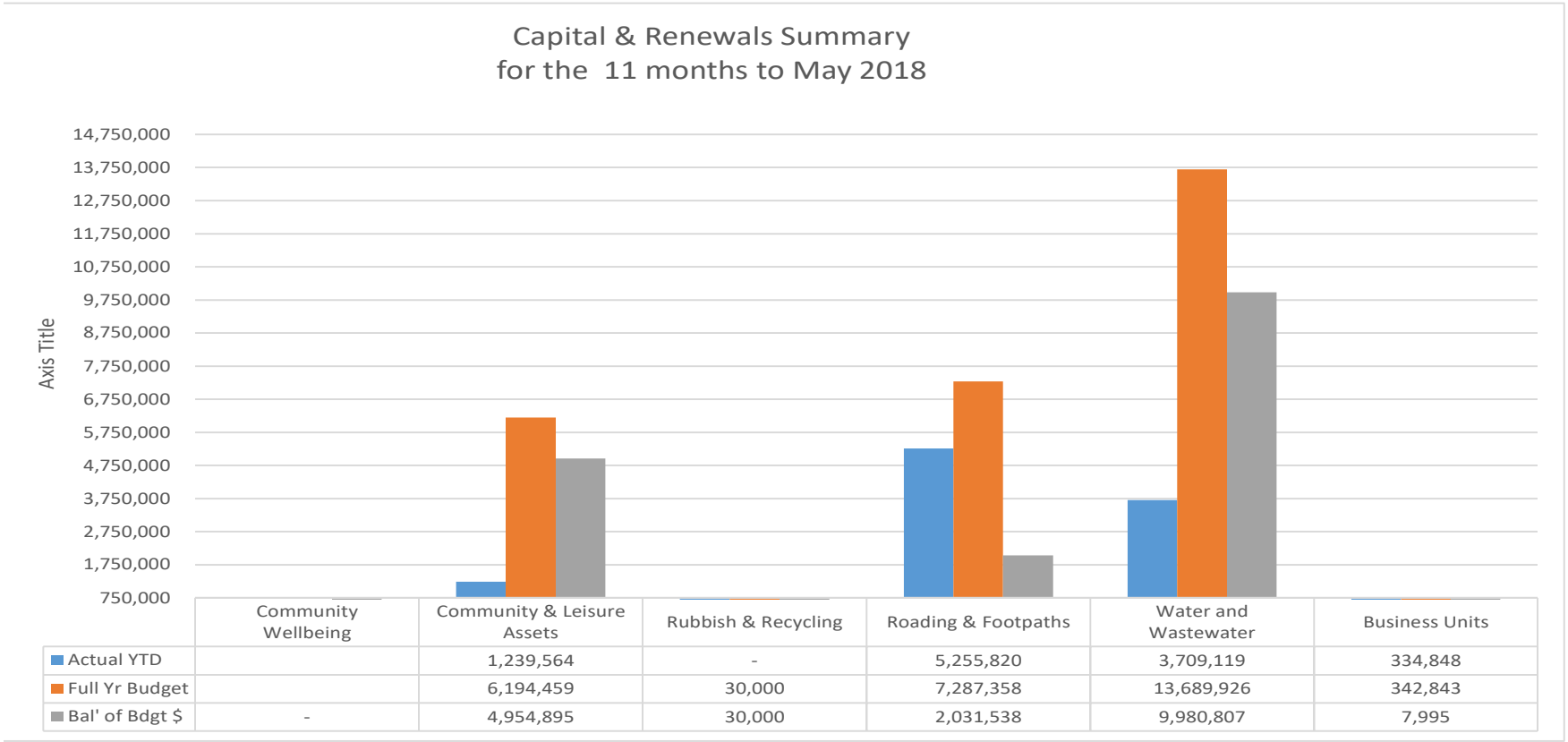
Activity Performance Report continued

Business Units		2018 Actual YTD	2018 Budget YTD	2018 Variance YTD	2018 Budget FY
	Revenue	43,381	26,103	17,278	28,470
	Rates Revenue	60,598	52,569	8,029	57,345
	Internal Recoveries	6,435,081	7,099,169	-664,088	7,744,555
	Internal Charges	1,680,814	1,891,307	210,493	2,063,212
	Expenses	5,285,945	5,234,053	-51,892	5,709,818
	Net Surplus	**-427,699**	**52,481**	**-480,180**	**57,340**
Assets Business Unit	Revenue	32,160	12,188	19,972	13,294
	Rates Revenue	60,598	52,569	8,029	57,345
	Internal Charges	523,598	612,480	-88,882	668,162
	Internal Recoveries	1,394,811	1,609,784	214,973	1,756,122
	Expenses	1,015,547	1,009,492	-6,055	1,101,255
	Net Surplus	**-51,576**	**52,569**	**-104,145**	**57,344**
CEO Business Unit	Revenue	7,884	0	7,884	0
	Rates Revenue	0	0	0	0
	Internal Charges	192,198	216,216	-24,018	235,853
	Internal Recoveries	1,162,477	1,141,668	-20,809	1,245,463
	Expenses	1,096,109	925,507	-170,602	1,009,612
	Net Surplus	**-117,946**	**-55**	**-117,891**	**-2**
Customer Services Business Uni	Revenue	791	990	-199	1,076
	Rates Revenue	0	0	0	0
	Internal Charges	202,651	234,487	-31,836	255,807
	Internal Recoveries	700,789	790,284	89,495	862,133
	Expenses	555,595	556,798	1,203	607,402
	Net Surplus	**-56,666**	**-11**	**-56,655**	**0**
Finance Business Unit	Revenue	2,376	12,925	-10,549	14,100
	Rates Revenue	0	0	0	0
	Internal Charges	504,214	526,174	-21,960	574,007
	Internal Recoveries	2,189,137	2,562,769	373,632	2,795,753
	Expenses	1,822,368	2,049,509	227,141	2,235,847
	Net Surplus	**-135,068**	**11**	**-135,079**	**-1**
Regualatory Business Unit	Revenue	170	0	170	0
	Rates Revenue	0	0	0	0
	Internal Charges	258,153	301,950	-43,797	329,383
	Internal Recoveries	987,867	994,664	6,797	1,085,084
	Expenses	796,327	692,747	-103,580	755,702
	Net Surplus	**-66,443**	**-33**	**-66,410**	**-1**

Rangitikei District Council
Strategic Activities - Capital Expenditure and Renewals Summary

for the 11 months to May 2018

	Actual YTD	Full Yr Budget	Bal' of Bdgt $	% of Bdgt Completed
Community Wellbeing			-	
Community & Leisure Assets	1,239,564	6,194,459	4,954,895	20%
Rubbish & Recycling	-	30,000	30,000	
Roading & Footpaths	5,255,820	7,287,358	2,031,538	72%
Water and Wastewater	3,709,119	13,689,926	9,980,807	27%
Business Units	334,848	342,843	7,995	98%
TOTAL CAPITAL EXPENDITURE & RENEWALS	**10,539,352**	**27,544,586**	**17,005,234**	**38%**



Rangitikei District Council
Statement of Capital Works 2017/2018
for the 11 months to May 2018

Unit	Activity	Capital Renewals/New	Details	G.L. A/c #	2018 Actuals YTD	2018 A.P. Bdgt Full Yr.	2018 Bal of Bdgt
Business Units	Assets Business Unit	Capital - Renewals	Motor Vehicle Purchases (dr)	95500701	333,367	262,000	-71,367
			Motor Vehicles Sold	955007011	-55,957	0	55,957
			Office Furniture Purchases	95301705	1,182	10,588	9,406
			Plant Purchases	95301702	0	255	255
	Finance Business Unit	Capital - Renewals	Hardware	9260070303	5,741	15,000	9,259
			Hardware Servers & Core Network	9260070301	15,963	10,000	-5,963
			PC Replacements	9260070302	27,077	30,000	2,923
			Software Purchases	92600704	7,475	15,000	7,525
Business Units Total					**334,848**	**342,843**	**7,995**
Community & Leisure Assets	Cemetaries	Capital - Renewals	New Capital-Berms	40701709	0	48,635	48,635
			Renewals - Contractor	40701708	22,378	59,000	36,622
	Community Housing	Capital - Renewals	Renewals	4040170604	59,925	100,000	40,075
	Domains	Capital - Renewals	Campground Toilet & WW T/ment	4410170609	51,804	90,000	38,196
			Centennial Park Skateboard area	4410170610	11,760	150,000	138,240
			Park Upgrades	4410170612	14,906	105,063	90,157
			Plant & Machinery	44101702	2,694		
			Memorial Park Toilet and Changing Rm	4410170611	0	600,000	600,000
			Renewals Buildings	4410170601	47,135	91,787	44,652
	Halls	Capital - Renewals	Disposal of Land and Buildings	4090170606	0	-1,065,000	-1,065,000
			Additions Buildings - Bulls Town Hall	40901706	147,594	4,053,280	3,905,686
			Renewals	4090170601	86,321	36,263	-50,058
	Libraries	Capital - Renewals	Upgrade of Offices	40801703	0	21,022	21,022
			Buildings Marton	40801706	3,435	967,000	963,565
			Furniture and Fittings	40801705	3,560	6,307	2,747
			Library Book Purchases	40801708	86,100	105,110	19,010
	Public Toilets	Capital - Renewals	New toilets (4)	40601709	0	125,000	125,000
			Mangaweka Toilet	4060170901	21,660	85,000	63,340
	Real Estate	Capital - Renewals	Renewals	2090170601	0	7,883	7,883
			Purchase of 7 King Street	2090170602	100,000	150,000	50,000
	Swim Centres	Capital - Renewals	Capital Additions - Plant	40001702	289,770	430,000	140,230
			Marton Renewals	4000170601	834	12,088	11,254
			Loan from MALT Repaid	40001720	0	16,021	16,021
			New Capital Filtration Pumping and Pool Leak	4000170203	289,689	0	-289,689
			Plant and Equipment	40001705	0	0	0
Community & Leisure Assets Total					**1,239,564**	**6,194,459**	**4,957,589**

Rangitikei District Council
Statement of Capital Works 2017/2018 (continued)
for the 11 months to May 2018

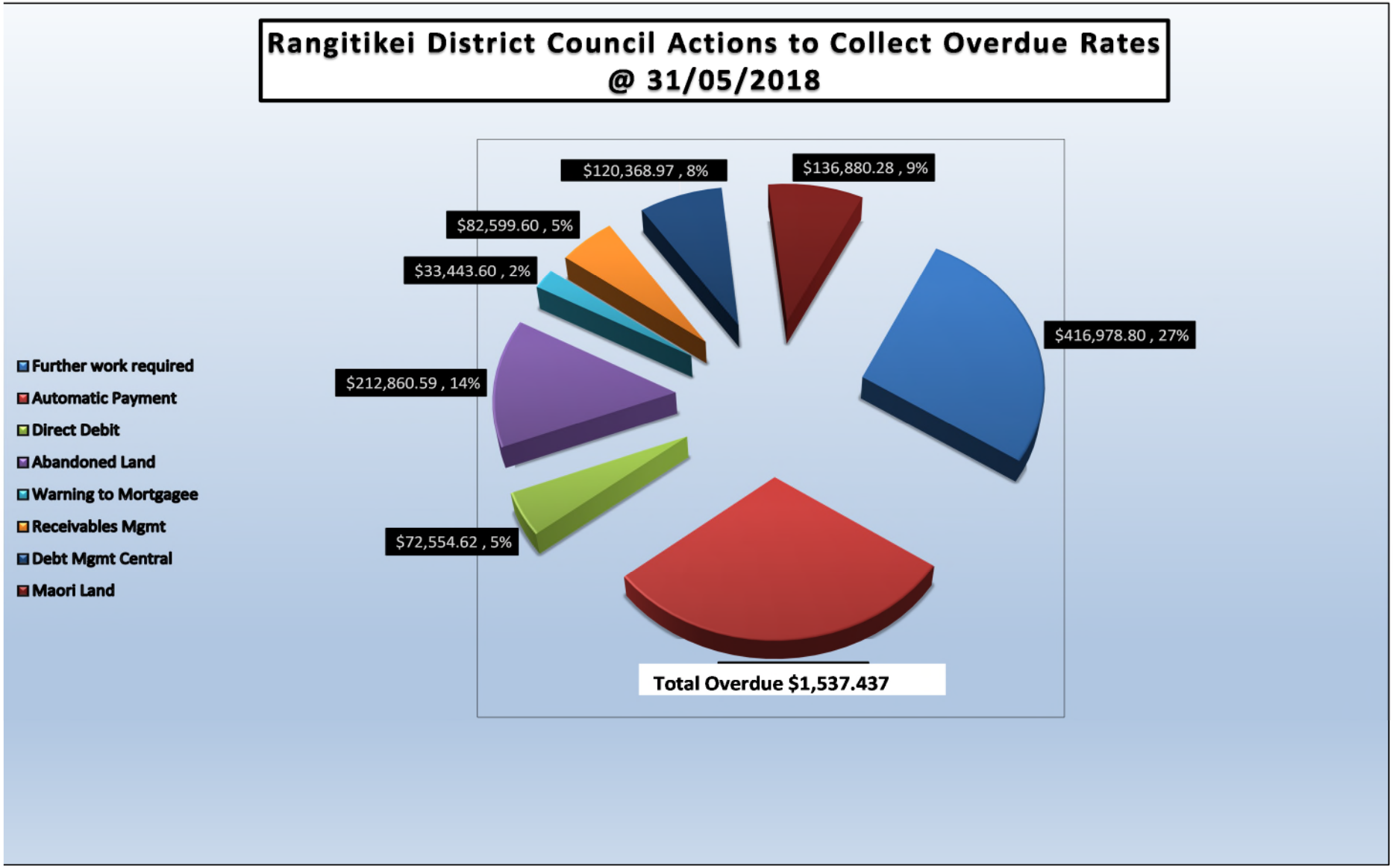
Public Refuse Collection - Litter	Landfills and Waste Transfer S	Capital - New	Direct Pit Access Marton	5060177303	0	30,000	30,000
Public Refuse Collection - Litter Total					**0**	**30,000**	**30,000**
Roading & Footpath	Non Subsidised Roading	Capital - New	Footpath Construction	70300791	**9,386**	68,291	58,905
		Capital - Renewals	Footpath Renewals	70300788	**71,233**	126,075	54,842
			Renewals -Prof services	70300784	**448**	0	-448
			Vehicle Crossings	70300792	**5,687**	26,266	20,579
	Subsidised Roading	Capital - Renewals	Asset Management Planning P/S	7010078410	**64,398**	0	-64,398
			Asset Mgmt P/S - Staff Time	7010078409	**158,790**	0	-158,790
			Drainage Renewals	70100782	**500,988**	352,425	-148,563
			Major Bridge Refurbishment	70100796	81,650	370,000	288,350
			Minor Safety Projects - Principal Contractor	70100795	449,872	525,677	75,805
			Prof Services - Minor Safety	7010079405	599	0	-599
			Sealed Road Pavement Rehabilitation	70100781	1,382,946	1,688,679	305,733
			Sealed Road Surfacing	70100787	1,398,694	1,789,375	390,681
			Flood Damage Reinstatement	70100791	0	822,000	822,000
			Structures Components Replacements	70100783	146,808	189,163	42,355
			Sub.Rdg.Drainage Prof.Serv.	7010078402	2,996	0	-2,996
			Sub.Rdg.Pavement Rehab. Prf.Sr	7010078401	129,851	0	-129,851
			Sub.Rdg.Sealed Rd Surfacg.P/S	7010078407	5,761	0	-5,761
			Sub.Rdg.Strt.Ltng.Prof Serv.	7010078406	1,008	0	-1,008
			Sub.Rdg.Struct.Comp.P/S	7010078403	20,524	0	-20,524
			Sub.Rdg.Traffic Ser Rnwl P/S	7010078405	4,844	0	-4,844
			Subsidised Roading Purchase Order Susp	70100789	13,007	0	-13,007
			Traffic Services Renewals	70100785	43,288	224,950	181,662
			Accelerated LED Renewals	70100784	484,207	644,332	160,125
			Unsealed Road Metalling & Rehabilitation	70100780	274,565	460,125	185,560
			Unsealed Road Metalling P/S	7010078408	4,270	0	-4,270
Roading & Footpath Total					**5,255,820**	**7,287,358**	**2,031,538**

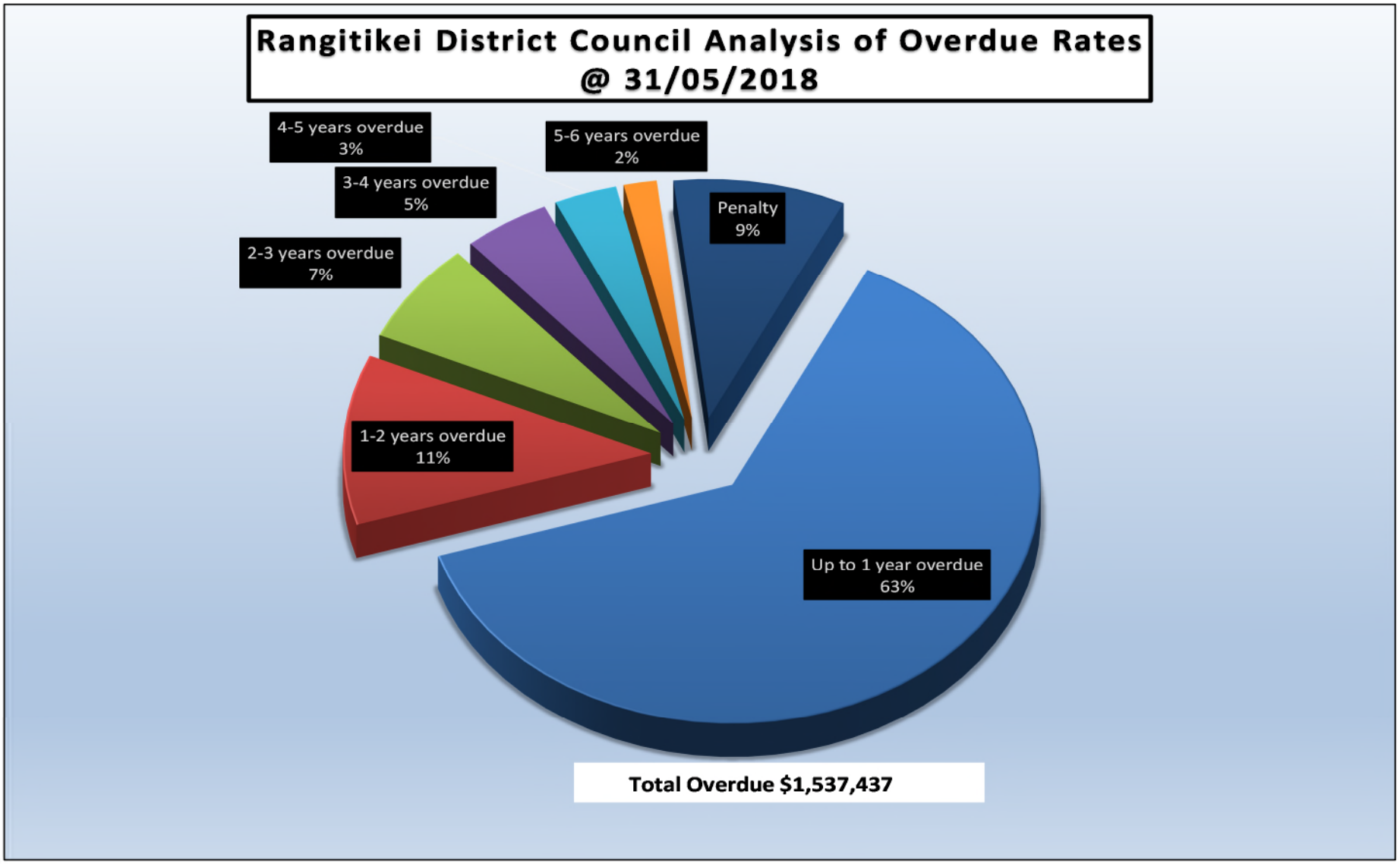
Rangitikei District Council
Statement of Capital Works 2017/2018 (continued)
for the 11 months to May 2018

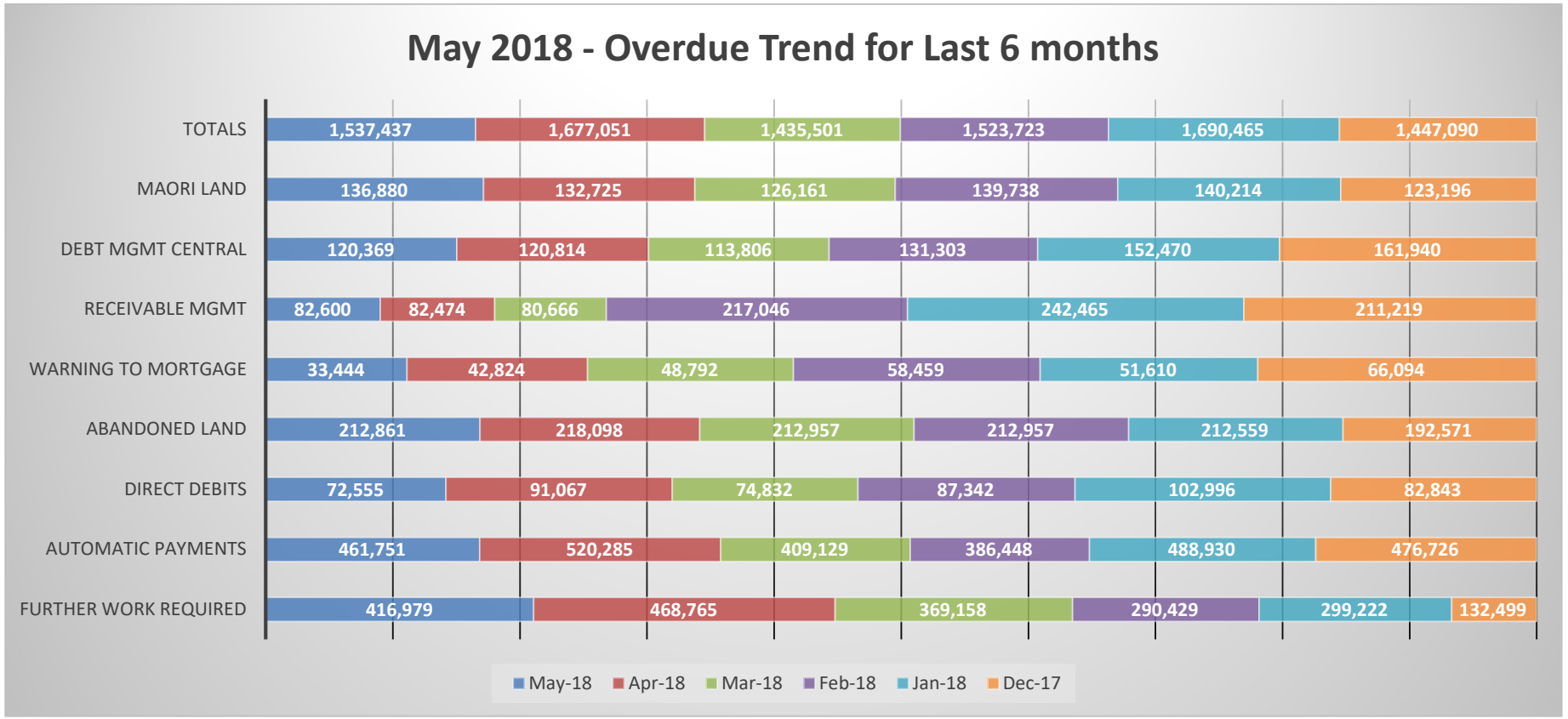
Unit	Activity	Capital Renewals/New	Details	G.L. A/c #	2018 Actuals YTD	2018 Budget FY	2018 Bal of Bdt
Water and Wastewater	Rural Water	Capital - Renewals	HRWS Reticulation - Staff Time	6061777303	1,097	0	-1,097
			Erewhon Reticulation - contractor	6061676201	60,126	133,477	73,351
			HRWS Reticulation - Contractor	6061776201	25,236	0	-25,236
			HRWS Treatment - Contractor	6061776301	22,328	60,000	37,672
	Stormwater	Capital - New	Marton Reticulation - Contractor	6050177301	10,603	470,000	459,398
		Capital - Renewals	Marton Reticulation - Contractor	6050176101	150,233	80,000	-70,233
			Marton Reticulation - Staff Time	6050176103	42,505	0	-42,505
			Taihape Reticulation - Contractor	6050176111	7,071	99,003	91,932
			Taihape Reticulation - Staff Time	6050176113	3,353	0	-3,353
	Wastewater	Capital - New	Bulls Treatment - Contractor	6070177311	7,009	1,100,000	1,092,991
			Hunterville Treatment - Contractor	6070177386	2,269	0	-2,269
			Koitiata Reticulation - Contractor	6070177151	8,915	110,000	101,085
			Marton Reticulation - Contractor	6070177301	113,577	1,338,000	1,224,423
			Marton Treatment - Contractor	6070177306	11,165	778,500	767,335
			Marton Treatment - Staff Time	6070177307	5,208	0	-5,208
			Ratana Treatment - Contractor	6070177325	13,517	1,419,000	1,405,483
			Ratana Treatment - Staff Time	6070177327	165	0	-165
			Taihape Reticulation - Contractor	6070177304	250	0	-250
		Capital - Renewals	Bulls Reticulation - Contractor	6070176161	4,628	20,000	15,372
			Hunterville Reticulation - Contractor	6070176181	8,569	270,318	261,749
			Hunterville Treatment - Contractor	6070176186	984	0	-984
			Koitiata Treatment - Contractor	6070176151	2,584	0	-2,584
			Mangaweka Treatment - Contractor	6070176171	2,987	0	-2,987
			Marton Reticulation - Contractor	6070176101	225,277	411,373	186,096
			Marton Reticulation - Staff Time	6070176102	15,488	0	-15,488
			Marton Treatment - Contractor	6070176131	11,958	267,250	255,292
			Ratana Reticulation Contractor	6070176191	535	4,309	3,774
			Ratana Treatment - Contractor	6070176194	3,120	528,890	525,770
			Taihape Reticulation - Contractor	6070176111	61,825	1,075,793	1,013,968
			Taihape Reticulation - Staff Time	6070176112	3,304	0	-3,304

Rangitikei District Council
Statement of Capital Works 2017/2018 (Water continued)
for the 11 months to May 2018

	Water - Urban	Capital - New	Taihape Treatment - Staff Time	6070176122	630	0	-630
			Hunterville Treatment - Contractor	6060777301	5,678	75,000	69,322
			Hunterville Treatment - Staff Time	6060777302	1,215	0	-1,215
			Mangaweka Treatment - Contractor	6060177371	9,982	0	-9,982
			Marton Reticulation - Contractor	6060177301	400	0	-400
			Marton Treatment - Contractor	6060177311	6,021	0	-6,021
			Marton Treatment - Staff Time	6060177313	1,937	0	-1,937
			Ratana Treatment - Contractor	6060177391	188,454	0	-188,454
			Ratana Treatment - Staff Time	6060177392	9,534	0	-9,534
			Taihape Treatment - Contractor	6060177331	37,874	0	-37,874
			Taihape Treatment - Staff Time	6060177332	2,048	0	-2,048
		Capital - Renewals	Bulls Reticulation - Contractor	6060176141	31,719	538,114	506,395
			Bulls Reticulation - Staff Time	6060176143	12,722	0	-12,722
			Bulls Treatment - Contractor	6060176151	60,111	900,000	839,889
			Bulls Treatment - Staff Time	6060176153	4,708	0	-4,708
			Hunterville Reticulation - Contractor	6060776201	6,519	115,411	108,892
			Hunterville Reticulation - Staff Time	6060776203	879	0	-879
			Mangaweka Reticulation - Contractor	6060176161	9,482	0	-9,482
			Mangaweka Reticulation - Staff Time	6060176163	26,066	0	-26,066
			Mangaweka Treatment - Contractor	6060176171	30,773	558,037	527,264
			Marton Reticulation - Contractor	6060176101	280,233	12,451	-267,782
			Marton Reticulation - Staff Time	6060176103	50,447	0	-50,447
			Marton Treatment - Contractor	6060176111	139,972	270,000	130,028
			Ratana Treatment - Staff Time	6060176193	25,042	0	-25,042
			Taihape Reticulation - Contractor	6060176121	1,745,447	2,480,000	734,553
			Taihape Reticulation - Staff Time	6060176123	114,890	0	-114,890
			Taihape Treatment - Contractor	6060176131	68,146	575,000	506,854
			Taihape Treatment - Staff Time	6060176133	12,307	0	-12,307
Water and Wastewater Total					**3,709,119**	**13,689,926**	**9,980,807**
Total					**10,539,352**	**27,544,586**	**17,007,928**


Rangitikei District Council Actions to Collect Overdue Rates
@ 31/05/2018
$120,368.97 , 8%
$136,880.28 , 9%
$82,599.60 , 5%
$33,443.60 , 2%
$416,978.80 , 27%
$212,860.59 , 14%
$72,554.62 , 5%
Total Overdue $1,537.437
Further work required
Automatic Payment
Direct Debit
Abandoned Land
Warning to Mortgagee
Receivables Mgmt
Debt Mgmt Central
Maori Land


Rangitikei District Council Analysis of Overdue Rates
@ 31/05/2018
4-5 years overdue
3%
5-6 years overdue
2%
3-4 years overdue
5%
Penalty
9%
2-3 years overdue
7%
1-2 years overdue
11%
Up to 1 year overdue
63%
Total Overdue $1,537,437


May 2018 - Overdue Trend for Last 6 months
TOTALS
1,537,437
1,677,051
1,435,501
1,523,723
1,690,465
1,447,090
MAORI LAND
136,880
132,725
126,161
139,738
140,214
123,196
DEBT MGMT CENTRAL
120,369
120,814
113,806
131,303
152,470
161,940
RECEIVABLE MGMT
82,600
82,474
80,666
217,046
242,465
211,219
WARNING TO MORTGAGE
33,444
42,824
48,792
58,459
51,610
66,094
ABANDONED LAND
212,861
218,098
212,957
212,957
212,559
192,571
DIRECT DEBITS
72,555
91,067
74,832
87,342
102,996
82,843
AUTOMATIC PAYMENTS
461,751
520,285
409,129
386,448
488,930
476,726
FURTHER WORK REQUIRED
416,979
468,765
369,158
290,429
299,222
132,499
May-18
Apr-18
Mar-18
Feb-18
Jan-18
Dec-17

TREASURY REPORT 31/05/2018

Investments

Bank Deposits	Maturity Date	Int Rate	Term	% of Portfolio	Amount	Comment		
Westpac Current Account	Call	0.0150	Call	56%	**5,632,504.24**	Immediate Needs		
Westpac Call Account	Call	0.0150	Call	1%	**54,883.69**	Immediate Needs		
ASB Term Deposit 12-3211-00010480-				0%	0.00			
Westpac Term Deposit -03.0683.0195600.081				0%	**0.00**	Immediate Needs		
Westpac Term Deposit -03.0683.0195600.081				0%	**0.00**	Immediate Needs		
Westpac Term Deposit -03.0683.0195600.081 - 43,44,45 see note below				40%	**4,000,000.00**	Immediate Needs		
Cash Floats					**-8,731.14**			
MW Lass Ltd					**16,000.00**			
					9,694,656.79		97%	Of total pool Investment policy allows up to 100%

The Investment Policy requires that maximum any one bank of $5m

And maturity mix as follows	Actual	Policy
0-3 months	100%	15%-40%
3-6 months		10%-60%
6 month to 2 years		10%-60%

Note:

Westpac Term Deposit 43 for 28 Days Mature 22/06/18 $2M Rate 2.21%
Westpac Term Deposit 44 for 180 Days Mature 24/10/18 $1M Rate 3.51%
Westpac Term Deposit 45 for 364 Days Mature 26/04/19 $1M Rate 3.49%

Equity Investments

	Number	Cost	Value 2017	@		
Local Government Insurance Corporation	**23,338**	**23338**	**54,261.00**		0.54%	Of total pool Investment policy allows up to 10%

CORPORATE BONDS 31/05/2018

Date of Purchase

							S &P Rating		
Purchased 16/02/06		**Effective**	**Coupon Rate**	**Face value**		**Fair Value 2017**			
Fonterra Perpetual Cap Note	none	0.0573	0.0874	191,963.00	201,735.76				
Purchased 21/02/06									
Fonterra Perpetual Cap Note	none	5.73%	8.74%	280,000.00	294,072.88				
Notes Redeemed 10/07/06				-443,645.00	-465,086.38				
loss on Redemption					-981.01				
Balance as at 30 June 2017		4.38%		28,318.00	29,741.25	**25,769.38**	A		
Total						**25,769.38**		0%	Of total pool Investment policy allows up to 50%
Forestry					**244,232.00**			2%	Of total pool Investment policy allows up to 20%
Total Investments and Cash					**10,018,919.17**				

Attachment 3

RANGITIKEI DISTRICT COUNCIL
Making this place home

MEMORANDUM

TO:	Ross McNeil
COPIES:	Council
FROM:	George McIrvine
DATE:	15/06/2018
SUBJECT:	**EECA Energy Audit.**
FILE:	
Attachments:	Energy Audits for HRWS, Marton Pool, Marton WWTP and Taihape WWTp

Background

1. Energy audits have been conducted with funding support from Energy Efficiency and Conservation Authority (EECA) have been conducted at a number of Council Facilities and Schemes (as above). The audit were performed a contractor approved to do this work by EECA.

2. This work was initially targeted towards areas of concern such as HRWS and Taihape WWTP with the EECA funding it was possible to look at the other large power usage operations within Council, Marton WWTP and Marton Pool.

3. Attached are the four reports on each of these facilities. There is a lot of detail in these which will require fuller reporting and an action plan developed by staff with reporting to the assets and infrastructure committee. Some of these will require investment of funds to put in place changes recommended and a summary of the highlights and conclusion in each of the reports are as follows;

4. Reports Summary

    a. Hunterville Rural Water Scheme
        i. The scheme appears to be well operated and in good condition
        ii. There is limited scope to improve the overall efficiency of the scheme other than fixing leaks and where tanks are over-spilling.
        iii. Some cost savings may be available but will require as yet undefined investment by the Scheme.
        iv. The report does note the current scheme is a fixed supply so does not incentivise water leak detection and repair by individual users.

v. The committee and staff have been working on better understanding the water/electricity usage relationship while repairing leaks where necessary

b. Marton Swim Centre

i. The Swim Centre appears to be well operated and with leaks having been fixed in the last few years is in good condition
ii. There is scope to improve the overall efficiency of the Swim Centre energy use.
iii. Some cost savings may be available from implementing a management regime which using automation to monitor and ensure water quality that "slows down" the water pumps and air fans during the night.
iv. A supporting strategy would see the implementation of energy and other metrics such as water loss targets and the monitoring of performance against these targets. The contractors operating the pool may be required to monitor these and this will have to be factored into their contract.
v. Investment by Council will be required to achieve these targets.

c. Marton Waste Water Scheme

i. The scheme appears to be well operated and in good condition
ii. A change in tariff from a supplier to those achieved in other plants would save 33% of power cost.
iii. The report does not identify other cost saving opportunities other than some operational changes and notes the consent expire and future project.

d. Taihape Waste Water Scheme

i. The scheme appears to be well operated and in good condition
ii. It would be useful to adopt some energy benchmarks.
iii. Projects around improving the performance of the aerators, stormwater separation and improving circulation were identified. There are no indicative costings for these but they may be required when gaining a new consent.

5. Recommendation:

6. That the report EECA Energy Audits HRWS, Marton Swim Centre, MWWTP and TWWTP, be received

George McIrvine
Group Manager Finance & Business Support

Ivan A Fraser
CONSULTING ENGINEER

CMEngNZ CPEng, (Mechanical Environmental), IntPE
BE(Mech), FIRHACE, MASHRAE, MCASANZ, CMVP
EMANZ EnergyMasters accredited Energy Auditor & Technology Specialist
EECA Business Programme Partner

46 Caribbean Drive, Unsworth Heights
Auckland 0632.

Ph: (09)410 5008 Fax (09)410 5008
E-mail: ivanfraser3@gmail.com

In association with Mason Consulting and Services Ltd

Rangitikei District Council
Hunterville Rural Water Supply Scheme

Pumping System Audit

REPORT

Prepared for
Ashley Dahl – Financial Services Team Leader, Rangitikei District Council

File Ref 3707-2
25 April 2018

TABLE OF CONTENTS

Executive Summary

This report summarises the historical energy usage and costs for the Hunterville Rural Water Supply Scheme as well as identifying opportunities for reducing costs through improved efficiency or operation of the system.

The period considered for the facility is 1 October 2016 to 30 September 2017and is described as the 'audit period' in this report.

Electricity is the only energy source and the main services are pumping and miscellaneous equipment. These services are supplied with electricity from three 11kV/400V time of use supplies from Contact Energy.

The electricity tariff is split into two components, network and energy, with energy typically accounting for 55% of the total. The overall unit cost of electricity in the audit period was 19.0c/kWh.

The services appear to be well operated and generally in good condition. In a typical 24-hour period the pumps are running for long periods and this combined with the fixed storage and pumping capacities places some limitations on the ability to improve the overall efficiency of the system.

The following summarises the recommendations in this report.

Recommendation identifier and Report Section Ref	Dependency	Electricity Saving (kWhpa)	Annual Cost Saving ($)	Implemnt costs ($)	Simple payback period (years)
Demand-side recommendations:					
#1 4.1.1: Reduce allocation	#9	7,800	$1,478	Not known	
#2 4.1.2: Monitor, repair leakage	#9	7,800	$1,478	Not known	
Network recommendations:					
#3 4.2.1: Monitor rising main	#9	7,800	$1,478	Not known	
Supply-side recommendations:					
#4 4.3.1: Replace Well pump	#9	41,800	$7,900	Not known	
#5 4.3.1: Replace Middle pump	#9	111,450	$21,175	Not known	
#6 4.3.1: Replace Top pump	#9	111,450	$21,175	Not known	
#7 4.3.2: Fit filters	None	Not known	Not known	$105,000	
#8 4.3.3: Clean intake gallery	#9	Not known	Not known	Not known	
Ongoing monitoring recommendations:					
#9 5: Monitor performance				None	
#10 5: Monitor leaks – rising main	#9	7,800	$1,478	none	

Note: Savings are based on 1% saving in water use as indicator.
Pump savings are based on actual pumps now installed.
Implementation costs & savings to be determined by RDC from maintenance records.

1. Introduction

The Hunterville Rural Water Supply Scheme (HRWS) was put in place and commenced operation in November 1985. Its purpose was and is to extract water from the Rangitikei River and distribute it to rural water users in the area and to the townships of Hunterville and Rata.

It comprises an extraction intake from the Rangitikei River in a gravel trench below the river level, a rising main to a reservoir and gravity mains to the end users. The rising main has three pumping stations designated Well, Middle and Top. It has a total design extraction rate of 26 litres/sec (2,250 m^3/day maximum). The consented maximum water take from the river is 2,500 m^3/day. The design distribution to end users is 1,900m^3/day and the current average take is 1,500m^3/day.

The purpose of this audit of the pumping system is to verify that the scheme is achieving its design supply rate, to evaluate possible improvements to the performance and operation of the scheme, and to minimise ongoing operating costs.

The audit was undertaken on 14 February 2018 by Ivan Fraser Consulting Engineer, and Noel Mason of Mason Consulting and Services Ltd. Assistance in the gathering of information has been provided by Ashley Dahl (Financial Services Team Leader) and Ivan O'Reilly, both of Rangitikei District Council, and their staff. Their input is gratefully acknowledged.

The audit has been conducted in accordance with AS/NZS 3598:2014 Part 2 (industrial and related activities), type 2, and in line with the EECA Pumping System Audit Standard version 1.0.

2. Pumping System Overview

The pumping system comprises a water intake from the Rangitikei River, three pumping stations to pump the water to a reservoir at a height above river of approximately 325 metres. Water from the reservoir is discharged to some 200 end users (including two townships) through underground gravity mains. The demand has some variability through the year, but is nearly constant over any 24 hour period.

The lowest Well pumping station uses two bore pumps (duty and standby) whereas the Middle and Top pumping stations use two multistage centrifugal pumps (duty and standby) to continue the feed to the reservoir.

Control is provided by inter-connected programmable controllers and system graphical displays at each pumping station. The control philosophy is a simple but effective cascade arrangement using staging storage tanks at each of the Middle and Top pumping stations. When the reservoir calls for water, the Top pump starts and draws down the level at its storage tank, which in turn starts the Middle pump and then the Well pump to maintain reservoir and tank levels.

The pumped rising mains are single buried PVC lines, installed by plough some 33 years ago. Maintenance on the mains is required from time to time as the PVC lines fatigue with age and due to ground settlement and pressure points arising from rocks impacting the lines. This also occurs in the gravity mains from the reservoir to the end users.

Some of the original pumps have recently been replaced as they reach the end of their economic life. Savings in running costs are being seen from this process. Filters are suggested to reduce wear on the system, but may not be economic.

A baseline energy intensity metric for each stage of the system is kWh/m^3 (refer Appendix C5 for these).

3. Audit Measurement Methods

3.1 Electricity usage measurement

Electricity usage has been measured from supplier monthly invoices, supplemented by SCADA data for selected time periods, and site observations of pump motor VSD unit displays, including run-hour data.

3.2 Electricity cost measurement

Electricity cost measurements are taken from supplier monthly invoices.

3.3 Pressure measurement

Pressure measurement is by calculation from site details, together with SCADA log data.

3.4 Flow measurement

Flow measurement is from SCADA log data and BMS flow recordings.

3.5 Measurement of leakage and inappropriate use

There are no specific records of leakage, except that the Rangitikei District Council maintenance staff are regularly involved with pipeline repairs as and when they occur. They are also involved with pump and valve upkeep and replacement.

Inappropriate use has not been measured. Each end user is charged a licence for the daily water allocated through their supply meter and it is the user's choice as to how the water is used. There is no individual advantage to make water savings. The meters each comprise a small header tank with ballcock shutoff, and a calibrated discharge orifice to provide the amount of water purchased.

Maintenance and testing of the flows through the meters is undertaken as required as part of on-going service to the end users.

3.6 Estimates of implementation costs

Implementation costs have not been determined. These are a function of the Rangitikei District Council maintenance duties, and cost breakdowns are to be determined by them.

4. Audit Findings

4.1 System demand side

4.1.1 Allow for 1% reduction in daily flow rate by all users by control of overflows
4.1.2 Monitor gravity main performance and leakage

4.2 System network

4.2.1 Monitor and test for rising main leakage (refer section 5 below)

4.3 System supply side

4.3.1 Determine pump duties and establish savings from pump replacements.
4.3.2 Consider installation of water filters at Well Pumps to reduce silt and algeal slime carryover (refer section 4.3.7 below)
4.3.3 Consider cleaning or replacement of river intake gallery.

4.3.1 Determine pump duties:

Well pumps

Item	Original pump	Replacement pump
Pump detail	Pleuger PJ4-64V-8-65?	Lowara Z8-95-5 5XFS?
Suction line size & specification	Not applicable	Not applicable
Straight run	0	0
Bends	0	0
Fittings	2.4m	2.4m
Total equivalent length	0	0
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.02m head/m equiv. length	0.02m head/m equiv.length
Suction dynamic head	0.0	0.0
Discharge line size & specification	150nb Sched 50 steel HDG	150nb Sched 50 steel HDG
Straight run	48m	48m
Bends	6m	6m
Fittings	6.4m	6.4m
Total equivalent length	60.4m	60.4m
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.02m head/m equiv.length	0.02m head/m equiv.length
Discharge dynamic head	1.2m	1.2m
Delivery line size & specification	200nb PVC Class D	200nb PVC Class D
Horizontal distance	1,000m	1,000m
Vertical rise	74.8m	74.8m
Total equivalent length	1,003m	1,003m
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.006m head/m equiv.length	0.006m head/m equiv.length
Delivery dynamic head	6.0m	6.0m
Total dynamic head	7.2m	7.2m
Minimum gravity head		
River RL	151.5m	151.5m
River HL	+0.2m	+0.2m
Delivery tank RL	225.79m	225.79m
Delivery tank LL	2.8m	2.8m
Total minimum gravity head	76.9m	76.9m
Maximum gravity head		
River RL	151.5m	151.5m
River LL	-0.2m	-0.2m
Delivery tank RL	225.79m	225.79m
Delivery tank HL	3.2m	3.2m
Total maximum gravity head	77.7m	77.7m
Total minimum pump head	84.1m	84.1m
Total maximum pump head	84.9m	84.9m
Pump kW from curves	37 kW	29 kW

Middle pumps

Item	Original pump	Replacement pump
Pump detail	KSB Movi -V 65-4	Acme MVD 125-265/7 stage
Suction line size & specification	200nb Sched 40 steel HDG	200nb Sched 40 HDG
Straight run	7.2m	8.7m
Bends equivalent length	9.0m	35m
Fittings equivalent length	1.4m	16.6m
Total equivalent length	17.6m	60.3m
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.006m head/m equiv. length	0.006m head/m equiv. length
Suction dynamic head	0.1m	0.4m
Discharge line size & specification	150nb Sched 40 steel HDG	150nb Sched 40 HDG
Straight run	7.2m	9.0m
Bends equivalent length	8.5m	18.4m
Fittings equivalent length	6.4m	16.4m
Total equivalent length	22.1m	43.8m
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.02m head/m equiv. length	0.02m head/m equiv. length
Discharge dynamic head	0.5m	0.9m
Delivery line size & specification	200nb PVC Class D	200nb PVC Class D
Horizontal distance	900m	900m
Vertical rise	119m	119m
Total equivalent length	908m	908m
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.006m head/m eqiv.length	0.006m head/m equiv.length
Delivery dynamic head	5.4m	5.4m
Total dynamic head	6.0m	6.7m
Minimum gravity head:		
Suction tank RL	225.79m	225.79m
Suction tank HL	3.2m	3.2m
Delivery tank RL	344.80m	344.80m
Delivery tank LL	2.0m	2.0m
Total minimum gravity head	117.8m	117.8m
Maximum gravity head:		
Suction tank RL	225.79m	225.79m
Suction tank LL	2.8m	2.8m
Delivery tank RL	344.80m	344.80m
Delivery tank HL	2.4m	2.4m
Total maximum gravity head	118.6m	118.6m
Total minimum pump head	123.8m	124.5m
Total maximum pump head	124.6m	125.3m
Pump kW from curves	52 kW	37 kW

Top pumps

Item	Original pump	Replacement pump
Pump detail	KSB Movi –V 65-4	Acme MVD 125-265/7 stage
Suction line size & specification	200nb Sched 40 steel HDG	200nb Sched 40 steel HDG
Straight run	7.2m	8.7m
Bends	9.0m	35m
Fittings	1.4m	16.6m
Total equivalent length	17.6m	60.3m
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.006m head/m equiv. length	0.006m head/m equiv. length
Suction dynamic head	0.1m	0.4m
Discharge line size & specification	150nb Sched 40 steel HDG	150nb Sched 40 steel HDG
Straight run	7.2m	9.0m
Bends	8.5m	18.4m
Fittings	6.4m	16.4m
Total equivalent length	22.1m	43.8m
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.02m head/m equiv. length	0.02m head/m equiv. length
Discharge dynamic head	0.5m	0.9m
Delivery line size & specification	200nb PVC Class D	200nb PVC Class D
Horizontal distance	2,000m	2,000m
Vertical rise	131m	131m
Total equivalent length	2,004m	2,004m
Flow rate	26 litres/sec	26 litres/sec
Specific friction loss	0.006m head/m eqiv.length	0.006m head/m equiv.length
Delivery dynamic head	12m	12m
Total dynamic head	12.6m	13.2m
Minimum gravity head		
Suction tank RL	344.80m	344.80m
Suction tank HL	2.4m	2.4m
Reservoir RL	476.23m	476.23m
Reservoir LL	1.8m	1.8m
Total minimum gravity head	130.8m	130.8m
Maximum gravity head		
Suction tank RL	344.80m	344.80m
Suction tank LL	2.0m	2.0m
Reservoir RL	476.23m	476.23m
Delivery tank HL	2.8m	2.8m
Total maximum gravity head	132.2m	132.2m
Total minimum pump head	143.4m	144.0m
Total maximum pump head	144.8m	145.4m
Pump kW from curves	55 kW	39 kW

From the charts on C5 it can be seen that the performance of the Middle and Top pumps were similar prior to the addition of the replacement pumps at each station. It can also be seen that the change of the Middle station pump has produced savings in energy consumption.

From the Middle Station data:
In September of the 2015-2016 year (prior to replacement of the Middle pump):
Middle station specific energy consumption = 0.762 kWh/m^3
Top station specific energy consumption = 0.770 kWh/m^3
Then, Middle pump specific energy = 99% of Top pump.

In September of the 2016-2017 year (after replacement of the Middle pump:
Middle station specific energy consumption = 0.576 kWh/m3
Top station specific energy consumption = 0.796 kWh/m3
And Middle pump specific energy = 72% of Top pump.

Correcting for the original difference, Corrected saving of pump replacement of Middle pump
= 1-((0.762/0.770) x (0.576/0.796)
= 28.4% saving.

This is an annual saving of 28.4% x 392,570 kWh p.a.
= 111,450 kWh p.a.
At average electricity cost = $0.19/kWh
Annual cost saving = $21,175

More recent data from the post-audit period indicates that similar savings are being achieved by replacement of the Top pump.

4.3.4 Relocate replacement pump (remove redundant pump)

The redundant pump at each of the Middle and Top stations could be removed, and the replacement pump relocated in its place. From the above calculations, the saving in pump head on the suction and delivery sides would be about 0.6m. This is insignificant and there is minimal energy savings from this action.

4.3.5 Bias pump running to night time operation

Consideration has been given to pump more at night when the electricity charges are lower, but the profile of demand suggests that there is little reduction in demand through the night, and this option has been discounted.

All three points of supply have the same time of use tariff that is broken into two portions – Line (Powerco) and Energy (Contact Energy) and these are described as follows.

Line Charges

This consists of four parts – an anytime demand charge, a fixed daily service charge, a daytime variable usage charge, and a nighttime variable usage charge. These charges are structured as follows:

- The Anytime Maximum Demand is the kilowatts delivered over the half hour period of maximum consumption during the month to which the charges apply.
- The fixed daily service charge – a fixed rate per day.
- The daytime variable usage charge – this is charged for energy usage between the hours of 0700 to 2300.
- The night time variable usage charge – this is charged for energy usage between the hours of 2300 to 0700.

Line charges typically account for between 55% and 60% of the total bill and they are typically broken down as follows:

- Anytime demand charge – 40%.
- Fixed daily service charge – < 1%.
- Daytime variable usage charge – 55%.
- Nighttime variable usage charge – 4%

Energy Charges

Energy usage is charged on the basis of:

- Daily six four-hour time of use rates.
- Differing rates for weekdays and weekends.
- Differing rates for summer and winter.

Energy charges account for between 40% and 45% of the total bill and they are typically broken down as follows:

- Weekday vs weekend – the typical unit cost of daytime electricity for a weekday is approximately 20% higher than for a weekend day.
- Daytime vs nighttime - the unit cost of daytime electricity is approximately 35% higher than that for the nighttime.

Other Charges

Additionally, an administration charge and the Electricity Levy are applied and these account for less than 1% of the total.

Comments and recommendations

1. There are relatively small variations in electricity usage over the course of a 24 hour period as highlighted below:
   - Weekday, day vs night (typical 4-hour periods) – the daytime usage is approximately 25% higher than during the night time.
   - Weekend, day vs night (typical 4-hour periods) - the daytime usage is approximately 20% higher than during the night time.
2. As mentioned above the night time unit rates are approximately 35% less than the daytime and it is recommended that a review of the users be undertaken to determine whether some night time use reduction is feasible. Current use profiles do not give much latitude for savings in this area.

4.3.6 Control pumps on VSD instead of stop-start

Currently, the pumps operate on a stop-start cycle controlled by demand from the delivery storage tank of reservoir.

A common practice in pumping systems is to slow pumps where possible, to take advantage of affinity laws of pumping where a reduction in pump speed of 50% can give a saving of 85% in pumping energy. In this case, however, the pump head remains nearly constant (refer section 4.3.1 above) and the pump power is directly proportional to flow rate. If we reduce the flow rate, we need to pump longer to deliver the same total volume, and energy costs remain the same. There is no energy advantage in this option.

Another reason to run the pumps at variable speed is to reduce the number of motor starts per hour. The pumping profiles in Appendix C indicate that the pumps are currently operating at between 1 and 2 starts per hour. This is well within the capacity of the motor allowances and no changes are proposed.

4.3.7 Add well station discharge side filtration

Reports from maintenance staff are that silt and algal slime are drawn into the system from the river gallery and cause pump blockages and sediment buildup at each storage tank, and at the reservoir. The cost of clearing blockages and erosion of the pumps and piping systems is not known at this stage.

Recommended filter unit is an Amiad model SAF 4500 which can filter down to 10 microns. The filter would be fitted to the supply line between the river extraction well and the adjacent pump house, with the contaminants discharged back to the river.
Installed filter cost is about $105,000 +GST.
Savings would come from a reduction in pump maintenance and extended pump life. These costs have not yet been quantified.

5. Ongoing Performance Monitoring

It is recommended that the system performance be monitored monthly using a metric such as kWh/m^3 for each pump station, and that these be plotted against water allocations. Any variances will indicate a possible system fault.

It is also suggested that the rising main be monitored for leakage in the piping system, and also leakage at the non-return valves.

A procedure to identify leakage would be to stop pumping from each station and monitor the rise or fall in storage tank level. If the tank level falls, it indicates some pipe leakage in the line below the storage tank, and if the level rises, it indicates a back flow from the section above into the tank. This procedure can be carried out remotely from the BMS/SCADA system.

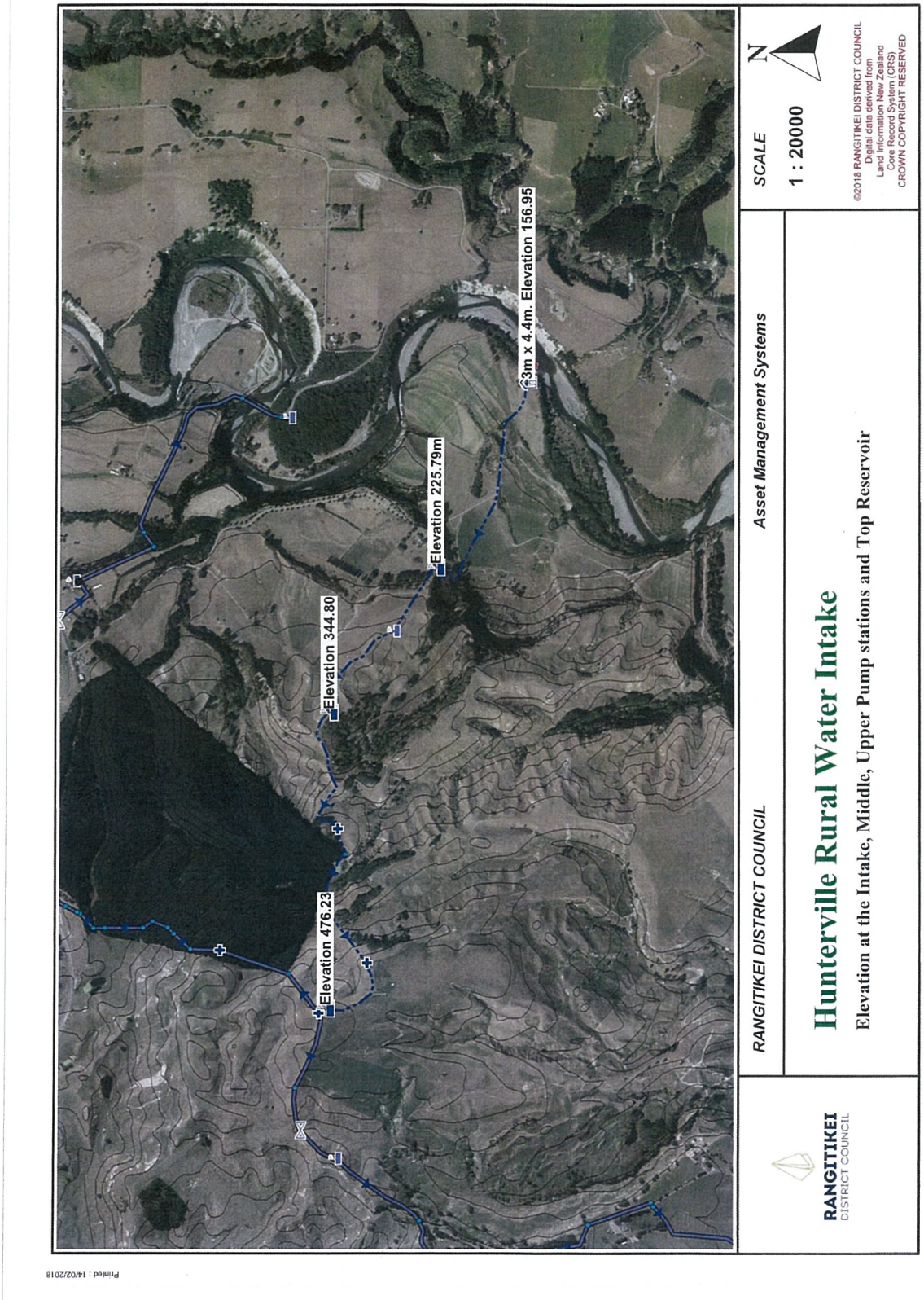
6. Summary of recommendations

Recommendation identifier and Report Section Ref	Dependency	Electricity Saving (kWhpa)	Annual Cost Saving ($)	Implemnt costs ($)	Simple payback period (years)
Demand-side recommendations:					
#1 4.1.1: Reduce allocation	#9	7,800	$1,478	Not known	
#2 4.1.2: Monitor, repair leakage	#9	7,800	$1,478	Not known	
Network recommendations:					
#3 4.2.1: Monitor rising main	#9	7,800	$1,478	Not known	
Supply-side recommendations:					
#4 4.3.1: Replace Well pump	#9	41,800	$7,900	Not known	
#5 4.3.1: Replace Middle pump	#9	111,450	$21,175	Not known	
#6 4.3.1: Replace Top pump	#9	111,450	$21,175	Not known	
#7 4.3.2: Fit filters	None	Not known	Not known	$105,000	
#8 4.3.3: Clean intake gallery	#9	Not known	Not known	Not known	
Ongoing monitoring recommendations:					
#9 5: Monitor performance				None	
#10 5: Monitor leaks – rising main	#9	7,800	$1,478	none	

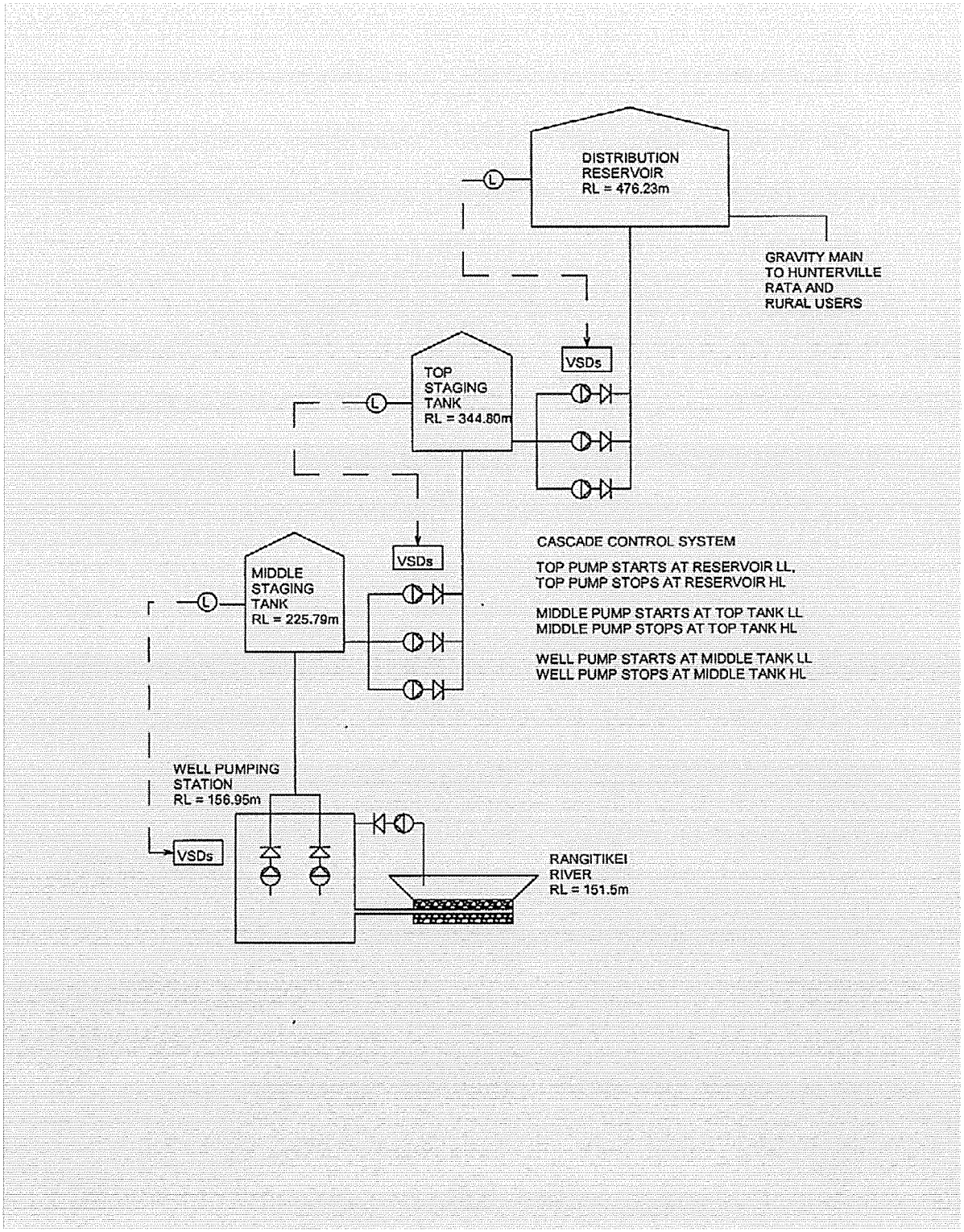
Note: Savings are based on 1% saving in water use as indicator
Pump savings are based on actual pumps now installed
Implementation costs & savings to be determined by RDC from maintenance records

7. Appendices

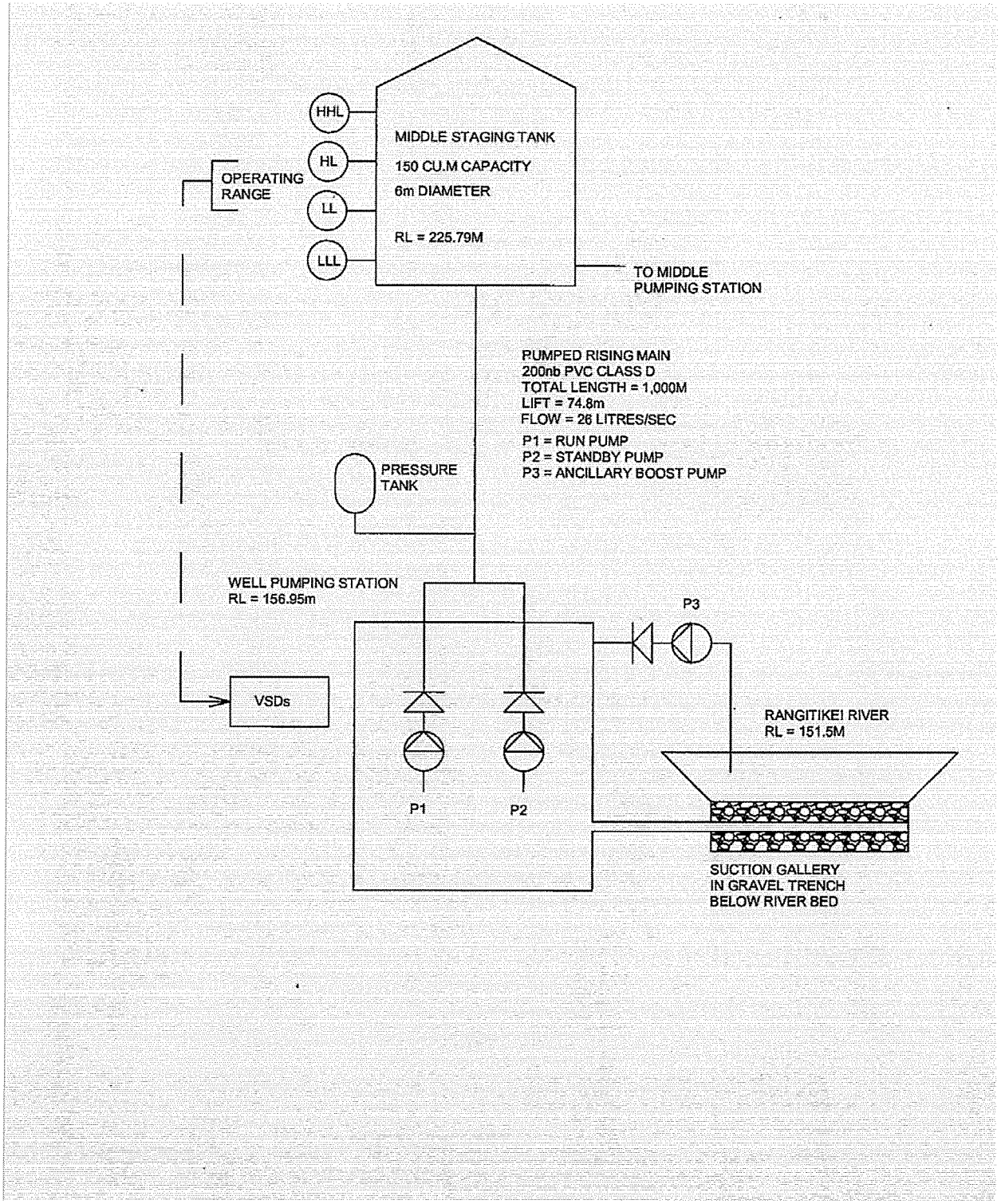
Appendix A – Site Layout



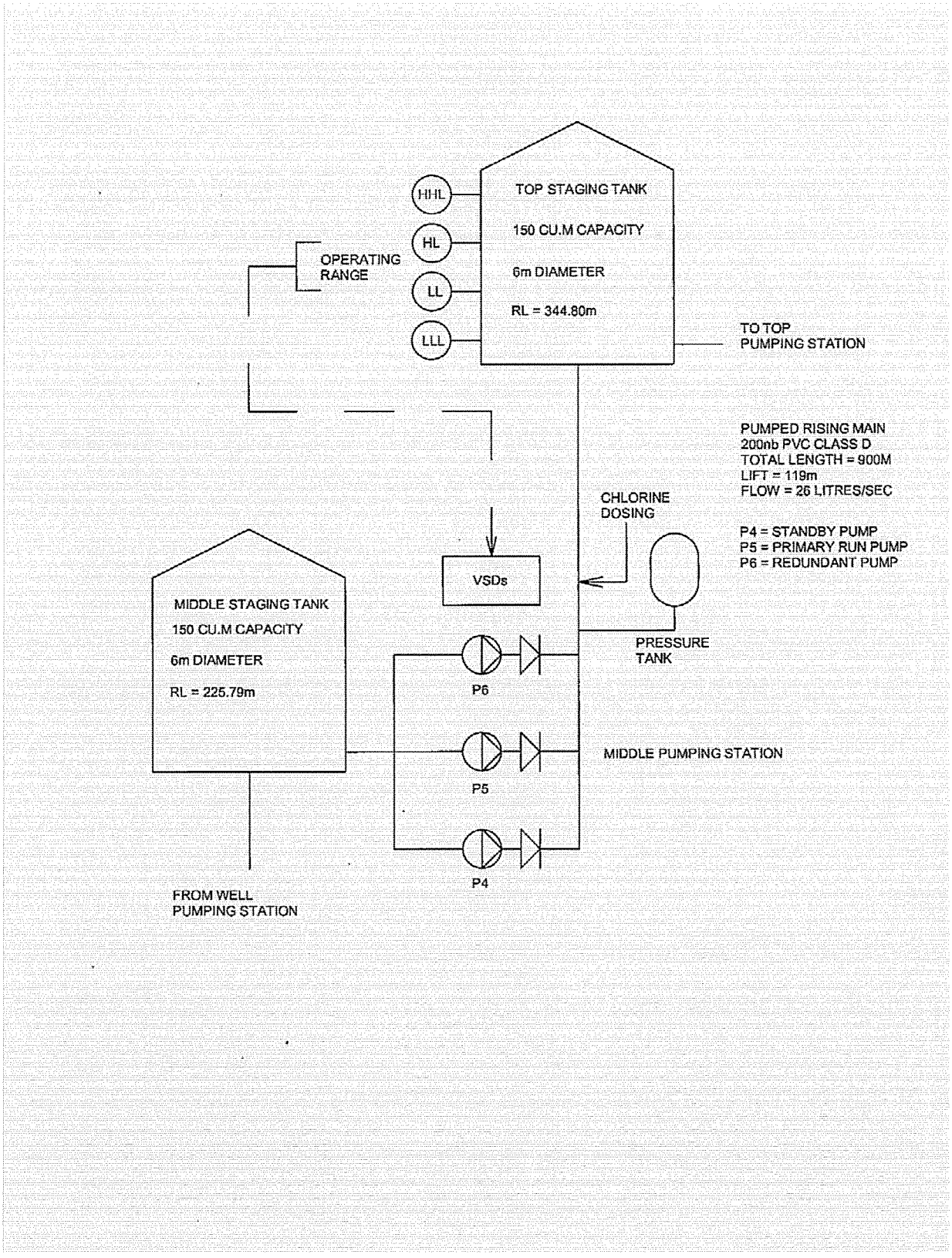
Appendix B1 – System Schematic Combined Rising Main



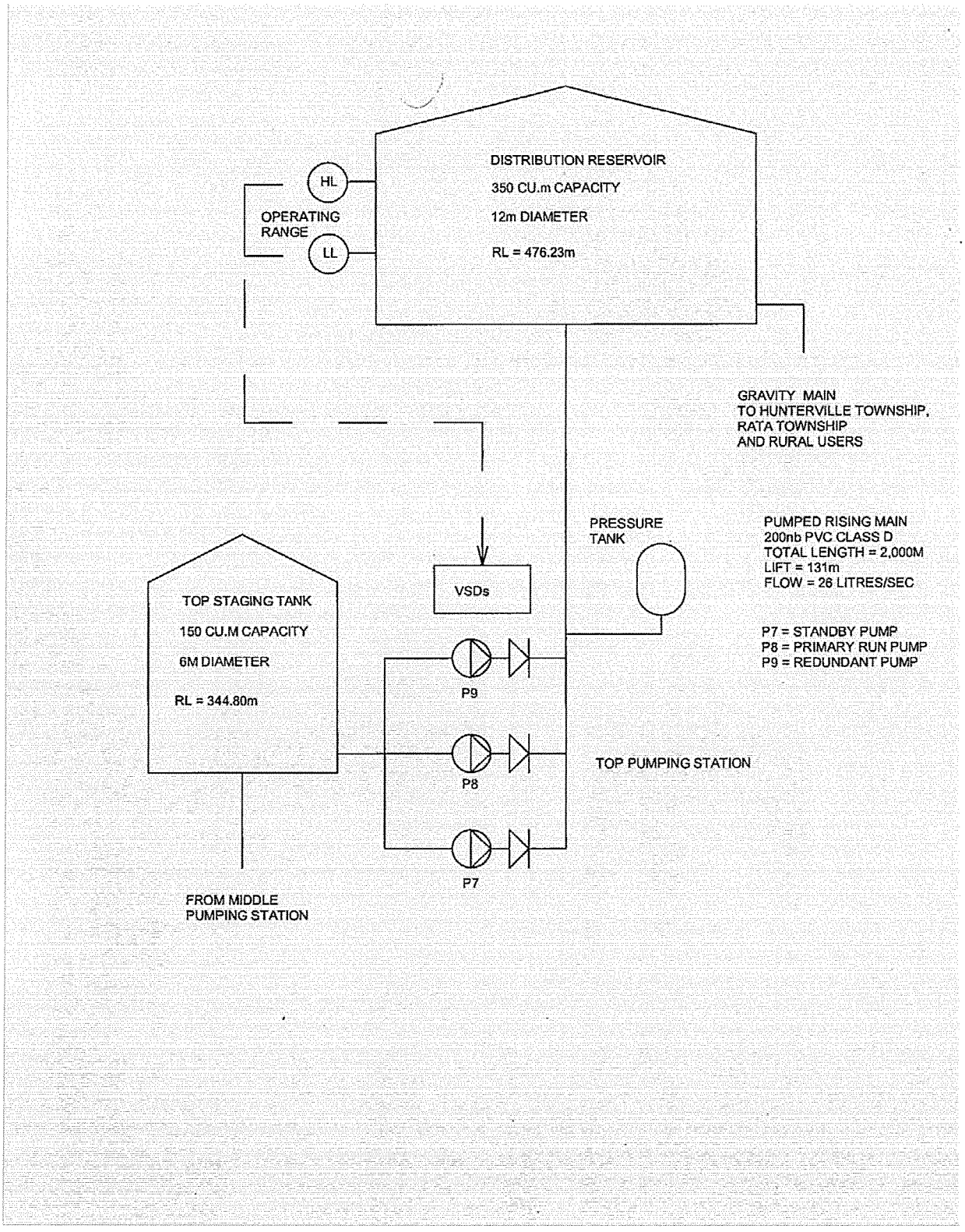
Appendix B2 – System Schematic Well Pumping Station



Appendix B3 – System Schematic Middle Pumping Station



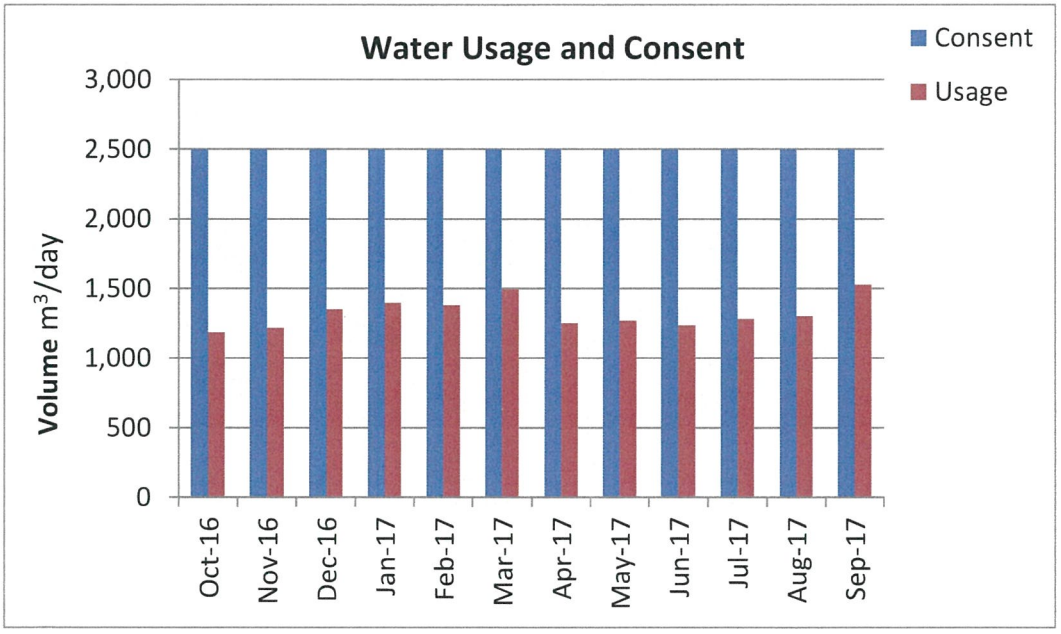
Appendix B4 – System Schematic Top Pumping Station



Appendix C1 – Audit data records Water Allocation and Use

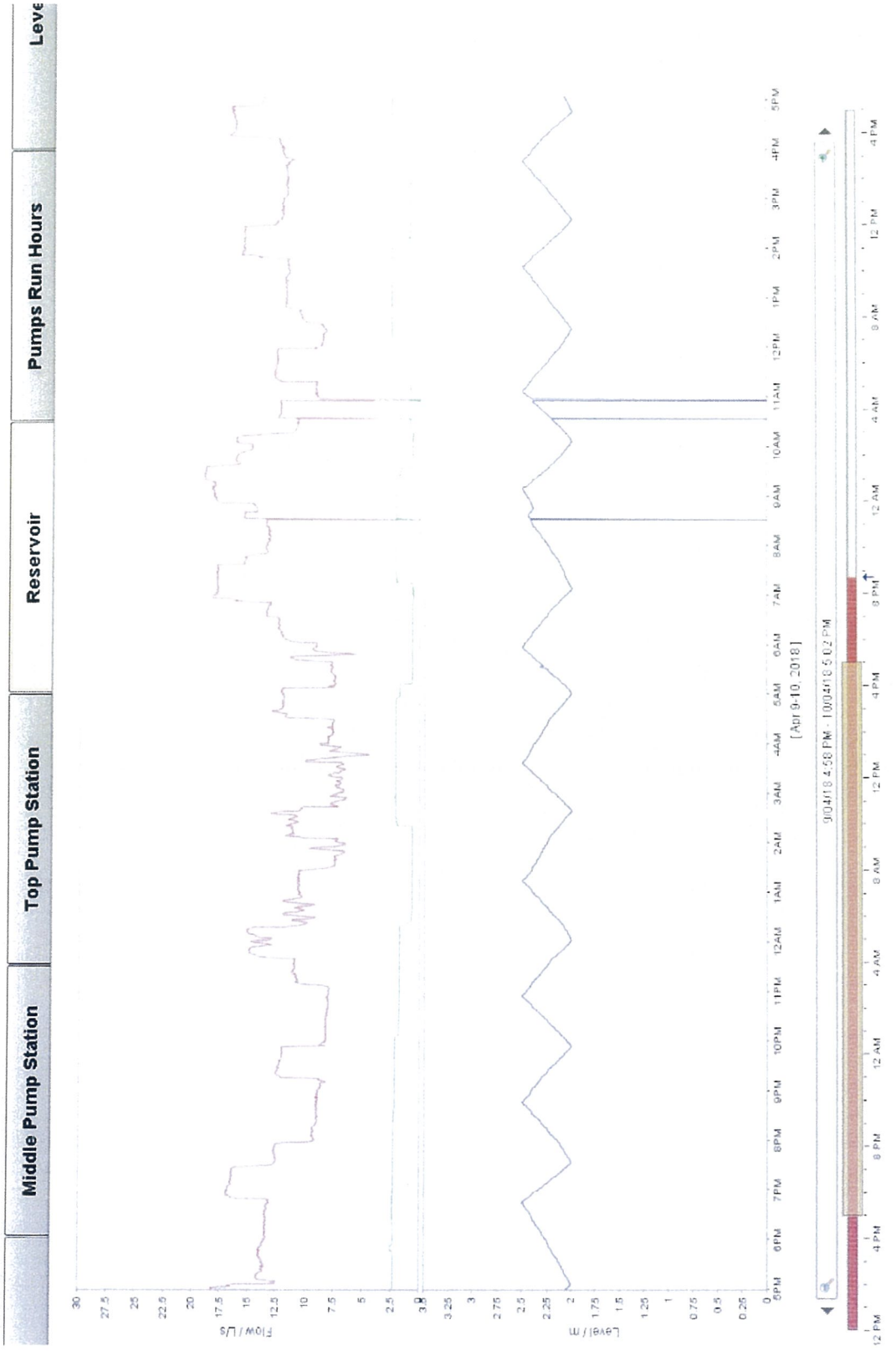
Monthly water end-use allocation and use:

Month	Consented Take Limit M^3/day	Total Daily Draw M^3/day	Urban use M^3/day	Rural Use M^3/day
Oct-16	2,500	1,186	143	1,043
Nov-16	2,500	1,216	133	1,083
Dec-16	2,500	1,352	145	1,207
Jan-17	2,500	1,400	159	1,241
Feb-17	2,500	1,381	133	1,249
Mar-17	2,500	1,497	112	1,386
Apr-17	2,500	1,253	160	1,093
May-17	2,500	1,269	139	1,130
Jun-17	2,500	1,236	134	1,102
Jul-17	2,500	1,280	144	1,136
Aug-17	2,500	1,304	133	1,171
Sep-17	2,500	1,530	137	1,393
Year	910,000	482,374	50,696	431,678



24 hour demand profile from reservoir:

There is only minor reduction in demand to North and South branches overnight.



Appendix C2 – Audit data records Well Pumping Station

Monthly electricity use:

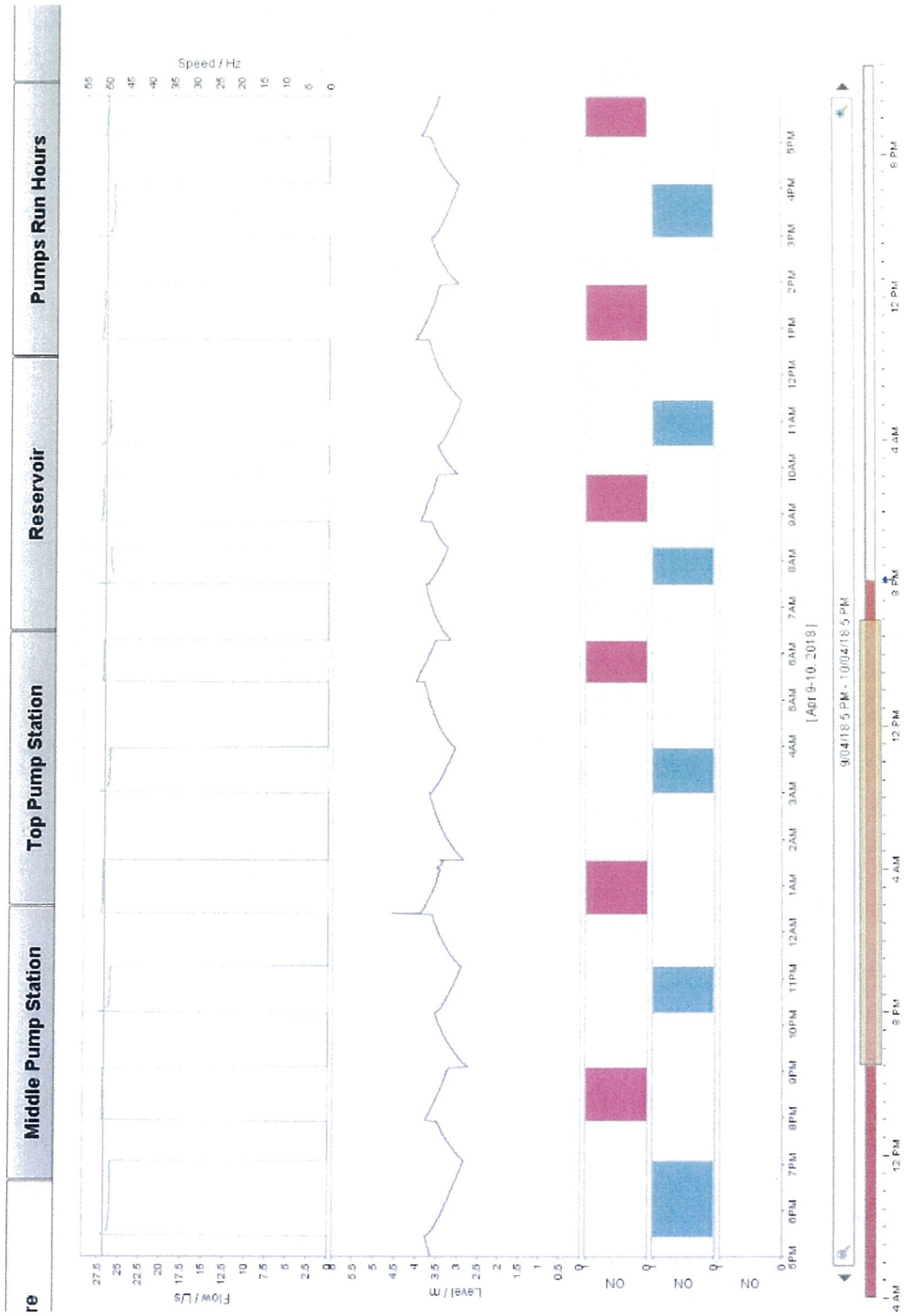
Year	Month	Days	kWh	kWh/day	Flow/day	kWh/m^3
2015	Oct	31	16,297	526	***1,171***	***0.449***
2015	Nov	30	17,334	578	***,1,200***	***0.482***
2015	Dec	31	19,289	622	***1,339***	***0.465***
2016	Jan	31	20,034	646	***1,452***	***0.445***
2016	Feb	29	21,901	755	***1,579***	***0.478***
2016	Mar	31	21,366	689	***1,452***	***0.475***
2016	Apr	30	18,003	600	***1,500***	***0.400***
2016	May	31	16,628	536	***1,435***	***0.374***
2016	Jun	30	13,561	452	***1,383***	***0.327***
2016	Jul	30	14,540	469	1,359	0.345
2016	Aug	31	14,106	455	1,234	0.369
2016	Sep	30	13,843	461	1,064	0.434
2015-6	Year	366	206,902			

Note: Flow values from Oct 2015 to Jun 2016 are estimates.

Year	Month	Days	kWh	kWh/day	Flow/day	kWh/m^3
2016	Oct	31	16,752	540	1,186	0.455
2016	Nov	30	16,849	562	1,216	0.462
2016	Dec	31	19,579	632	1,352	0.467
2017	Jan	31	20,704	668	1,400	0.477
2017	Feb	28	18,365	656	1,381	0.475
2017	Mar	31	22,700	732	1,497	0.489
2017	Apr	30	17,984	599	1,253	0.478
2017	May	31	18,455	595	1,269	0.469
2017	Jun	30	17,316	577	1,236	0.467
2017	Jul	30	17,485	564	1,280	0.441
2017	Aug	31	18,229	588	1,304	0.451
2017	Sep	30	20,764	692	1,530	0.452
2016-7	Year	365	225,182		482,374	0.467

24 hour pumping demand:

12 pumping cycles over 24 hours.



Appendix C3 – Audit data records Middle Pumping Station

Monthly electricity use:

Year	Month	Days	kWh	kWh/day	Flow/day	kWh/m^3
2015	Oct	31	27,917	901	***1,171***	***0.769***
2015	Nov	30	29,704	990	***1,200***	***0.825***
2015	Dec	31	32,918	1,062	***1,339***	***0.793***
2016	Jan	31	34,427	1,111	***1,452***	***0.765***
2016	Feb	29	35,572	1,227	***1,579***	***0.777***
2016	Mar	31	34,881	1,125	***1,452***	***0.775***
2016	Apr	30	30,039	1,001	***1,500***	***0.667***
2016	May	31	27,261	879	***1,435***	***0.613***
2016	Jun	30	23,050	768	***1,383***	***0.555***
2016	Jul	30	24,627	794	1,359	0.584
2016	Aug	31	24,824	801	1,234	0.649
2016	Sep	30	24,327	811	1,064	0.762
2015-6	Year	366	349,547			

Note: Flow values from Oct 2015 to Jun 2016 are estimates.

Year	Month	Days	kWh	kWh/day	Flow/day	kWh/m^3
2016	Oct	31	30,179	974	1,186	0.821
2016	Nov	30	29,471	982	1,216	0.808
2016	Dec	31	34,170	1,102	1,352	0.815
2017	Jan	31	35,902	1,158	1,400	0.827
2017	Feb	28	3,1965	1,142	1,381	0.827
2017	Mar	31	39,160	1,263	1,497	0.844
2017	Apr	30	32,438	1,081	1,253	0.863
2017	May	31	32,009	1,033	1,269	0.814
2017	Jun	30	30,927	1,031	1,236	0.834
2017	Jul	30	27,480	886	1,280	0.692
2017	Aug	31	23,314	752	1,304	0.577
2017	Sep	30	26,452	882	1,530	0.576
2016-7	Year	365	373,467		482,374	0.774

24 hour pumping demand:

22 pumping cycles over 24 hours

Appendix C4 – Audit data records Top Pumping Station

Monthly electricity use:

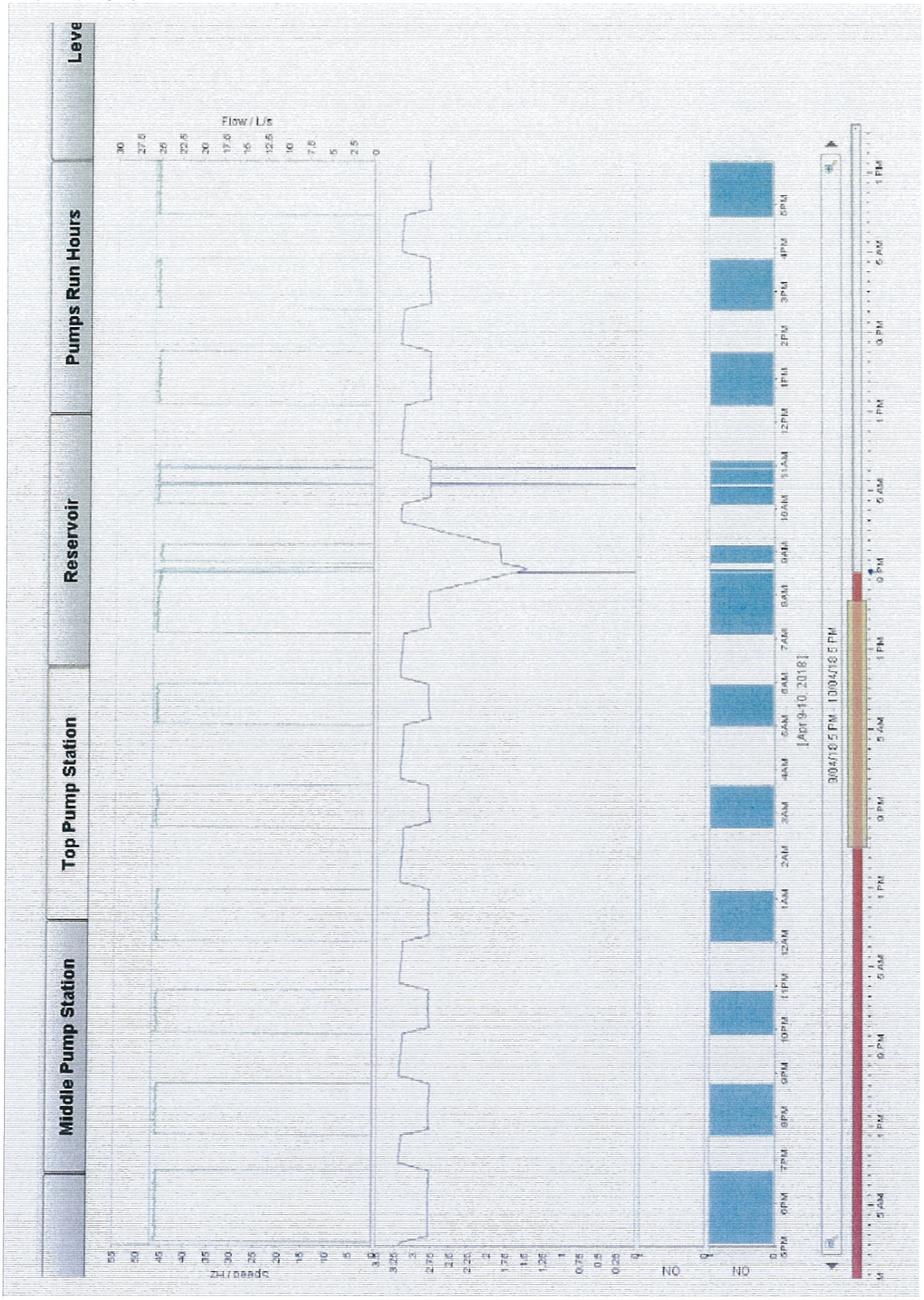
Year	Month	Days	kWh	kWh/day	Flow/day	kWh/m^3
2015	Oct	31	26,581	857	***1,171***	***0.732***
2015	Nov	30	28,296	943	***1,200***	***0.786***
2015	Dec	31	30,618	988	***1,339***	***0.738***
2016	Jan	31	30,516	984	***1,452***	***0.678***
2016	Feb	29	32,108	1,107	***1,579***	***0.701***
2016	Mar	31	31,549	1,018	***1,452***	***0.701***
2016	Apr	30	27,218	907	***1,500***	***0.605***
2016	May	31	26,008	839	***1,435***	***0.585***
2016	Jun	30	22,693	756	***1,383***	***0.547***
2016	Jul	30	24,404	787	1,359	0.579
2016	Aug	31	25,866	834	1,234	0.676
2016	Sep	30	24,583	819	1,064	0.770
2015-6	Year	366	330,440			

Note: Flow values from Oct 2015 to Jun 2016 are estimates.

Year	Month	Days	kWh	kWh/day	Flow/day	kWh/m^3
2016	Oct	31	29,778	961	1,186	0.810
2016	Nov	30	29,060	969	1,216	0.797
2016	Dec	31	34,091	1,100	1,352	0.814
2017	Jan	31	35,818	1,155	1,400	0.825
2017	Feb	28	31,542	1,127	1,381	0.816
2017	Mar	31	3,8372	1,238	1,497	0.827
2017	Apr	30	31,634	1,054	1,253	0.841
2017	May	31	31,878	1,028	1,269	0.810
2017	Jun	30	30,489	1,016	1,236	0.822
2017	Jul	30	31,056	1,002	1,280	0.783
2017	Aug	31	32,315	1,042	1,304	0.800
2017	Sep	30	36,537	1,218	1,530	0.796
2016-7	Year	365	392,570		482,374	

24 hour pumping demand:

11 pumping cycles over 24 hours



Appendix C5 – Audit data records Combined Profiles

The charts below show relative pump loads for the 2015-2016 and 2016-2017 years. Data is taken from individual pump data in appendices C2, C3 and C4.

Chart C5-1

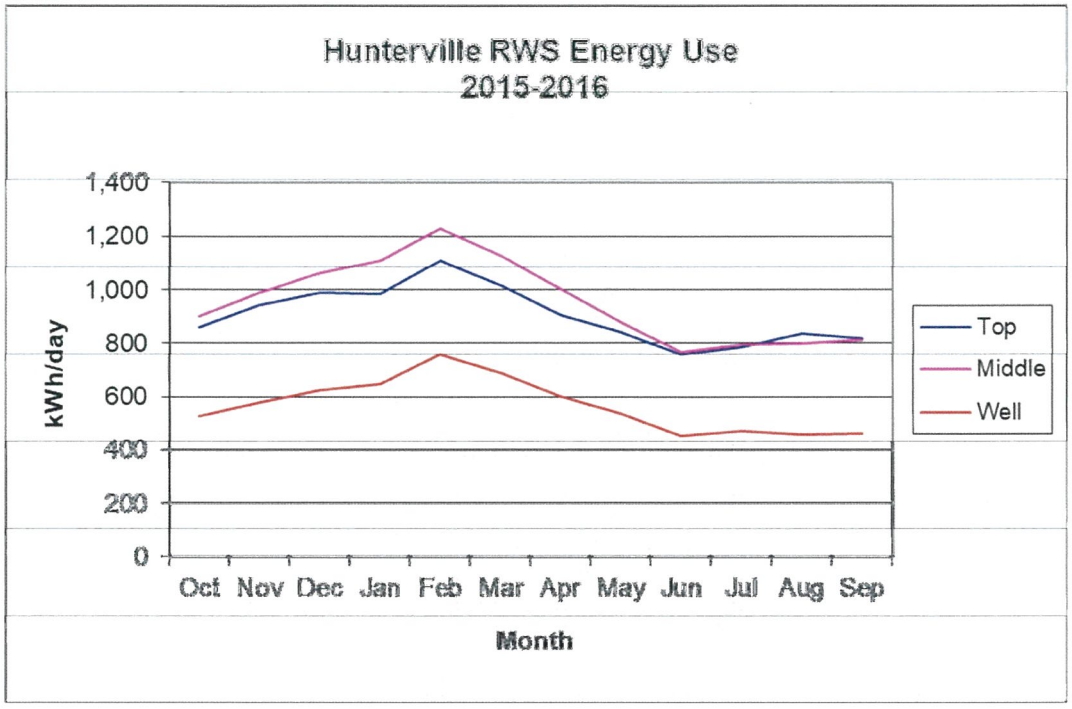
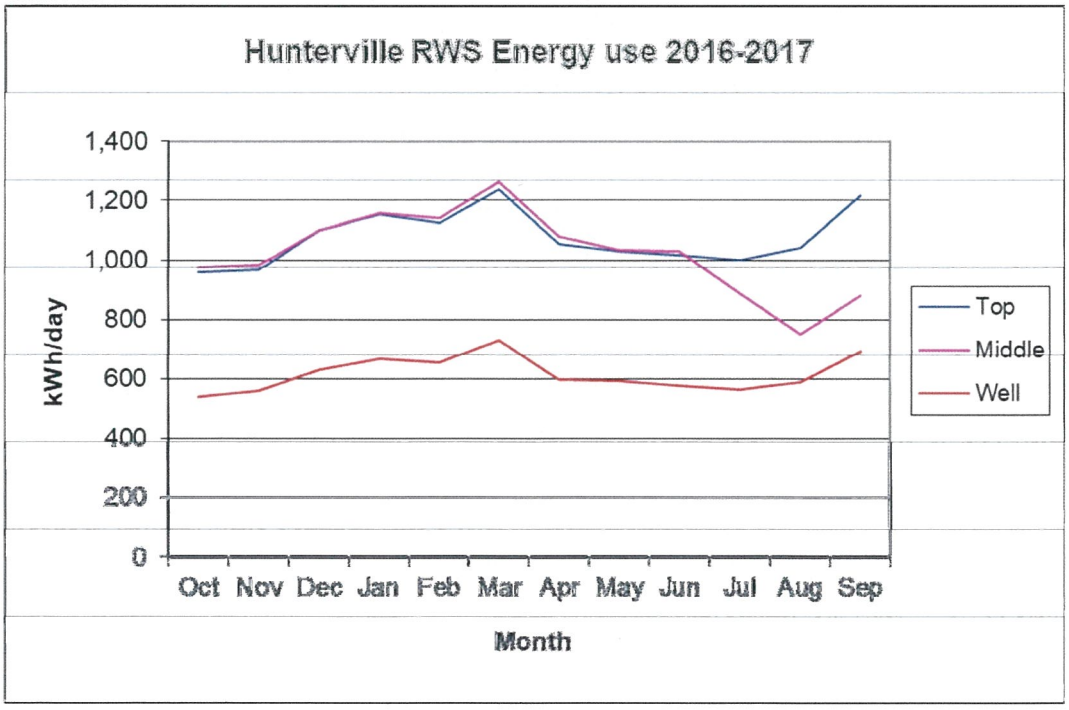


Chart C5-2



Appendix C6 - Electricity usage and cost data

Area	Year	Month	kWh nett	Total $ less 10%	c/kWh
Top pump	2016	Oct	29,778	$5,292.50	0.18
	2016	Nov	29,060	$5,119.62	0.18
	2016	Dec	34,091	$6,031.13	0.18
	2017	Jan	35,818	$6,622.04	0.18
	2017	Feb	31,542	$6,324.90	0.20
	2017	Mar	38,372	$6,534.53	0.17
	2017	Apr	31,634	$6,311.21	0.20
	2017	May	31,878	$6,558.20	0.21
	2017	Jun	30,489	$6,500.21	0.21
	2017	Jul	31,056	$6,688.18	0.22
	2017	Aug	32,315	$6,612.81	0.20
	2017	Sep	36,537	$6,801.71	0.19
Totals			**392,570**	**$75,397.04**	**0.19**

Middle pump	2016	Oct	30,179	$5,320.28	0.18
	2016	Nov	29,471	$5,185.61	0.18
	2016	Dec	34,170	$6,044.57	0.18
	2017	Jan	35,902	$6,669.85	0.19
	2017	Feb	31,965	$6,251.24	0.20
	2017	Mar	39,160	$7,017.59	0.18
	2017	Apr	32,438	$6,487.97	0.20
	2017	May	32,009	$6,627.63	0.21
	2017	Jun	30,927	$6,624.66	0.21
	2017	Jul	27,480	$6,212.05	0.23
	2017	Aug	23,314	$4,671.92	0.20
	2017	Sep	26,452	$5,219.32	0.20
Totals			**373,467**	**$72,332.67**	**0.19**

Well pump	2016	Oct	16,752	$3,027.29	0.18
	2016	Nov	16,849	$3,018.21	0.18
	2016	Dec	19,579	$3,518.46	0.18
	2017	Jan	20,704	$4,034.21	0.19
	2017	Feb	18,365	$3,751.71	0.20
	2017	Mar	22,700	$4,094.61	0.18
	2017	Apr	17,984	$3,768.38	0.21
	2017	May	18,455	$3,652.75	0.20
	2017	Jun	17,316	$3,578.90	0.21
	2017	Jul	17,485	$4,054.91	0.23
	2017	Aug	18,229	$4,033.89	0.22
	2017	Sep	20,764	$4,154.59	0.20
Totals			**225,182**	**$44,687.91**	**0.20**

Ivan A Fraser
CONSULTING ENGINEER

CMEngNZ CPEng, (Mechanical Environmental), IntPE
BE(Mech), FIRHACE, MASHRAE, MCASANZ, CMVP
EMANZ EnergyMasters accredited Energy Auditor & Technology Specialist
EECA Business Programme Partner

46 Caribbean Drive, Unsworth Heights
Auckland 0632.

Ph: (09)410 5008 Fax (09)410 5008
E-mail: ivanfraser3@gmail.com

In association with Mason Consulting and Services Ltd

Rangitikei District Council
Marton Swim Centre

Energy Audit

REPORT

Prepared for
Ashley Dahl – Financial Services Team Leader, Rangitikei District Council

File Ref 3707-5
30 April 2018

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APPENDICES

Executive Summary

The Marton Swim Centre is located in Hereford Street, Marton and is operated as a joint venture between Rangitikei District Council and the Nicholls Swim Academy. This audit was undertaken on 16 February 2018 by Ivan Fraser and Noel Mason.

The facility is well managed and controlled but there are some areas identified where energy savings may be made. The site has had a history of water leaks but many of these have recently been repaired.

For the audit period from 1 October 2016 to 30 September 2017 the energy usage is summarised as follows:

Energy Source	Usage	Average rate	Cost	Tonnes CO_{2e}
Electricity (Meridian until 31 Dec, then Contact)	191,911 kWh	19c/kWh	$34,563	102
Natural Gas (Trustpower / Energy Direct))	688,524 kWh	6.75c/kWh	$46,451	134
Total	**880,435 kWh**	**9.20c/kWh**	**$81,014**	**236**

There are areas where energy can be saved cost-effectively and these are summarised as follows.

Measure	Annual $ savings	Annual kWh/yr savings	Est. costs	Simple payback yrs	Reference page
Insulate 50m pool hall roof	$23,000	596,960	$35,000	1.5	27
Install check metering	$4,000	8,000	$10,000	2.0	18
Night turn-down of pool fans	$3,464	18,232	$8,000	2.3	24
50m Pool pump night turndown	$1,473	7,751	$6,000	4.1	23
Training Pool pump night turndown	$1,029	5,414	$4,500	4.4	23
Totals	***$32,966***	***636,357***	***$63,500***	***1.9***	

1. Introduction

The Marton Swim Centre is located in Hereford Street, Marton and is operated as a joint venture between Rangitikei District Council and the Nicholls Swim Academy. This audit was undertaken on 16 February 2018 by Ivan Fraser and Noel Mason.

This energy assessment was carried out on 16 February 2018 by Ivan Fraser and Noel Mason with assistance from Trevor Nicholls – the plant operator, and from Ashley Dahl and his staff from Rangitikei District Council. Their assistance is appreciated. The audit period was from 1 October 2016 to 30 September 2017.

The facility is well managed and controlled but there are some areas identified where energy savings may be made. The site has had a history of water leaks. Many of these have recently been repaired.

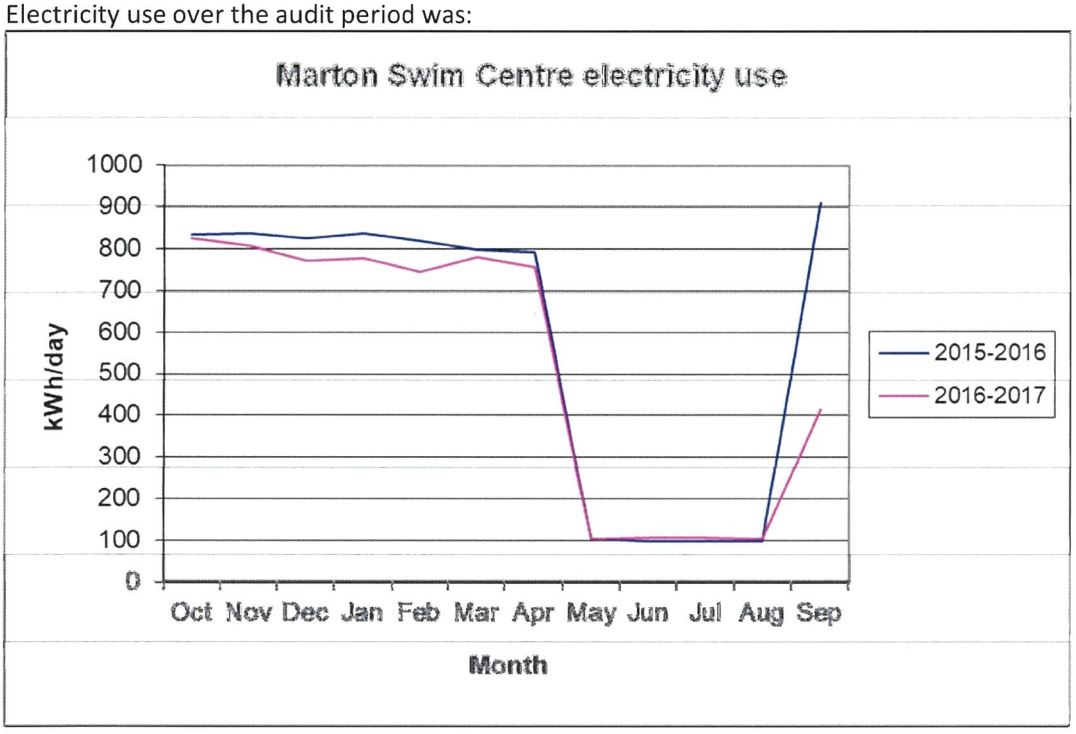
The pool season is from end of term 3 to last Sunday in May (about 260 days /year). Pool draining and maintenance is carried out in the off season. During the season, the Centre operates for seven days per week over 260 days per year. The 50 metre operates for 13 hours per day and the training pool operates for 8 hours per day.

2. Historic Energy Use and comparison to targets

2.1 Electricity use

Electricity is provided to the site by Contact Energy through a point of supply identified as ICP 0032770057PCC1F.

Electricity use over the audit period was:



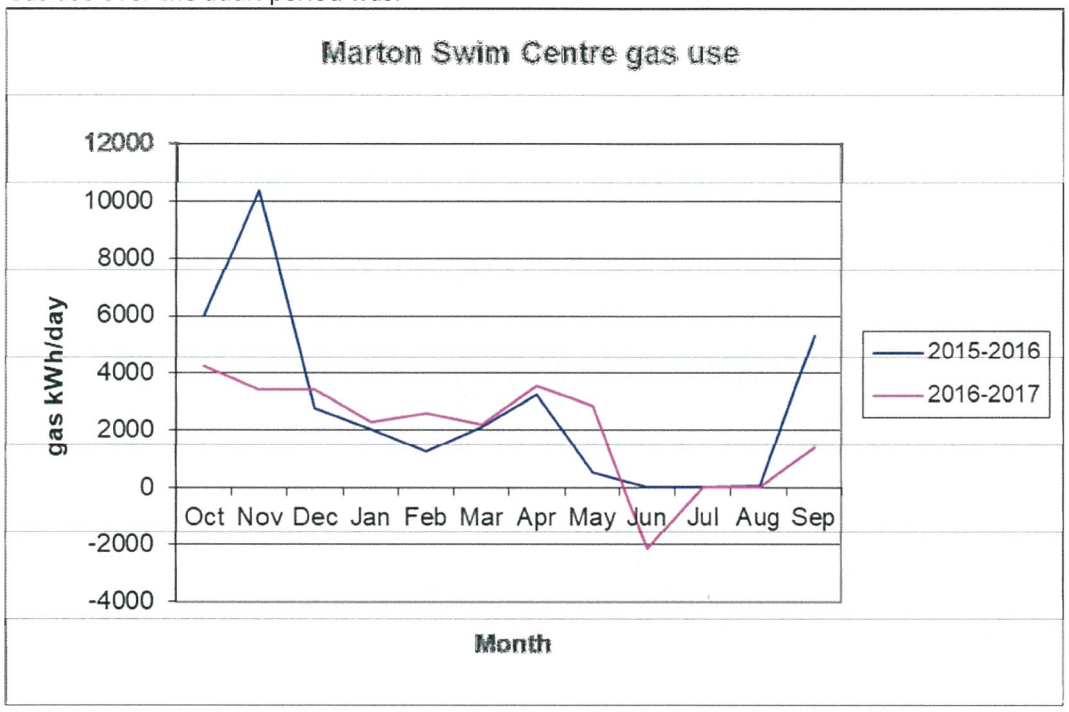
The drop in electricity use between June and August each year is due to the Marton Swim Centre being closed for maintenance during these periods.

2.2 Natural gas use

Natural gas is provided to the site by Energy Direct through ICP No 0000027434GN5F3 through gas meter No 8193555/1. The details of gas supplied to the site are set out in Appendix C. Gas tariffs are set out in Section 2.5.2 below.

Natural gas is used on site for pool water heating and for domestic hot water in the showers, and is the dominant energy use on the site.

Gas use over the audit period was:



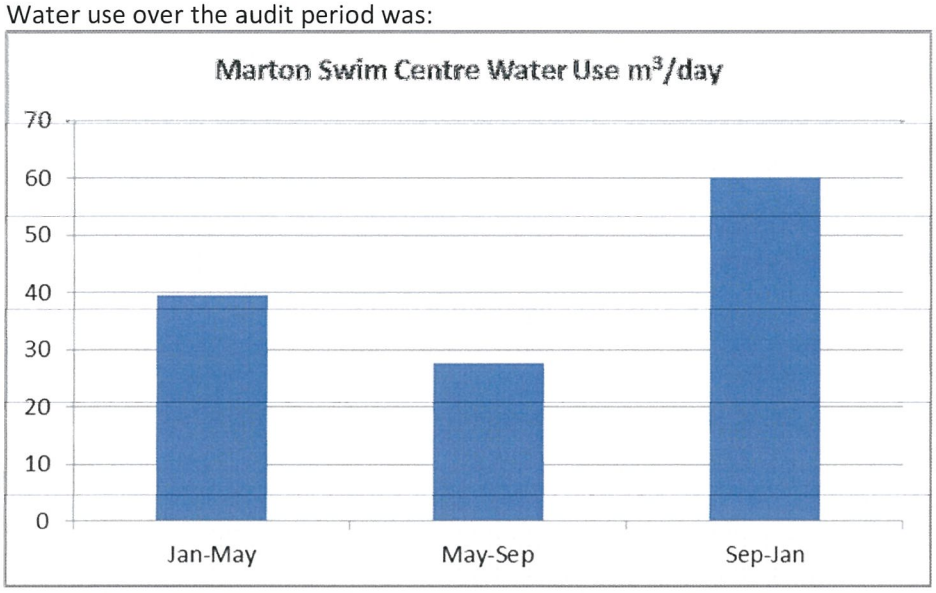
The negative supply in June 2017 results from a correction to the amount billed to the site in previous months.

2.3 Water use

Potable water is provided to the site by Rangitikei District Council through water meter M120102 in Hereford Street. The details of water supplied to the site are set out in Appendix D. Water supply tariffs are set out in Section 2.5.3 below.

Water is used on the site for pool water, pool area wash-down and domestic water in the change rooms.

Water use over the audit period was:



The period from May to September mainly covers the off-season when the Centre is closed for maintenance. The large consumption in the September to January period will include refilling the pools before reopening for the new season.

2.4 Total combined use

The total combined usage for the audit period was 880,435 kWh at a total cost $81,014 and an average unit 9.20c/kWh.

2.5 Tariff analysis

2.5.1 Electricity tariff

Electricity is provided to the site by Contact Energy through a point of supply identified as ICP 0032770057PCC1F.

This supply has a time of use tariff that is broken into two portions – Line (Powerco) and Energy (Contact Energy) and these are described as follows.

Line Charges

This consists of five parts – an anytime demand charge, a wash-up demand charge, a fixed daily service charge, a daytime variable usage charge, and a nighttime variable usage charge. These charges are structured as follows:

- The Anytime Maximum Demand is the kilowatts delivered over the half hour period of maximum consumption during the month to which the charges apply.

- The Wash-up Demand is an adjustment to take into account the cyclical nature of meter readings making it impractical to provide completely accurate figures for consumption for each Point of Connection within the timeframe required for payment of Line Charges. It is, therefore, necessary to provide a structure for subsequent wash-ups.
- The fixed daily service charge – a fixed rate per day.
- The daytime variable usage charge – this is charged for energy usage between the hours of 0700 to 2300.
- The night time variable usage charge – this is charged for energy usage between the hours of 2300 to 0700.

Line charges typically account for approximately 60% of the total bill and they are typically broken down as follows:

- Anytime demand charge – 55%.
- Wash-up demand charge – usually a credit.
- Fixed daily service charge – < 1%.
- Daytime variable usage charge – 45%.
- Nighttime variable usage charge – 4%

Energy Charges

Energy usage is charged on the basis of:

- Daily six four-hour time of use rates.
- Differing rates for weekdays and weekends.
- Differing rates for summer and winter.

Energy charges account for approximately 40% of the total bill and they are typically broken down as follows:

- Weekday vs weekend – the typical unit cost of daytime electricity for a weekday is approximately 20% higher than for a weekend day.
- Daytime vs nighttime - the unit cost of daytime electricity is approximately 45% higher than that for the nighttime.

Other Charges

Additionally, an administration charge and the Electricity Levy are applied and these account for less than 5% of the total.

Comments and recommendations

1. There are relatively small variations in electricity usage over the course of a 24 hour period as highlighted below:
    - Weekday, day vs night (typical 4-hour periods) – the daytime usage is approximately 30% higher than during the night time.
    - Weekend, day vs night (typical 4-hour periods) - the daytime usage is approximately 30% higher than during the night time.

The overall unit cost of electricity during the audit period was 19c/kWh.

2.5.2 Gas tariff

The gas energy use on site is the dominant energy use. The majority of charges are for energy consumption (94%of the total) with the remaining 6% for daily and network charges.

Under the Trustpower contract, the gas energy cost remained constant at 6.92c/kWh over the audit period from October 2016 to September 2017.

The daily charge was $11.48/day, and GIC levies were 0.0046c/kWh and 2.196c/day.
Average gas rate for calculations was 6.75c/kWh.

The total gas charge for the audit period was $46,451.

The gas charges are typical of other users and no changes are recommended.

2.5.3 Water tariff

The water use on site is not an energy use but is significant for this site. Analysis indicates that there are very large losses in water, not used in the operation of the site.

The water is charged at a bulk rate of $1.71 per cubic metre of water supplied.

The total water charge for the audit period was $27,662.

2.6 Energy use targets

For indoor heated swimming pools, the usual metric for an Energy Performance Indicator (EnPI) is kWh/year of total energy consumption excluding ancillary services such as sauna rooms, spas and gyms per m2 of pool surface area (kWh/m2).

The total energy use during the audit period	= 880,435 kWh
The total pool surface area	= 710 m^2
Then, Marton Swim Centre EnPI	= 1,240 kWh/m^2

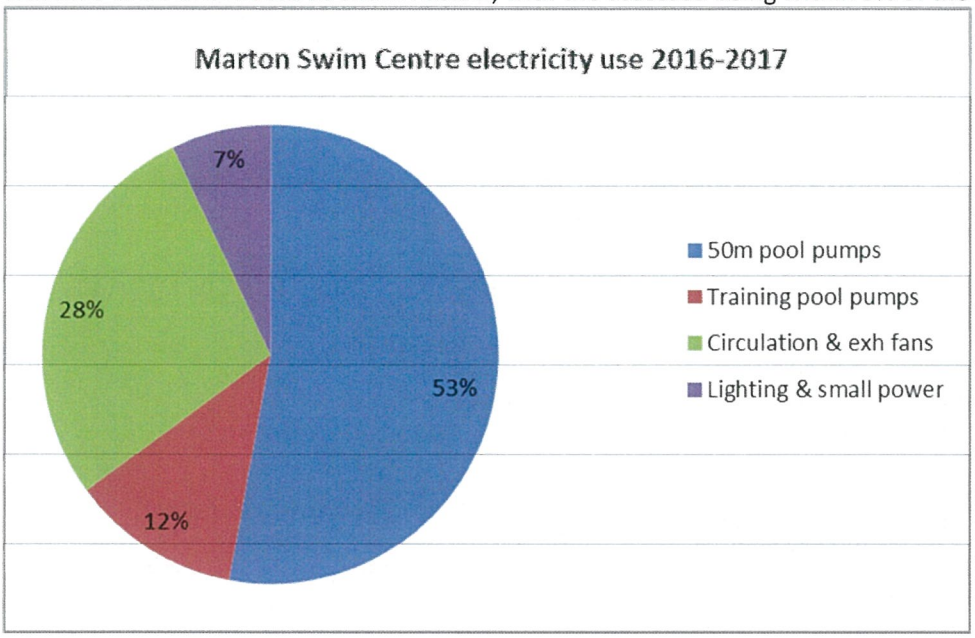
This compares favourably with the guidelines from the EECA publication "Energy Efficient Indoor Swimming Pools" 2001 of 7GJ/m^2 (1,944 kWh/m^2) for gas heated pool complexes. Even adjusting for full year operation, the estimated EnPI would only increase to 1,740 kWh/m^2 per year. This is still lower than the guidelines and compares favourably with other similar pools.

Leakage at the Centre is a concern, as is the size of the training Pool balance tank. These leakages increase the consumption of make-up water, and the heating and chemicals required for replacement.

3 Energy end uses

3.1 Electricity end uses

Electricity is used on the site for pumping, fans, lighting and small power. The electricity usage has been assessed to be distributed as shown below, with the assessed being within 5% of the actual.



3.1.1 Pumping

Pumping is the largest use of electricity on the site, amounting to 100,460 kWh/season.
There are two 15kW pool pumps serving the 50 meter pool and a 4kW and 3kW pump serving the training pool. None of these pumps are on VSD control. There is potential for reducing the pump speeds at night when the pools are closed, subject to certain criteria:
Pump turndown is only permitted if pool water quality monitoring is automatic.
In this case, after the pool is closed, run pumps at full speed for one pool water turnover.
Then:
If water pH is in acceptable range,
AND FAC is within the acceptable range,
Reduce pump speed to 50% (this reduces pump power to 15%)
IF either pH OR FAC go outside acceptable limits, increase pump speed to 100%.
Otherwise, leave pump at 50% speed until 1 hour before opening, then increase to 100%.
For these pools, the energy savings are estimated to be about 13,000 kWh/season, an annual cost saving of about $2,500.

3.1.2 Fans

The dominant fan is the pool hall air circulation fan, consuming an estimated 53,000 kWh/season, an annual cost of $10,000 per year. If the fan can be arranged to slow at night when the pools are covered, the estimated saving is about 18,000 kWh/season, about $3,500 per year.

3.1.3 Lighting

The annual cost of the existing lighting is estimated to be $3,000, and this figure consists of $2,500 for energy and $500 for averaged annual *ordinary* maintenance costs. The maintenance costs are based upon a non-programmed maintenance plan.

The main pool hall is the predominant lighting in use and recently this has been upgraded to LED floodlights. Typically this upgrade will be providing around 50% energy savings and significant reductions in maintenance costs.

The other lighting in use predominantly utilises linear T8 fluorescent lamps. These luminaires offer average efficiency and lamp life and they appear to be in average condition.

The maintenance of the lighting is currently carried out on a 'replacement of failures' basis, by RDC staff.

The relevant standards for the lighting are:

- AS/NZS 1680.2.1: Interior lighting – Circulation spaces and other general areas.
- AS 2560.2.5: Interior lighting – Swimming pools.

The following are some extracts from the AS/NZS1680 standards, and their relevance to this site.

Location	**AS/NZS 1680 (lux)**
Bathrooms and toilets	80
Corridors	40
Offices	320
Pool halls	160

Extensive recording of the existing illumination levels was not carried out but generally they appear to meet code requirements.

There is some variety of run times for the lighting but the majority has been assessed to run for 16 hours per day, 7 days per week.

The majority of the switching is provided by local manual switching.

Various options exist to upgrade lighting systems and achieve energy and maintenance savings, with the possible upgrades generally summarised as follows.

New high efficiency luminaires

New luminaires utilising modern technologies can achieve significant energy savings. Often installed lighting load reductions ranging from 20% to 60% can be achieved.

Additional to energy savings, modern high efficiency luminaires can offer the benefits of reduced maintenance costs (due to their longer life) and significant lighting quality improvements (due to their high colour rendering).

Retrofit lamps

Energy saving lamps are available to replace existing lamps, and some typical examples would be:

- High efficiency fluorescent lamps – simple replacement of the existing lamps, typically providing a 10% energy saving.
- LED replacement lamps. These potentially offer good energy and maintenance savings but care must be taken to ensure that:
  - Maintained illumination levels and uniformity requirements are met.
  - Stated energy savings are achieved.
  - Luminaire warranties remain in place.
  - Lamps are trialed for all luminaires types and situations to establish their suitability, the savings, and the ongoing lighting performance.

Please note – the cost of complete LED luminaires has reduced significantly in the past three years. Consequently the economics of LED replacement lamps vs new luminaires is typically only attractive for single or in some cases twin lamp luminaires i.e. in many cases complete LED luminaires now offer better economics than replacement lamps.

Controls
Occupancy and daylight controls can provide significant savings offering economic payback periods, and generally it is reasonable to expect a further 20% to 30% savings additional to what high efficiency luminaires will achieve.

The economics of installing controls varies space by space as the ease of installation as well as obtaining effective sensor coverage can significantly influence the overall cost. Anecdotally the extra cost of controls often has a payback period of around four years.

Marton lighting opportunities
The LED replacement work in the main pool hall is providing excellent savings in the largest lighting load, well done!!

There are some minor additional savings still to be achieved in the other areas, with the solutions and economics of upgrading the luminaires being dependent upon their condition and running hours. The following is recommended:

1. For luminaires that are in good condition – relamp with LED replacement lamps e.g. replace 58W fluorescent lamps with 30W LED lamps.
2. For luminaires that are in poor condition (or have failed) – replace with new LED luminaires e.g. replace a twin 58W fluorescent under veranda luminaire with a 40W LED under veranda.

As mentioned above the economics of these upgrades will vary but it is reasonable to expect a simple payback period of less than 5 years.

3.1.4 Small power
This consists of PCs, office equipment, and kitchen equipment. These have minor usage and are considered fit for purpose.

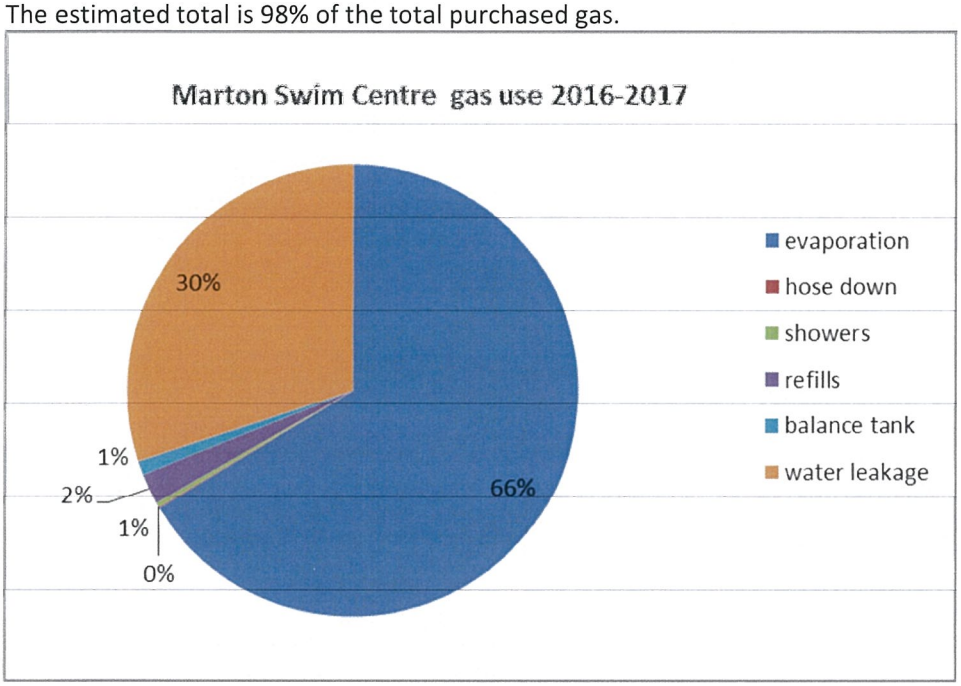
3.2 Gas end uses
Natural gas is used on the site for pool water heating, showers and reheating of water lost by the undersized Training Pool balance tank, and from undetected leaks.

The details of natural gas supplied to the site are set out in Appendix C.

The end uses of gas are:

End Use	Seasonal Quantity	% of total
Evaporation	446,270 kWh/year	66.29%
Hose down	557 kWh/year	0.08%
Showers	2,228 kWh/year	0.33%
Annual pool refills	14,920 kWh/year	2.22%
Training Pool balance tank	6,800 kWh/year	1.01%
Water leakage	202,400 kWh/year	30.07%
Total	673,175 kWh/year	100.00%

The estimated total is 98% of the total purchased gas.



Gas heating is provided to the site by a bank of four Clima 90kW wall mounted condensing hot water boilers operating at 78°C and feeding heat exchangers for the two pools, the circulation air heating coil, and the showers. The boilers are flued to a common exhaust stack. The arrangement is appropriate and no changes are recommended. It should be noted that the boilers will only be operating in non-condensing mode at this temperature. It is critical that water treatment is maintained at all times to avoid corrosion of the boiler heat exchanger surfaces and prevent premature failure of the units.

3.2.1 Pool heating

The 50 metre pool is maintained at a water temperature of 28.4°C throughout the operating season. This is typical for pools of this type and use. The temperature can be dropped to 27°C if the pool is mainly used for competition rather than recreation. Energy savings would result from such a temperature drop.

The training pool is maintained at a water temperature of 32°C. this temperature is appropriate and no changes are proposed.

Both pools have pool covers to minimise heat and water vapour loss at nights when the pools are not in operation. This is an energy efficient practice and saves about 27% of heat and water evaporation which

would otherwise be lost and contribute moisture into the pool hall and condensation requiring the circulation fan and extraction fans to run to prevent condensation on the walls and ceiling.

Pool heating is estimated to require 446,270 kWh/season with pool covers in use.

3.2.2 Air heating

The pool hall is supplied with a mixture of fresh air and recirculated air at a rate of about 4 air changes per hour to maintain pool hall air condition of 26°C and 70-75%RH. These conditions are appropriate. The main circulating fan flow rate is controlled by a PLC to maintain the pool hall conditions. The optimum set point recommended in literature is to hold the air temperature at + 1C° of the main pool water temperature when the pool is in use, at a humidity of 60% to 75%, but such that there is no condensation on the inside of the building fabric. The exhaust fans help maintain these conditions and should be set to minimise the fresh air requirement.

3.2.3 Domestic hot water

The showers are well controlled with low flow rates and time restrictions to provide 2.7 litres per 30 second shower. This is good management and accounts for about 2,228 kWh per season.

3.2.4 Balance Tank spillage

The balance tank for the Training Pool is undersized and bathers entering the pool overflow the tank to waste. When the pool is emptied of bathers the tank fills again to the normal operating level. This makeup water then is required to be reheated to pool operating temperature. This is estimated to add 6,800 kWh/season to the gas demand.

3.2.5 Unaccounted-for water leaks

The water balance shows that there was a large amount of unaccounted-for water leakage from the site. If the leakage comes from the 50 metre pool, the heat required to heat the replacement cold water to operating temperature, the gas demand to meet this loss amounts to about 202,400 kWh per season.

3.2.6 Solar water heating

A solar heating array of about 60m^2 is located on the training pool roof. This is not in use. Investigations would be required to bring the system back into reliable operation and gain savings in gas heating demand. A suitable company who can investigate and advise further on this is Solar Group Ltd (contact Roy Netzer on 09-477 2999).

3.2.7 Building fabric

The building fabric is sound but we understand that the 50 metre pool hall roof is due for replacement at a cost of about $35,000. There is no insulation in the roof and the inclusion of good quality insulation and the necessary inside fully sealed vapour barrier with this replacement would save about $23,000 per year. Insulating the Training Pool area roof would save about $6,000 per year in energy and maintenance costs.

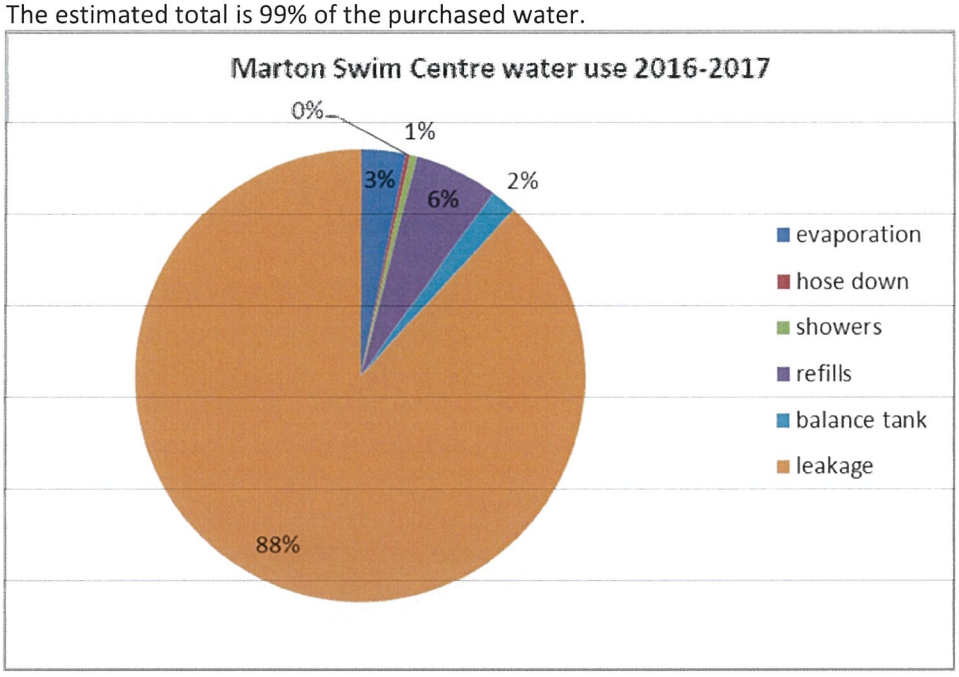
3.3 Water end uses

Potable water is provided to the site by Rangitikei District Council through water meter M120102 in Hereford Street. The details of water supplied to the site are set out in Appendix D.

The end uses of the water are:

End Use	Seasonal Quantity	% of total
Evaporation from pool surfaces	490 m^3/year	3.22%
Hose down of the pool surrounds	45 m^3/year	0.30%
Showers for pool users	76 m^3/year	0.50%
Refills of pools after draining for maintenance and cleaning	910 m^3/year	5.98%
Training Pool balance tank overflows	290 m^3/year	1.91%
Leakage from unaccounted-for areas (by difference)	13,400 m^3/year	88.09%
Total	**15,211 m^3/year**	**100.00%**

The estimated total is 99% of the purchased water.



3.3.1 Pools

With the use of pool covers, and close control of pool hall air temperature and humidity (refer section 3.2.1 and 3.2.2 above), the evaporation from the pool surfaces is minimised and water loss from evaporation and splashing is estimated at 490 m^3 of water per season.

3.3.2 Domestic hot water

Domestic hot water for showers is well controlled with low flow shower heads in 6 of the 7 showers and a timeout time of 30 seconds. This is good practice and accounts for 76 m^3 per season. The 7th shower is for paraplegics, but the usage is expected to be low and no changes are proposed.

3.3.3 Training pool balance tank losses

The Training Pool balance tank is undersized and if the pools are used to capacity (thirty five 50kg bathers or a smaller number of heavier bathers) the balance tank will overflow and require refilling when the pools empty. When the pools empty, the balance tank level is raised with cold fresh water. It is estimated that this loss and refilling with new water consumes about 290 m^3 per season.

3.3.4 Water leakage

Although this is not a planned activity, water leaks on the site account for a significant portion of total water use on the site. The unaccounted-for losses probably due to leakage amount to 88% of the total water use measured by difference between the purchased water for the audit period and the known or calculated uses. Although the calculated uses are best estimates, they are based on experience and industry standards.

There has been a history on the site of water leakages, and the numbers suggest that these are still present to some extent, but at a slightly lower rate than in the previous year. All water lost from the site incurs costs, not only as a water supply charge, but also in chemicals required to treat the replacing water and gas costs to heat the cold water supplied to the site. It is estimated that in the 2016-2017 season that the water lost by leakage was about 13,400 m^3.

This is an ongoing issue with many pools, commonly due to differential settlement between the pool and its connecting pipework.

4 Energy Management Practices

4.1 Monitoring, Targeting and Metering

Currently RDC reviews accounts monthly for usage and costs. It is suggested this be expanded to monitor and target monthly usage in specific areas. Personal accountability for the energy use and costs in these areas will highlight any abnormal operation before significant financial penalties occur as well as providing motivation to make savings.

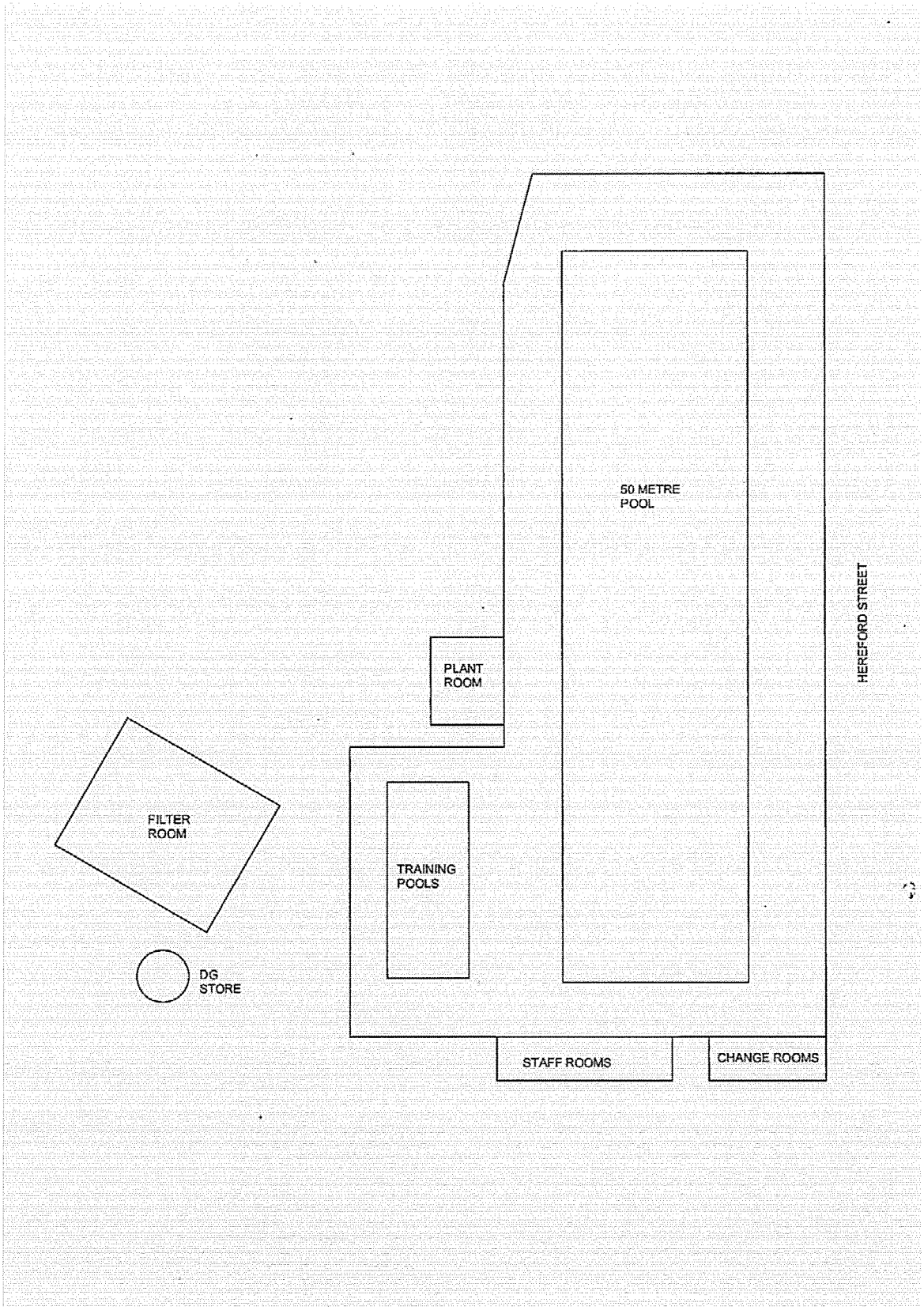
RDC currently does not have check metering to identify the electricity and gas usage associated with specific areas or services.

Comments, recommendations and savings opportunities

The following comments and recommendations are made:

1. That RDC investigates the requirements and costs to establish a site-wide software based check metering system. A (conservative) 5% reduction in energy usage through monitoring and targeting will provide an annual saving of approximately $4,000, with investment in the order of $10,000 required.
2. That a planned maintenance program is put in place to effectively manage ongoing lighting, heating, and ventilation equipment maintenance costs. For example, The Energy Efficiency and Conservation Authority (EECA) recommends bulk replacement of fluorescent lamps when 7% have failed.
3. Encourage staff to switch off equipment, computers, printers and photocopiers at night and weekends, and to switch off lights in unoccupied areas.

Appendix A Site Layout



Appendix B – Electricity Purchase Details

2015-2016

Area	Year	Supplier	Month	Days	kWh nett	Total $ less 10%	c/kWh	$/day
Pool	2016	Meridian	Oct	31	25,892	$4,647.20	0.18	$150
	2016	Meridian	Nov	30	25,104	$4,518.68	0.18	$151
	2016	Meridian	Dec	31	25,576	$4,609.85	0.18	$149
	2017	Meridian	Jan	31	25,933	$5,015.62	0.19	$162
	2017	Meridian	Feb	29	23,748	$4,593.58	0.19	$158
	2017	Meridian	Mar	31	24,798	$4,642.96	0.19	$150
	2017	Meridian	Apr	30	23,763	$4,412.97	0.19	$147
	2017	Meridian	May	31	3,250	$722.21	0.22	$23
	2017	Meridian	Jun	30	2,967	$704.93	0.24	$23
	2017	Meridian	Jul	31	3,041	$736.23	0.24	$24
	2017	Meridian	Aug	31	3,041	$736.23	0.24	$24
	2017	Meridian	Sep	30	27,331	$4,806.02	0.18	$160
				366	**214,444**	**$40,146.49**	**0.19**	**$110**

2016-2017

Area	Year	Supplier	Month	Days	kWh nett	Total $ less 10%	c/kWh	$/day
Pool	2016	Meridian	Oct	31	25,545	$5,014.16	0.20	$162
	2016	Meridian	Nov	30	24,251	$4,762.04	0.20	$159
	2016	Meridian	Dec	31	23,973	$4,692.09	0.20	$151
	2017	Contact	Jan	31	24,110	$4,356.33	0.18	$141
	2017	Contact	Feb	28	21,621	$3,995.08	0.18	$143
	2017	Contact	Mar	31	24,163	$4,417.37	0.18	$142
	2017	Contact	Apr	30	22,704	$4,395.54	0.19	$147
	2017	Contact	May	31	3,223	$745.64	0.23	$24
	2017	Contact	Jun	30	3,239	$871.81	0.27	$29
	2017	Contact	Jul	31	3,342	$856.12	0.26	$28
	2017	Contact	Aug	31	3,267	$755.28	0.23	$24
	2017	Contact	Sep	30	12,473	$2,904.79	0.23	$97
				365	**191,911**	**$36,319.42**	**0.19**	**$100**

Note: A portion of the invoiced electricity is used by the adjacent gym and cross-charged through a check meter. This portion is included in the above and has not been accounted for as a separate charge.

Appendix C – Gas Purchase Details

Date	kWh	Days	kWh/day	$/month	$/day
Oct 2015	179,765	30	5,992	$12,816	$427.20
Nov 2015	289,895	28	10,353	$8,065	$288.04
Dec 2015	74,814	27	2,771	$5,485	$203.15
Jan 2016	72,574	36	2,016	$5,438	$151.06
Feb 2016	34,127	27	1,264	$2,673	$99.00
Mar 2016	71,540	34	2,104	$5,343	$157.15
Apr 2016	94,021	29	3,242	$6,842	$235.93
May 2016	15,051	29	519	$1,375	$47.41
Jun 2016	0	32	0	$368	$11.50
Jul 2016	0	30	0	$236	$7.87
Aug 2016	1,223	29	42	$528	$18.21
Sep 2016	197,124	37	5,328	$14,598	$394.54
Totals	1,030,134	368	2,799	$63,767	$173.28

Date	kWh	Days	kWh/day	$/month	$/day
Oct 2016	114,368	27	4,236	$7,421	$274.85
Nov 2016	98,707	29	3,404	$6,464	$222.90
Dec 2016	112,319	33	3,404	$7,355	$222.88
Jan 2017	69,042	30	2,301	$4,623	$154.10
Feb 2017	62,208	24	2,592	$4,085	$170.21
Mar 2017	71,097	32	2,222	$4,652	$145.38
Apr 2017	102,991	29	3,551	$6,558	$226.14
May 2017	85,617	30	2,854	$5,513	$183.77
Jun 2017	-72,739	34	-2,139	-$3,954	-$105.71
Jul 2017	0	27	0	$312	$11.56
Aug 2017	0	30	0	$281	$93.67
Sep 2017	44,914	32	1,404	$3,141	$98.16
Totals	688,524	357	1,929	$46,451	$130.11

Appendix D – Water Purchase details

From	To	Days	M^3	M^3/day	$	$/day
13 Jan 2017	10 May 2017	118	4,678	39.6	$7,999.38	$67.78
11 May 2017	19 Sep 2017	124	3,435	27.7	$5,987.80	$48.29
20 Sep 2017	12 Jan 2018	121	7,274	60.1	$13,675.12	$113.02
Total		363	15,387	42.39	$27,662.30	$76.20

Appendix E – Energy End Use Calculations

E1 Night turn-down of pool pumps

Pump turndown is only permitted if pool water quality monitoring is automatic.
In this case, after the pool is closed, run pumps at full speed for one pool water turnover.
Then:
If water pH is in acceptable range,
AND FAC is within the acceptable range,
Reduce pump speed to 50% (this reduces pump power to 15%)
IF either pH OR FAC go outside acceptable limits, increase pump speed to 100%.
Otherwise, leave pump at 50% speed until 1 hour before opening, then increase to 100%.
Assume that 50% of available saving can be achieved.

Pool	Turnover	Hrs used	Turndown hrs/day	kW day	kW night	kW reduction
50 metre	3hrs	13hrs	7hrs/day	15 (2@15kW x0.5)	2.3	12.7
Training	1hr	8hrs	14hrs/day	3.5 (4kW x 0.5 & 3kW x0.5)	0.5	3.0

50 metre pool

Full speed operation = 6,240 hrs x 7.5 kW
= 46,800 kWh

Reduced speed operation = (9x260) hrs x (7.5 x 0.15) kW at low speed = 2,048 kWh
+ ((15) x(260) hrs x 7.5 kW at full speed = 29,250 kWh
Annual energy use = 31,298 kWh

Energy saving = 15,502 kWh/yr
50% savings = 7,751 kWh/yr
Electricity rate = $0.19/kWh
Energy cost saving = $1,473 per year

Estimated capital cost of 2 off 15kW VSDs and controls = $6,000
Simple payback = $6,000 / $1,473
= 4.1 years.

Training pool

Full speed operation = 6,240 hrs x 3.5 kW
= 21,840 kWh

Reduced speed operation = (14x260) hrs x (3.5 x 0.15) kW at low speed = 1,911 kWh
+ ((10) x(260) hrs x 3.5 kW at full speed = 9,101 kWh
Annual energy use = 11,012 kWh

Energy saving = 10,828 kWh/yr
50% savings = 5,414 kWh/yr
Electricity rate =$ 0.19/kWh
Energy cost saving = $1,029 per year

Estimated cost of 4kW & 3kW VSD drives and controls = $4,500
Simple payback = $4,500 / $1029
= 4.4 years.

E2 Night turn-down of pool fans

During operating hours, the Pool Hall air supply and exhaust fans run to maintain air conditions at 4 air changes/hour.

When pools are closed and pool covers are in place, water evaporation rate drops to about 10% (less with better quality covers).

Then:

Fan speed can be reduced to maintain an indoor hall humidity of 80% (up from the 70% when pools are occupied).

Typically, fan speed can be reduced to 50% of flow rate, reducing fan kW to 15% of day load.

With fan running at day rate for 24 hours/day, energy demand	= 15 kW x 0.5x 6,240 hrs
	= 46,800 kWh/season
With fan running for 11hrs/day at reduced speed, energy demand	= 15kW x 0.5 x13/24 x 6,260 hrs
	+ 15kWx0.5x0.15 x 11/24x6,240 hrs
	= 25,350 kWh + 3,218 kWh
	= 28,568 kWh/season
Energy saving	= 18,232 kWh/season
Electricity rate	= $0.19/kWh
Electricity cost saving	= $3,464/season.
Capital cost for controls upgrade	= $8,000
Then, simple payback	= $8,000 / $3,464
	= 2.3 years.

E3 Lighting upgrades

There are some minor savings still to be achieved with the solutions and economics of upgrading the luminaires being dependent upon their condition and running hours. The following is recommended:

1. For luminaires that are in good condition – relamp with LED replacement lamps e.g. replace 58W fluorescent lamps with 30W LED lamps.
2. For luminaires that are in poor condition (or have failed) – replace with new LED luminaires e.g. replace a twin 58W fluorescent under veranda luminaire with a 40W LED under veranda.

E4 Training Pool balance tank sizing

The Training Pool balance tank is undersized, causing overflows from the bather load.

Pool combined surface area = 75 m^2
Maximum bather load = 34 bathers.

Refer NZS 4441:2008 – Swimming Pool Design Standard.
Section 13.1.2 Instantaneous bathing load
Subsection 13.1.2.1 Public pools
Table 1 – pool surface areas used to determine instantaneous bathing load
For water depth < 1 metre, pool water surface area per pool user = 2.2 m^2.
Then, maximum allowable bather load = 75 m^2 / 2.2 m^2/bather
= 34 bathers.
Then, loading is at acceptable limit.

Section 20.2 Balance tank dimensions
Subsection 20.2.1
"In order to ensure efficient skimming of the pool and to prevent wastage of water, the balance tank shall be approximately a deep as the deepest part of the pool and of such dimensions as to contain both the following volume of water between overflow level (OL) and normal low water level (NLWL) (see figure E1):

(a) The area of the pool x 20mm, to allow for water displaced from the pool by wind and wave action; and
(b) The maximum number of pool users in the water at one time x 0.05m3, to allow for water displaced from the pool by pool users."

Item (a) for this pool requires a volume of
Pool area = 75 m^2 x 0.02 m^2
= 1.5 m^3

Item (b) for this pool requires a volume of
No of bathers = 34 x 0.05m^3
= 1.7 m^3

Note, this implies 23 bathers of average weight 50kg. If heavier bathers are in pool, number must be reduced proportionally.

Then, total balance tank volume
= 1.5 m^3 + 1.7 m^3
= 3.2 m^3

Actual balance tank size
= 2m diameter x 0.150m between OL and NLWL)
= 0.47 m^3

Total depth of balance tank below OL is 1.25 m. If all of this depth was available, balance tank volume would be 2.5 m3 and would be able to handle 20 bathers only. To use this, the tank would need to be deepened over its full diameter to allow the NLWL to draw from this depth.

An alternative is to install an additional tank cross-linked to the existing one, with a deep sump to draw from.

E5 Pool hall fabric upgrades

The roof on the Pool Hall is being considered for replacement. At that time, it is recommended that the roof of the 50 metre pool be well insulated, with a fully sealed vapour barrier on the underside (pool side).

Current and future fabric losses, based on ambient outside temperature of 50°C for the Swimming season are estimated as:

Item	Uninsulated heat loss	Insulated heat loss	Heat loss reduction
50m pool roof	49 kW	8 kW	41 kW
50m pool walls	17 kW	17 kW	0 kW
50m poo l windows	2.7 kW	2.5 kW	0.2 kW
50m pool floor	3 kW	3 kW	0 kW
50m pool walls and floor	3 kW	3 kW	0 kW
Training pool roof	8 kW	1.5 kW	6.5 kW
Training pool walls	1 kW	1 kW	0 kW
Training pool windows	7 kW	6.5 kW	0.5 kW
Training pool floor	1 kW	1 kW	0 kW
Training pool walls and floor	1 kW	1 kW	0 kW

There are only minimal savings from double glazing windows in both pool halls

Savings from insulating 50m pool hall roof:

Energy saving	= 41kW x 6,240/season
	= 255,840 kWh net
Assume boiler seasonal efficiency	= 75%
Gross heat saving	= 255,840 / 0.75
	= 341,120 kWh
Gas tariff	= 6.75c/kWh
Gas energy saving	= $23,000 per season.
Roof replacement cost	= $35,000.
Then, simple payback	= $35,000 / $23,000 per season
	= 1.5 years.

On pre-rata basis,

Training Pool roof energy cost saving	= $3,700 /season
Training pool roof replacement cost	=$5,600
Simple payback	= 1.5 years.

Note: the effect of the insulation may not reflect directly in the cost of gas used, but the lack of condensation of the roofs will reduce pool heat losses , reduce maintenance and reduce fan running load to maintain pool hall temperature and humidity.

Ivan A Fraser
CONSULTING ENGINEER

CMEngNZ CPEng, (Mechanical Environmental), IntPE
BE(Mech), FIRHACE, MASHRAE, MCASANZ, CMVP
EMANZ EnergyMasters accredited Energy Auditor & Technology Specialist
EECA Business Programme Partner

46 Caribbean Drive, Unsworth Heights
Auckland 0632.

Ph: (09)410 5008 Fax (09)410 5008
E-mail: ivanfraser3@gmail.com

In association with Mason Consulting and Services Ltd

Rangitikei District Council
Marton Waste Water Treatment Plant

Energy Audit

REPORT

Prepared for
Ashley Dahl – Financial Services Team Leader, Rangitikei District Council

File Ref 3707-4
30 April 2018

TABLE OF CONTENTS

Executive Summary

This report summarises the historical energy usage and costs for the Marton Waste Water Treatment Plant as well as identifying opportunities for reducing costs through improved efficiency or operation of the systems.

The period considered for the facility is 1 October 2016 to 30 September 2017and is described as the 'audit period' in this report.

Electricity is the only energy source and the main services are aeration, pumping, filtration, and miscellaneous equipment. These services are supplied with electricity from two 400V non time of use supplies from Genesis Energy.

The 'anytime' electricity tariffs are predominantly based on energy usage. The overall unit cost of electricity in the audit period was 28c/kWh for the Aeration Lagoon and 29c/kWh for the Sewerage Ponds. These rates would be considered to be high (24c and 19c at Taihape) and it is recommended that time of use tariffs be put in place.

The services appear to be well operated and in good condition.

1. Introduction

The Marton Waste Water Treatment plant serves a nominal township population of 4,548 (ref: AA Traveller guide 2016). The plant is located at Croydon to the South east of the township. Parts of the plant are not in service, (anaerobic lagoon and contact tank) but the remainder of the plant appears to be in good functional order.

With these omissions, the plant comprises a main Facutative (aeraobic) lagoon followed by a maturation pond for polishing of the influent.

There are two lift pumps (duty and standby) raising the waste water to a flocculation tank where aluminium sulphate is added and sand filters before discharge of the effluent to a stream.

The dominant energy loads are the aerators in the facultative lagoon and maturation pond and these should be considered for upgrade. Circulation in the facultative lagoon appears to be adequate.

The current waste water discharge consent is up for renewal. The effluent and discharge levels appear to be within the parameter limits except at peak flows. It is understood that consideration is being given to amalgamating the plant with the Bulls plant, with treated effluent being disposed of from there on land in an adjacent forest on sandy soils.

An alternative may be to reactivate the anaerobic pond for treatment of critical parameters. Further evaluation of this option is outside our area of expertise.

This energy assessment was carried out on 16 February 2018 by Ivan Fraser and Noel Mason with assistance from Wayne Schrieber – the plant operator, and for Ashley Dahl and his staff from Rangitikei District Council.

The audit period was from 1 October 2016 to 30 September 2017.

Potential projects identified are:

- Review electricity tariffs for this site. The current tariffs are significantly higher than other Rangitikei District Council sites in the area. If the tariffs can be reduced to about 19c/kWh as for the Marton Swim Centre and the Taihape Waste Water Treatment Plant, cost savings of about 33% can be expected.

2. Historic Energy Use and comparison to targets

2.1 Electricity tariff

The two points of supply are described as follows:

1. Aeration Lagoon – ICP 0032782085PC-704.
2. Sewerage Ponds – ICP 0033300104PC-46C.

Both points of supply have the same 'anytime' tariff that is based on energy usage plus relatively minor fixed daily charges. The overall unit cost of electricity were:

- Aeration Lagoon = 28c/kWh.
- Sewage treatment plant = 29c/kWh.

These rates would be considered to be high (24c and 19c at Taihape) and it is recommended that time of use tariffs be put in place.

2.2 Comparison to targets

During the Energy Audit period from 1 October 2016 to 30 September 2017, the total electricity uses were:

Aerobic ponds	245,600 kWh
Treatment plant (including lift pumps)	265,800 kWh
Total plant	511,400 kWh

This was a daily energy use of 1,401 kWh/day

Consider two possible Energy Performance Indicators (EnPI) benchmarks:

1. Energy use per cubic metre of effluent discharge
   - Average energy use/day = 1,401 kWh/day
   - Average effluent flow = 2,191 m^3/day
   - Then, energy performance indicator (EnPI) = 0.64 kWh/m^3

2. Energy use per head of population of inlfluent
   - Average energy use/year = 511,400 kWh/year
   - Nominal population (AA reference 2016) = 4,548
   - EnPI population based = 112 kWh/person/year.

   There may be other EnPIs used in the industry.

3. Electricity End Uses

The dominant energy use was the aeration ponds (facultative lagoon and maturation pond) at 54% of the total energy use at the plant at 432 kWh/day. They have an installed electrical capacity of 99 kW and diversity of 30%, running 24 hours/day .

The current aerators are a mix of Tornado and Monsoon models. Other dearators on the market may have a greater oxygen delivery rate at lower electricity input and it recommended that these should be investigated.

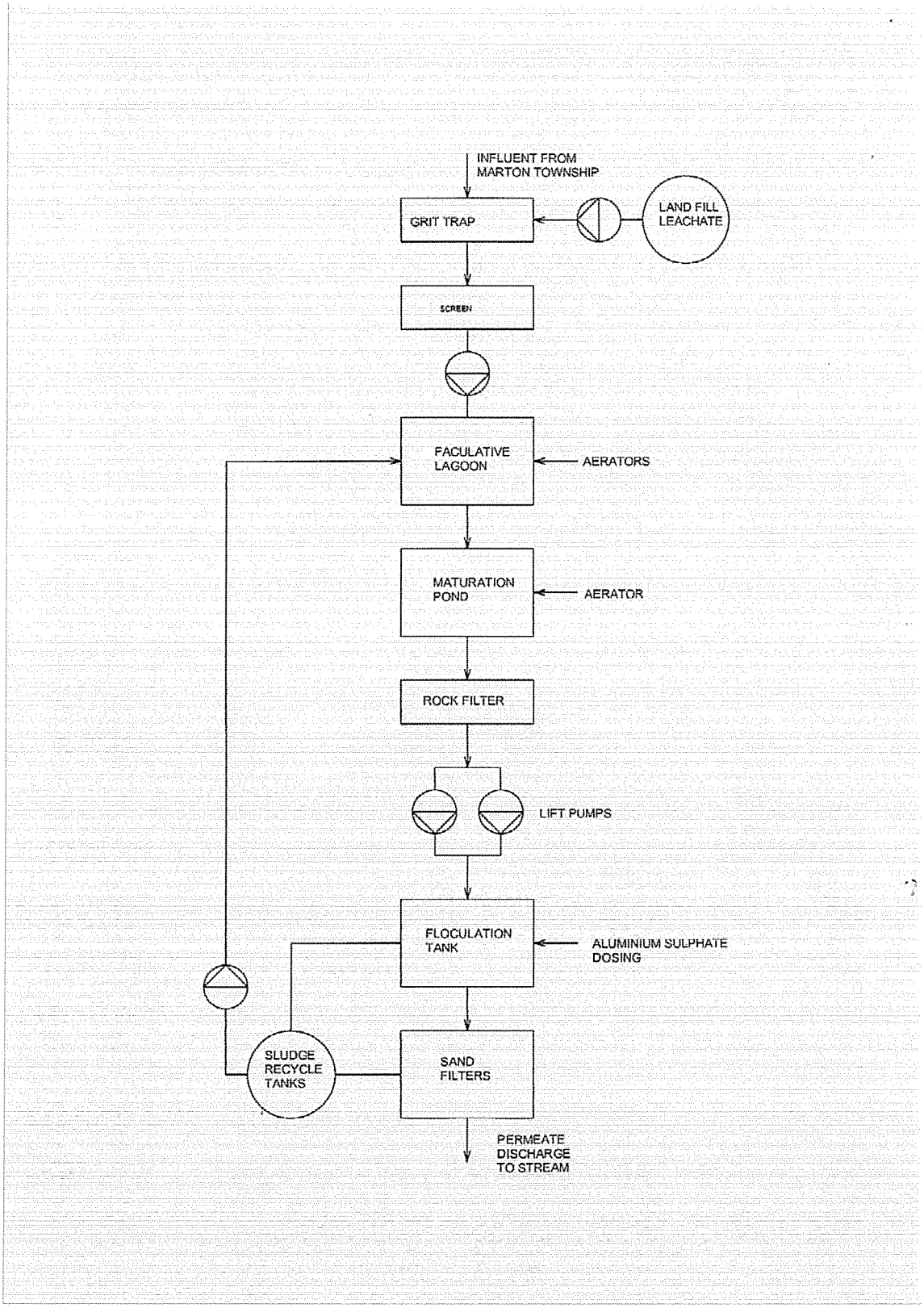
The aeration ponds have a holding capacity of about 28,000 m^3, giving an average retention time of 45 days if there is full mixing in each pond.

The next largest energy use is in the lift pumps which feed the flocculation tank and the sand filters. The two pumps are arranged in parallel on duty and standby. Their estimated energy use is 540 kWh/day, 37% of that for the total plant. These pumps appear to be fit for purpose and no changes are proposed.

The treatment plant is the smallest of the three areas comprising of compressors and small pumps at 194 kWh/day (13.5% of the total). All equipment is appropriate for service and no changes are proposed.

Appendix A – Site Layout

Appendix B – Process Schematic



Appendix C – Electricity Purchase details

Area	Year	Supplier	Month	From	To	Days	kWh nett	Total $ less 10%	c/kWh
Aeration lagoon	2016	Meridian	Oct	10-Oct	9-Nov	30	22,400	$5,725.48	0.26
	2016	Meridian	Nov	10-Nov	9-Dec	30	21,700	$5,675.09	0.26
	2016	Meridian	Dec	10-Dec	31-Dec	22	15,900	$5,497.70	0.35
	2017	Genesis	Jan	1-Jan	27-Jan	27	19,200	$5,358.61	0.28
	2017	Genesis	Feb	28-Jan	26-Feb	30	21,400	$5,972.53	0.28
	2017	Genesis	Mar	27-Feb	26-Mar	28	20,500	$5,720.63	0.28
	2017	Genesis	Apr	27-Mar	29-Apr	34	20,100	$5,615.32	0.28
	2017	Genesis	May	30-May	27-May	28	19,900	$5,553.99	0.28
	2017	Genesis	Jun	28-May	26-Jun	30	21,600	$6,028.07	0.28
	2017	Genesis	Jul	27-Jun	25-Jul	29	20,700	$5,777.15	0.28
	2017	Genesis	Aug	26-Jul	23-Aug	29	20,700	$5,781.65	0.28
	2017	Genesis	Sep	24-Aug	22-Sep	30	21,500	$6,068.03	0.28
							245,600	**$68,774.23**	**0.28**

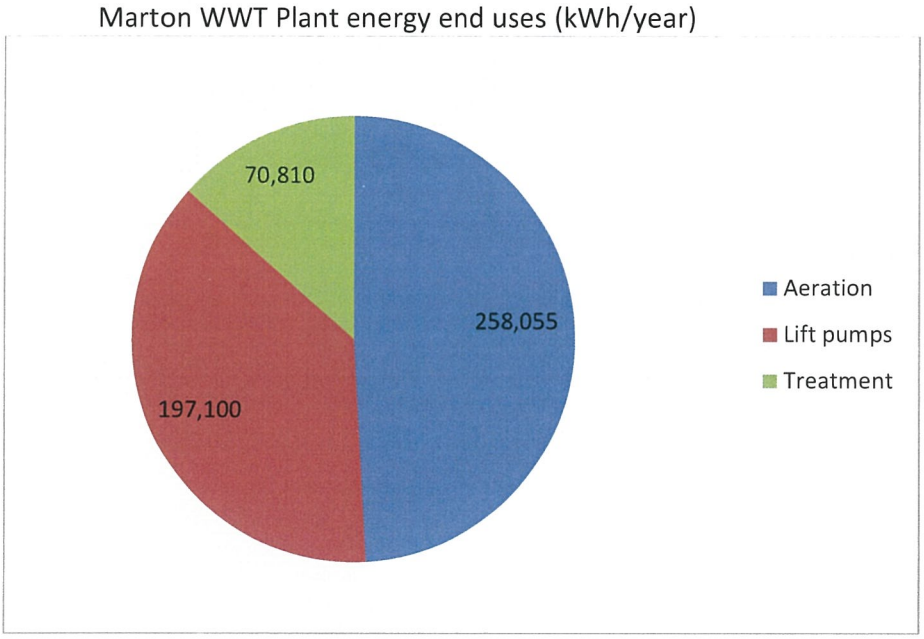
Area	Year	Supplier	Month	From	To	Days	kWh nett	Total $ less 10%	c/kWh
Sewage Ponds	2016	Meridian	Oct	12-Oct	10-Nov	31	27,920	$6,383.59	0.23
	2016	Meridian	Nov	12-Nov	11-Dec	30	27,040	$7,065.91	0.26
	2016	Meridian	Dec	12-Dec	31-Dec	20	18,000	$6,843.18	0.38
	2017	Genesis	Jan	1-Jan	2-Feb	33	320	$4,555.40	14.24
	2017	Genesis	Feb	3-Feb	20-Feb	18	160	$120.65	0.75
	2017	Genesis	Mar	21-Feb	21-Mar	29	240	$61.78	0.26
	2017	Genesis	Apr	22-Mar	20-Apr	30	240	$94.58	0.39
	2017	Genesis	May	21-Apr	22-May	32	320	$215.24	0.67
	2017	Genesis	Jun	23-May	23-Jun	32	150,400	$41,802.91	0.28
	2017	Genesis	Jul	24-Jun	23-Jul	30	21,400	$3,472.87	0.16
	2017	Genesis	Aug	24-Jul	21-Aug	29	11,520	$3,472.87	0.30
	2017	Genesis	Sep	22-Aug	19-Sep	29	8,240	$3,227.49	0.39
							265,800	**$76,186.04**	**0.29**

Appendix D – Electricity end Uses

Annual end use Energy Balance

Area	Item	Connected kW	Diversity	Hrs/day	kWh/day	% of total
Aeration ponds	Aerators	99	0.3	24	707	49%
Lift pumps	Pumps	45	0.5	24	540	37.5%
Treatment plant	Pumps, compressors	41	0.5	24	194	13.5%
Total		185			1,441	100%

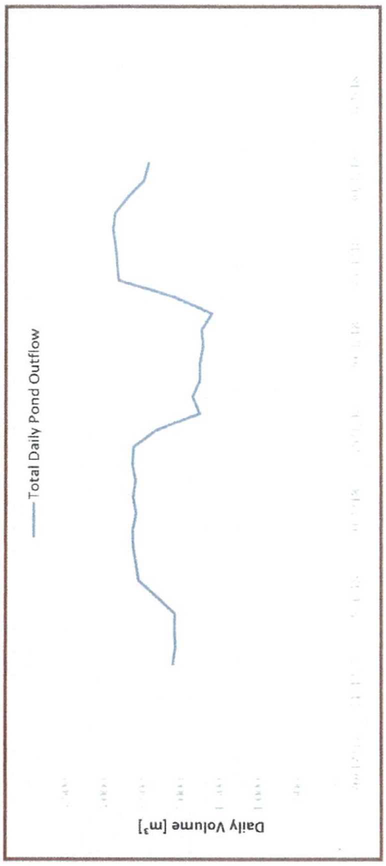
This is within 3% of the total purchased energy.

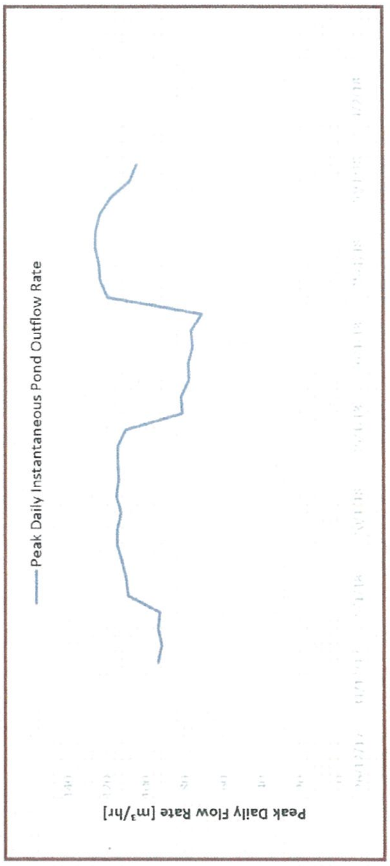


Appendix E – Monitoring Details

Marton WWTP - Monthly Discharge Flows — January 2018

	Total Daily Pond Outflow	Peak Daily Instantaneous Pond Outflow Rate
Limit	-	-
Units	m³	m³/hr
1/01/2018	2,114	94
2/01/2018	2,083	92
3/01/2018	2,092	94
4/01/2018	2,086	93
5/01/2018	2,325	109
6/01/2018	2,567	110
7/01/2018	2,594	112
8/01/2018	2,628	114
9/01/2018	2,633	114
10/01/2018	2,593	113
11/01/2018	2,632	115
12/01/2018	2,600	114
13/01/2018	2,640	114
14/01/2018	2,626	114
15/01/2018	2,339	110
16/01/2018	1,764	81
17/01/2018	1,859	82
18/01/2018	1,764	77
19/01/2018	1,767	78
20/01/2018	1,726	76
21/01/2018	1,740	77
22/01/2018	1,613	71
23/01/2018	2,104	119
24/01/2018	2,823	123
25/01/2018	2,845	124
26/01/2018	2,861	126
27/01/2018	2,896	126
28/01/2018	2,871	124
29/01/2018	2,696	118
30/01/2018	2,492	108
31/01/2018	2,434	105
Total	72,807	-





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Marton WWTP - Effluent Sampling — January 2018

		Limited Parameters			Other Parameters					
	Parameter	Suspended Solids - Total	BOD - Soluble Carbonaceous	Ammonia Nitrogen	Nitrate - Nitrogen	Dissolved Reactive Phosphorus	Faecal Coliforms	pH	Dissolved Oxygen	Temperature
	Units	g/m³	g/m³	g/m³	g/m³	g/m³	cfu/100ml	0	g-02/m3	°C
Compliance Limit		150	60	25.00	-	-	-	-	-	-
12-Month Summary	# of Samples	12	12	12	12	12	12	12	12	
	Average	56	3	13.63	3.98	4.33	2,079	7.44	5.8	
	Maximum	113	7	47.00	10.50	6.14	7,800	7.90	8.8	

Notes

Compliant = (green) / Non-Compliant= (red) / No Compliance Limit = -

1. 12 Month Summary = Current Month + Previous 11 Months
2. For evaluation against compliance criteria, results of '< X' and '> X' are both treated as '= X'

Recent Samples

Date	Sample Status	Suspended Solids - Total	BOD - Soluble Carbonaceous	Ammonia Nitrogen	Nitrate - Nitrogen	Dissolved Reactive Phosphorus	Faecal Coliforms	pH	Dissolved Oxygen	Temperature
17/01/2018	Historic	113	<3	0.03	0.94	5.57	92	7.2	<1	
5/12/2017	Historic	80	7	25.4	10.5	5.17	1600	7.3	<1	
2/11/2017	Historic	8	4	47	0.28	4.39	750	7.9	5.2	
5/10/2017	Historic	26	<3	36.2	0.58	4.38	320	7.7	6.3	
6/09/2017	Historic	23	4	24.7	5.19	3.85	3500	7.6	2.4	
2/08/2017	Historic	51	<6	19.2	5.34	3.36	7800	7.5	6.1	
5/07/2017	Historic	61	<6	8.96	9.98	3.8	230	7.3	3.1	
7/06/2017	Historic	61	<3	0.02	7.25	2.69	3900	7.3	7.4	
4/05/2017	Historic	75	<6	0.01	3.56	3.51	660	7.4	6.7	
19/04/2017	Historic	47	<3	0.02	2.76	3.3	4900	7.4	8.8	
2/03/2017	Historic	62	<3	1.18	0.15	5.83	200	7.4	5.5	
9/02/2017	Historic	68	<3	0.89	1.18	6.14	1000	7.3	6	

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Marton WWTP - Stream Sampling

June 2016

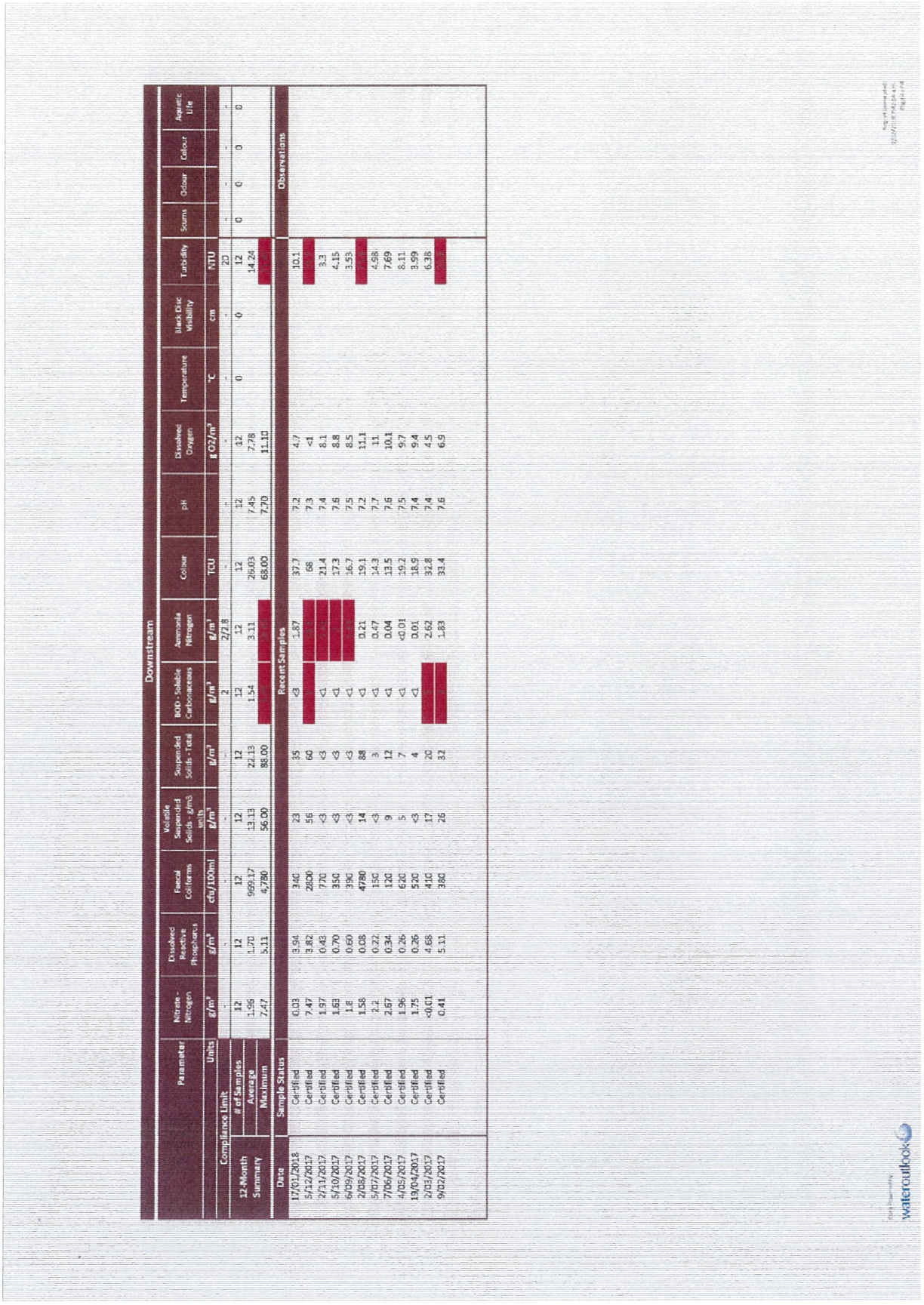
Difference Upstream - Downstream

Parameter	Black Disc Visibility
Units	cm
Compliance Limit	30%
Maximum	

Upstream

Date	Sample Status	Nitrate - Nitrogen	Dissolved Reactive Phosphorus	Faecal Coliforms	Volatile Suspended Solids - g/m3 units	Suspended Solids - Total	BOD - Soluble Carbonaceous	Ammonia Nitrogen	Colour	pH	Dissolved Oxygen	Temperature	Black Disc Visibility	Turbidity	Scums	Odour	Colour	Aquatic Life	Observations
	Units	g/m^3	g/m^3	cfu/100ml	g/m^3	g/m^3	g/m^3	g/m^3	TCU		g $O2/m^3$	°C	cm	NTU					
		Recent Samples																	
2/11/2017	Certified	1.64	0.048	480	<3	<3	<1	<0.01	15.9	7.4	8.8			1.9					
5/10/2017	Certified	1.2	0.05	130	<3	<3	<1	0.01	9.5	7.3	8.6			1.11					
6/09/2017	Certified	0.59	0.02	120	<3	<3	<1	<0.01	8.4	7.8	10.4			0.8					
2/08/2017	Certified	1.56	0.05	8200	13	76	<1	<0.01	17.8	7	11.1			67.7					
5/07/2017	Certified	1.75	0.02	220	<3	<3	<1	0.01	10.6	7.8	11.3			3.98					
7/06/2017	Certified	1.85	0.04	570	<3	<3	<1	0.02	9.8	7.6	10.5			0.8					
4/05/2017	Certified	1.95	0.05	900	<3	3	<1	<0.01	17.8	7.5	9.8			6.01					
19/04/2017	Certified	1.69	0.05	400	<3	<3	<1	<0.01	16.9	7.3	9.4			2.57					

Data Powered by wateroutlook



Downstream

Parameter	Nitrate - Nitrogen	Dissolved Reactive Phosphorus	Faecal Coliforms	Volatile Suspended Solids - g/m3 sm3	Suspended Solids - Total	BOD - Soluble Carbonaceous	Ammonia Nitrogen	Colour	pH	Dissolved Oxygen	Temperature	Black Disc Visibility	Turbidity	Scums	Odour	Colour	Aquatic Life
Units	g/m³	g/m³	cfu/100ml	g/m³	g/m³	g/m³	g/m³	TCU		g O2/m³	°C	cm	NTU				
Compliance Limit	-	-	-	-	-	2	2/2.8	-	-	-	-	-	20	-	-	-	-
12-Month Summary # of Samples	12	12	12	12	12	12	12	12	12	12	0	0	12	0	0	0	0
12-Month Summary Average	1.96	1.70	969.17	13.13	22.13	1.54	3.11	26.03	7.45	7.78			14.24				
12-Month Summary Maximum	7.47	5.11	4,780	56.00	88.00			68.00	7.70	11.10							
Date	Sample Status	Recent Samples												Observations			
17/01/2018	Certified	0.03	3.94	340	23	35	<3	1.87	37.7	7.2	4.7		10.1				
5/12/2017	Certified	7.47	3.82	2800	56	60			68	7.3	<1						
2/11/2017	Certified	1.97	0.43	770	<3	<3	<1		21.4	7.4	8.1		3.3				
5/10/2017	Certified	1.63	0.70	350	<3	<3	<1		17.3	7.6	8.8		4.15				
6/09/2017	Certified	1.8	0.60	390	<3	<3	<1		16.7	7.5	8.5		3.53				
2/08/2017	Certified	1.58	0.08	4780	14	88	<1	0.21	19.1	7.2	11.1						
5/07/2017	Certified	2.2	0.22	150	<3	3	<1	0.47	14.3	7.7	11		4.98				
7/06/2017	Certified	2.67	0.34	120	9	12	<1	0.04	13.5	7.6	10.1		7.69				
4/05/2017	Certified	1.96	0.26	620	5	7	<1	<0.01	19.2	7.5	9.7		8.11				
19/04/2017	Certified	1.75	0.26	520	<3	4	<1	0.01	18.9	7.4	9.4		3.99				
2/03/2017	Certified	<0.01	4.68	410	17	20		2.62	32.8	7.4	4.5		6.38				
9/02/2017	Certified	0.41	5.11	380	26	32		1.83	33.4	7.6	6.9						

Ivan A Fraser
CONSULTING ENGINEER

CMEngNZ CPEng, (Mechanical Environmental), IntPE
BE(Mech), FIRHACE, MASHRAE, MCASANZ, CMVP
EMANZ EnergyMasters accredited Energy Auditor & Technology Specialist
EECA Business Programme Partner

46 Caribbean Drive, Unsworth Heights
Auckland 0632.

Ph: (09)410 5008 Fax (09)410 5008
E-mail: ivanfraser3@gmail.com

In association with Mason Consulting and Services Ltd

Rangitikei District Council
Taihape Waste Water Treatment Plant

Energy Audit

REPORT

Prepared for
Ashley Dahl – Financial Services Team Leader, Rangitikei District Council

File Ref 3707-3
30 April 2018

TABLE OF CONTENTS

Executive Summary

This report summarises the historical energy usage and costs for the Taihape Waste Water Treatment Plant as well as identifying opportunities for reducing costs through improved efficiency or operation of the systems.

The period considered for the facility is 1 October 2016 to 30 September 2017and is described as the 'audit period' in this report.

Electricity is the only energy source and the main services are aeration, pumping, filtration, and miscellaneous equipment. These services are supplied with electricity from two 11kV/400V time of use supplies from Contact Energy.

The electricity tariff is split into two components, network and energy, with energy typically accounting for 50% of the total. The overall unit cost of electricity in the audit period was 24c/kWh for the Huia St Pump Station and 19c/kWh for the Sewerage Ponds.

The services appear to be well operated and in good condition. Potential projects are summarised on page 4 and described in more detail in the report.

1. Introduction

The Taihape Waste Water Treatment plant serves a nominal township population of 1,512 (ref: AA Traveller guide 2016). The pumping station is located in the township and is relatively new, being installed in about 2013. The remainder of the plant is significantly older but has been upgraded from time to time.

The plant is a basic one, comprising a single aeration pond, clarifiers and membrane filters. The plant generally appears suitable for purpose, except that capacity and some effluent parameters are exceeded at peak times.

The dominant energy load are the aerators in the aeration pond, and these should be considered for upgrade, along with rearrangement of them and the influent infeed to improve circulation throughout the pond.

The current waste water discharge consent is up for renewal. The plant is currently exceeding its discharge rate limit and changes may be required when a new consent is negotiated. This is outside our area of expertise.

This energy assessment was carried out on 13 March 2018 with assistance from Wayne Schrieber - the plant operator, and from Ashley Dahl and his staff from Rangitikei District Council. The audit period was from 1 October 2016 to 30 September 2017.

We are aware that the plant services a small population and some projects may be uneconomic, except that some projects may be required to comply with the new Resource consent.

Projects identified are:

- Upgrade aerators to provide greater and more efficient oxygen addition to the aeration pond.
- Improve circulation in aeration in aeration pond to increase effective residence time
- Separate stormwater from waste water.

2. Historic Energy Use and comparison to targets

2.1 Electricity tariff

The two points of supply are described as follows:

1. Taihape Sewerage ponds – ICP 0035842001PC0AE.
2. Taihape Sewerage pumping – ICP 0033302416PC801.

Both points of supply have the same time of use tariff that is broken into two portions – Line (Powerco) and Energy (Contact Energy) and these are described as follows.

Line Charges

This consists of five parts – an anytime demand charge, a wash-up demand charge, a fixed daily service charge, a daytime variable usage charge, and a nighttime variable usage charge. These charges are structured as follows:

- The Anytime Maximum Demand is the kilowatts delivered over the half hour period of maximum consumption during the month to which the charges apply.
- The Wash-up Demand is an adjustment to take into account the cyclical nature of meter readings making it impractical to provide completely accurate figures for consumption for each Point of Connection within the timeframe required for payment of Line Charges. It is, therefore, necessary to provide a structure for subsequent wash-ups.
- The fixed daily service charge – a fixed rate per day.
- The daytime variable usage charge – this is charged for energy usage between the hours of 0700 to 2300.
- The night time variable usage charge – this is charged for energy usage between the hours of 2300 to 0700.

Line charges typically account for approximately 50% of the total bill and they are typically broken down as follows:

- Anytime demand charge – 45%.
- Wash-up demand charge – usually a credit.
- Fixed daily service charge – < 1%.
- Daytime variable usage charge – 50%.
- Nighttime variable usage charge – 4%

Energy Charges

Energy usage is charged on the basis of:

- Daily six four-hour time of use rates.
- Differing rates for weekdays and weekends.
- Differing rates for summer and winter.

Energy charges account for approximately 50% of the total bill and they are typically broken down as follows:

- Weekday vs weekend – the typical unit cost of daytime electricity for a weekday is approximately 20% higher than for a weekend day.
- Daytime vs nighttime - the unit cost of daytime electricity is approximately 40% higher than that for the nighttime.

Other Charges
Additionally, an administration charge and the Electricity Levy are applied and these account for less than 1% of the total.

Comments and recommendations
1. There are relatively small variations in electricity usage over the course of a 24 hour period as highlighted below:
   - Weekday, day vs night (typical 4-hour periods) – the daytime usage is approximately 5% higher than during the night time.
   - Weekend, day vs night (typical 4-hour periods) - the daytime usage is approximately 5% higher than during the night time.

The Huia Street pumping station marginal electricity rate = 24c/kWh
The Sewage Treatment Plant marginal electricity rate = 19c/kWh

2.2 Comparison to targets

During the Energy Audit period from 1 October 2016 to 30 september 2017, the total electricity uses were

Pumping station	79,236 kWh
Treatment plant (including Aeration pond)	212,502 kWh
Total plant	291,738 kWh

This was a daily energy use of 799 kWh/day.

Consider two possible Energy Performance Indicator (EnPI) benchmarks:

1. Energy use per cubic meter of effluent discharge
   Average energy use/day = 799 kWh/day
   Average effluent flow = 1,355 m^3/day
   Then, energy performance indicator (EnPI) = 0.59 kWh/m^3

2. Energy use per head of population of influent
   Average energy use/day = 291,738 kWh/year
   Nominal population (AA reference 2016) = 1,512
   EnPI population based = 193 kWh/person/year.

   There may be other EnPIs used in the industry.

3. Electricity End Uses

The dominant energy use was the 432 kWh/day (54.5% of total) of the Aeration Pond Aerators.
It is estimated that the three sets of aerators have an installed electrical capacity of 36 kW and diversity of 50%, operating for 24 hours per day.

The effluent discharge from the plant has an average dissolved oxygen level of 105.7%, compared to the receiving stream upstream level of 104%, and biological oxygen demand in the effluent is the same as the demand upstream of the site, both implying that the aerators are operating acceptably.

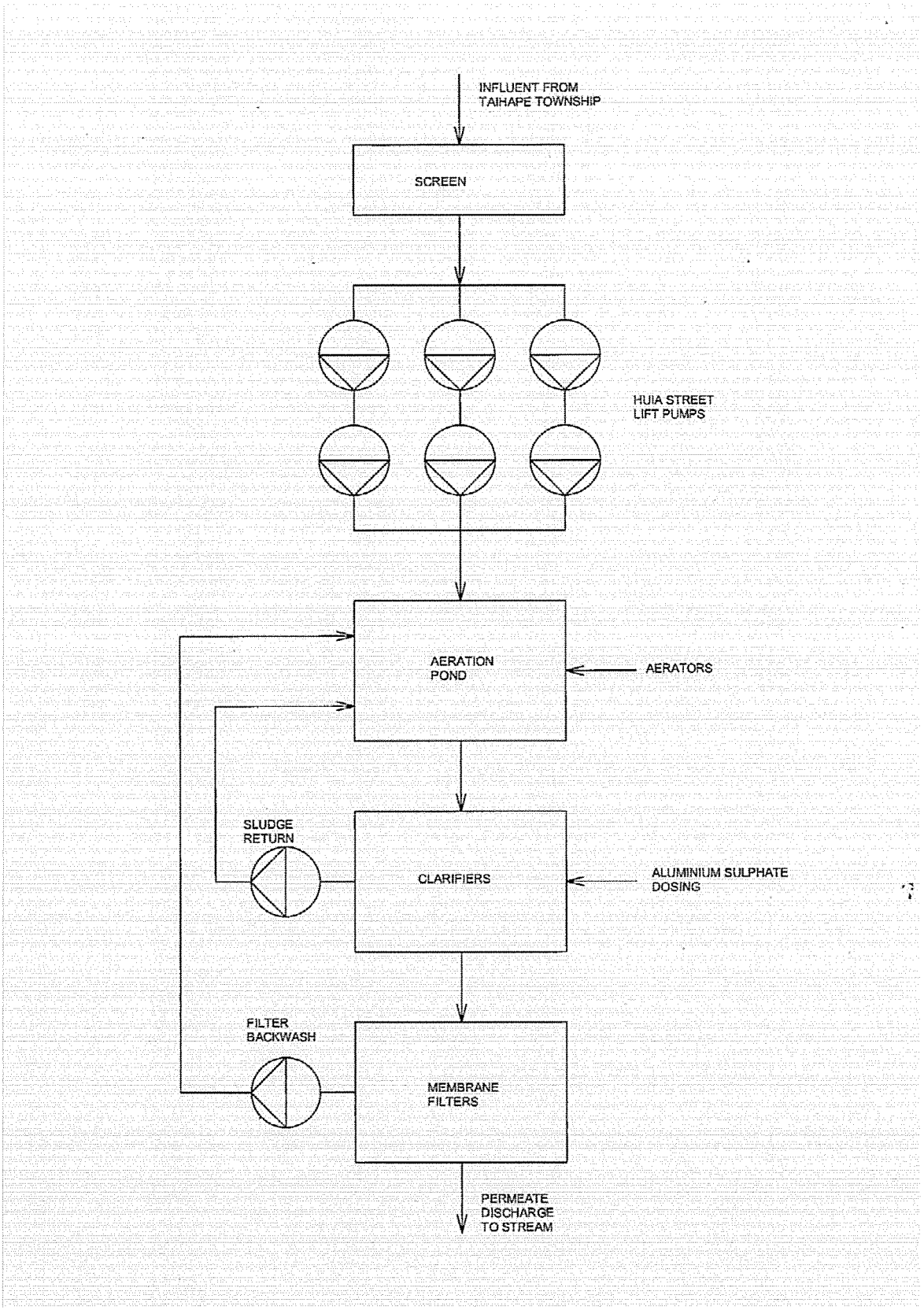
Other dearators on the market may have a greater oxygen delivery rate at lower electricity input and it is recommended that these should be investigated.

The next largest energy use was the pumping station (217 kWh/day and 27.3% of the total) which contains six Gorman Rupp pumps arranged in three banks of two stage pumps. The pumpsets are about four years old, close coupled to 45 kW electric motors and controlled on VSDs and a management system to optimise their use. The electric motors are normally fed from a mains supply, but also have a diesel fired generator for emergency use. These pump sets are well designed and controlled and no changes are proposed.

The treatment plant is the smallest of the three areas at 144 kWh/day (18.2% of the total). It comprises sundry electrical equipment such as pumps, blowers, compressors and other associated items. All appear to be suitable for purpose and no changes are proposed.

Appendix A – Site Layout

Appendix B – Process Schematic



Appendix C - Electricity Purchase details

Area	Year	Supplier	Month	From	To	Days	kWh nett	Total $ less 10%	c/kWh
Pump station Huia	2016	Meridian	Oct	1-Oct	31-Oct	31	7,456	$1,686.41	0.23
	2016	Meridian	Nov	1-Nov	30-Nov	30	5,690	$1,298.40	0.23
	2016	Meridian	Dec	1-Dec	31-Dec	31	4,877	$1,174.53	0.24
	2017	Contact	Jan	1-Jan	31-Jan	31	4,698	$1,421.69	0.30
	2017	Contact	Feb	1-Feb	28-Feb	28	4,323	$1,107.70	0.26
	2017	Contact	Mar	1-Mar	31-Mar	31	4,707	$1,718.09	0.37
	2017	Contact	Apr	1-Apr	30-Apr	30	6,999	$1,105.89	0.16
	2017	Contact	May	1-May	31-May	31	9,014	$2,757.40	0.31
	2017	Contact	Jun	1-Jun	30-Jun	30	6,263	$903.25	0.14
	2017	Contact	Jul	1-Jul	31-Jul	31	8,926	$2,545.76	0.29
	2017	Contact	Aug	1-Aug	31-Aug	31	8,729	$2,101.15	0.24
	2017	Contact	Sep	1-Sep	30-Sep	30	7,554	$1,409.99	0.19
							79,236	**$18,814.34**	**0.24**

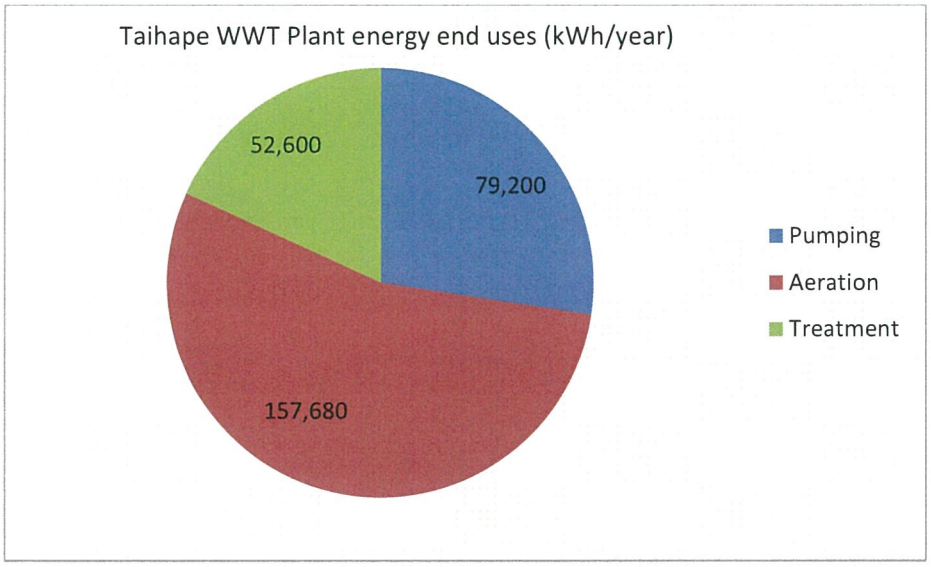
Area	Year	Supplier	Month	From	To	Days	kWh nett	Total $ less 10%	c/kWh
Sewage Ponds	2016	Meridian	Oct	1-Oct	31-Oct	31	27,646	$5,629.50	0.20
	2016	Meridian	Nov	1-Nov	30-Nov	30	20,067	$4,097.44	0.20
	2016	Meridian	Dec	1-Dec	31-Dec	31	28,208	$5,840.16	0.21
	2017	Contact	Jan	1-Jan	31-Jan	31	5,970	$1,819.81	0.30
	2017	Contact	Feb	1-Feb	28-Feb	28	9,695	$1,236.72	0.13
	2017	Contact	Mar	1-Mar	31-Mar	31	16,846	$3,015.78	0.18
	2017	Contact	Apr	1-Apr	30-Apr	30	16,434	$3,082.53	0.19
	2017	Contact	May	1-May	31-May	31	17,435	$3,454.93	0.20
	2017	Contact	Jun	1-Jun	30-Jun	30	19,881	$3,979.29	0.20
	2017	Contact	Jul	1-Jul	31-Jul	31	15,331	$3,325.05	0.22
	2017	Contact	Aug	1-Aug	31-Aug	31	18,204	$3,437.09	0.19
	2017	Contact	Sep	1-Sep	30-Sep	30	16,785	$2,890.64	0.17
							212,502	**$40,252.22**	**0.19**

Appendix D – Electricity End Uses

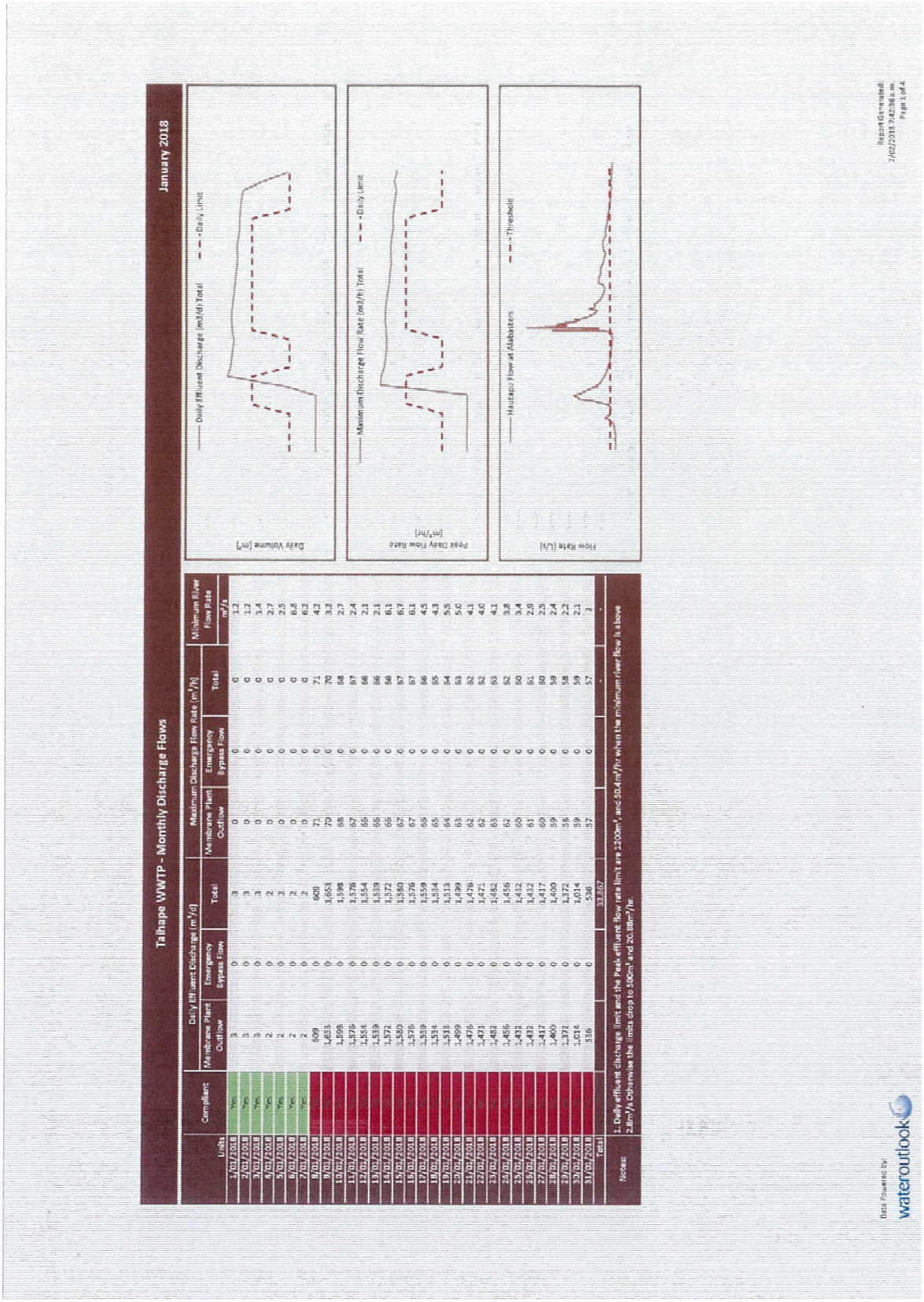
Annual end use Energy Balance

Area	Item	Connected kW	Diversity	Hrs/day	kWh/day	% of total
Pump Station	Pumps & Screen	272	0.1	8	217	27.3%
Aeration Pond	Aerators	36	0.5	24	432	54.5%
Treatment plant	Pumps compressors & blowers	15	0.4	24	144	18.2%
Total		323 kW			793 kWh/day	100%

This is within 1% of the total purchased electricity.



Appendix E - Monitoring Details



Taihape WWTP - Effluent Sampling

January 2018

Parameter		Suspended Solids - Total	Carbonaceou	Total Kjeldahl Nitrogen	Nitrate - Nitrogen	Ammonia Nitrogen	Nitrite - Nitrogen	Reactive	Total Phosphorus
Units		g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³
12-Month Summary	# of Samples	12	12	12	12	12	12	12	12
	Average	31	2	3.40	0.47	0.25	0.09	0.01	0.30
	Maximum	76	6	7.30	1.22	0.53	0.19	0.03	0.73
Date	Sample Status	Recent Samples							
1/02/2017	Certified	28	<1	4.2	<0.01	0.26	0.06	0.034	0.455
2/02/2017	Certified	18	<1	<0.8	<0.01	0.36	0.01	0.026	0.293
9/02/2017	Certified	31	<1	5.7	0.01	0.39	0.04	0.01	0.286
10/02/2017	Certified	29	<1	2.5	0.04	0.28	0.09	0.013	0.295
14/02/2017	Certified	28	<1	3.3	0.13	0.53	0.16	0.006	0.347
15/02/2017	Certified	24	<1	4.5	0.19	0.27	0.18	0.008	0.166
22/02/2017	Certified	29	<1	2.3	0.81	0.15	0.07	<0.005	0.209
23/02/2017	Certified	34	<1	2.8	1.03	0.19	0.19	<0.005	0.198
1/03/2017	Certified	31	<1	3.7	0.71	0.15	0.14	<0.005	0.324
3/03/2017	Certified	19	<3	2.4	0.63	0.32	0.07	<0.005	0.172
8/03/2017	Certified	76	<5	7.3	1.22	0.04	0.05	<0.005	0.731
9/03/2017	Certified	20	<1	1.3	0.89	0.08	0.01	<0.005	0.077

Parameter		Suspended	Environment	Aluminium - Total	Copper - Total	Lead - Total	Zinc - Total	Chromium - Total	pH - onsite reading	Dissolved
Units		g/m³	cfu/100mL	g/m³	g/m³	g/m³	g/m³	g/m³	0	% O2
12-Month Summary	# of Samples	12	12	12	12	12	12	12	12	12
	Average	23	252	10.260	0.003	0.001	0.014	0.006	5.56	95.4
	Maximum	64	2,900	23.600	0.010	0.001	0.027	0.017	7.75	118.6
Date	Sample Status	Recent Samples								
1/02/2017	Certified	20	36	21.1	<0.002	<0.001	0.007	0.004	4.13	80.7
2/02/2017	Certified	12	<4	23.6	<0.002	<0.001	0.009	0.004	4.5	56.6
9/02/2017	Certified	22	12	12.2	<0.002	<0.001	0.013	0.008	4.8	106.2
10/02/2017	Certified	18	<4	23.5	0.005	<0.001	0.012	0.009	4.28	96.4
14/02/2017	Certified	17	4	16.4	<0.002	<0.001	0.022	0.005	7.1	94.2
15/02/2017	Certified	16	<4	11.7	<0.002	<0.001	0.01	0.007	7.75	108.3
22/02/2017	Certified	23	12	1.75	<0.002	<0.001	0.027	0.002	5.96	100.8
23/02/2017	Certified	25	8	1.68	<0.002	<0.001	0.012	0.002	5.7	118.6
1/03/2017	Certified	30	27	4.39	0.005	<0.001	0.015	0.004	5.42	100.5
3/03/2017	Certified	19	4	4.71	0.008	<0.001	0.011	0.002	4.32	86.7
8/03/2017	Certified	64	2900	1.24	0.01	<0.001	0.013	0.017	7.05	98.2
9/03/2017	Certified	15	4	0.854	<0.002	<0.001	0.011	0.005	5.76	97.9

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Taihape WWTP - Stream Sampling

January 2018

Difference Upstream - Downstream

Parameter	Temperature	pH
Units	°C	-
Compliance Limit	3.0	0.5
Maximum	[illegible]	0.2

Upstream (pg 1 of 2)

	Parameter	TSS	scBOD	TKN	Nitrate-N	Ammonia-N	Nitrite-N	SIN (calculated)	DRP	TP
	Units	g/m³	g/m³	g/m³	g-NO_3-N/m³	g-NH_4-N/m³	g-NO_2-N/m³	g/m³	g-PO_4-P/m³	g/m³
12-Month Summary	# of Samples	12	12	12	12	12	12	12	12	12
	Average	12.5	1.2	1.31	0.29	0.01	0.01	0.31	0.02	0.04
	Maximum	39.0	3.0	3.10	2.50	0.02	0.01	2.52	0.03	0.08
Date	Sample Status	Recent Samples								
9/02/2017	Certified	4.0	<1	3.10	0.01	<0.01	<0.01	0.03	0.02	0.03
1/03/2017	Certified	<3	3.0	<0.8	<0.01	0.02	<0.01	0.04	0.01	0.03
12/04/2017	Certified	4.0	<1	2.30	2.50	<0.01	0.01	2.52	0.02	0.03
9/05/2017	Certified	5.0	<1	1.70	0.03	0.01	<0.01	0.05	0.01	0.04
6/06/2017	Certified	8.0	<1	<0.8	0.10	<0.01	<0.01	0.12	0.01	0.02
12/07/2017	Certified	<3	1.0	0.90	0.09	<0.01	<0.01	0.11	0.01	0.02
16/08/2017	Certified	39.0	<1	<0.8	0.26	<0.01	<0.01	0.28	0.01	0.06
6/09/2017	Certified	7.0	<1	<0.8	0.14	<0.01	<0.01	0.16	0.01	0.03
11/10/2017	Certified	38.0	<1	<0.8	0.13	0.02	<0.01	0.16	0.02	0.08
9/11/2017	Certified	14.0	<1	<0.8	0.08	<0.01	<0.01	0.10	0.03	0.05
5/12/2017	Certified	13.0	<1	2.10	0.07	0.02	<0.01	0.10	0.02	0.05
9/01/2018	Certified	12.0	<1	<0.8	0.06	0.01	<0.01	0.08	0.02	0.05

Downstream (pg 1 of 2)

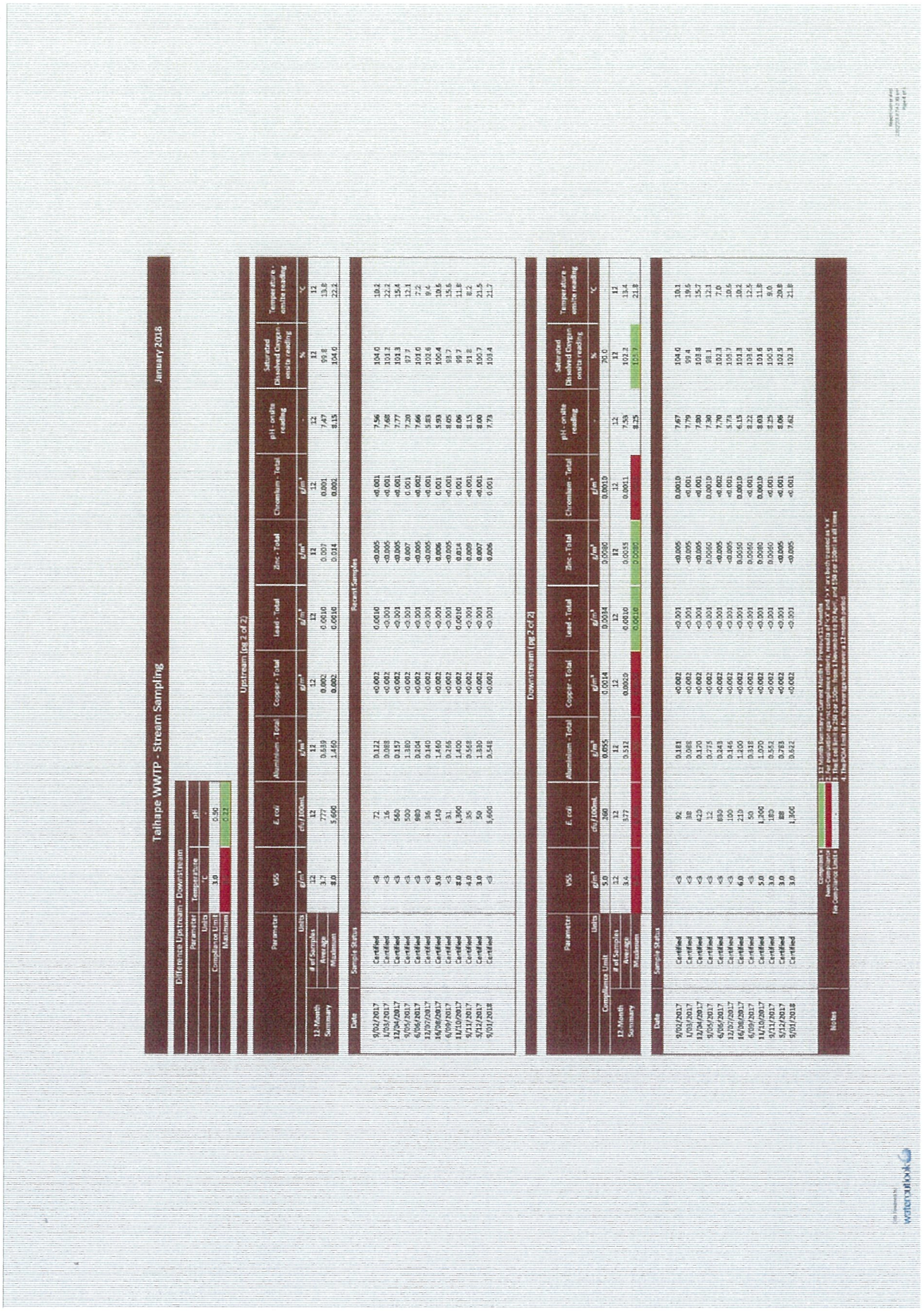
	Parameter	TSS	scBOD	TKN	Nitrate-N	Ammonia-N	Nitrite-N	SIN (calculated)	DRP	TP
	Units	g/m³	g/m³	g/m³	g-NO_3-N/m³	g-NH_4-N/m³	g-NO_2-N/m³	g/m³	g-PO_4-P/m³	g/m³
Compliance Limit		-	2.0	-	-	-	-	0.11	0.01	-
12-Month Summary	# of Samples	12	12	12	12	12	12	12	12	12
	Average	11.4	1.2	1.32	0.09	0.02	0.01	0.12	0.01	0.04
	Maximum	[illegible]	2.0	2.60	0.27	0.05	0.01	[illegible]	[illegible]	0.06
Date	Sample Status	Recent Samples								
9/02/2017	Certified	4.0	<1	2.60	0.01	0.05	<0.01	0.07	0.02	0.04
1/03/2017	Certified	<3	<1	<0.8	<0.01	0.01	<0.01	0.03	0.01	0.03
12/04/2017	Certified	4.0	<1	1.60	<0.01	<0.01	<0.01	0.03	0.01	0.02
9/05/2017	Certified	12.0	<1	1.80	0.04	<0.01	<0.01	0.06	0.01	0.04
6/06/2017	Certified	8.0	<1	<0.8	0.11	<0.01	<0.01	0.13	0.01	0.02
12/07/2017	Certified	4.0	<1	<0.8	0.10	0.03	<0.01	0.14	0.01	0.02
16/08/2017	Certified	31.0	2.0	<0.8	0.27	0.02	<0.01	0.30	0.02	0.06
6/09/2017	Certified	7.0	<1	0.80	0.19	0.04	<0.01	0.24	0.01	0.03
11/10/2017	Certified	23.0	2.0	2.50	0.13	0.02	<0.01	0.16	0.02	0.06
9/11/2017	Certified	13.0	<1	<0.8	0.08	0.05	<0.01	0.14	0.03	0.06
5/12/2017	Certified	14.0	<1	1.70	0.08	0.01	<0.01	0.10	0.02	0.05
9/01/2018	Certified	14.0	<1	<0.8	0.06	<0.01	<0.01	0.08	0.01	0.05

Notes

Compliant = (green)
Non-Compliant = (red)
No Compliance Limit = -

1. 12 Month Summary = Current Month + Previous 11 Months
2. For evaluation against compliance criteria, results of '< X' and '> X' are both treated as '= X'
3. The E.coli limit is 260 per 100ml from 1 November to 30 April, and 550 per 100ml at all times
4. The POM limit is for the average value over a 12 month period

wateroutlook


Taihape WWTP - Stream Sampling
January 2018
Difference Upstream - Downstream
Upstream (pg 2 of 2)
Downstream (pg 2 of 2)
Recent Samples
Compliance Limit
12-Month Summary
Notes