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Department of Internal Affairs

Addendum

Cost estimates for upgrading wastewater treatment plants

December 2019

Proactively released by the Department of Internal Affairs

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Figure 1 Discharge classifications for all council owned WWTPs in New Zealand2

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1. Introduction

1.1 Purpose

GHD Limited (GHD) and Boffa Miskell Limited (BML) have delivered a series of studies for the Department of Internal Affairs (DIA) relating to wastewater. Two of the reports provide cost estimates for upgrades of wastewater treatment plants (WWTPs):

- Report #1- National Report on cost estimates for upgrading wastewater treatment plants to meet objectives of the NPS Freshwater (October 2018)
- Report #2- National Report on cost estimates for upgrading Wastewater treatment plants that discharge to the ocean (November 2019);

Both reports were developed to inform the Three Waters Review, which DIA is undertaking to gain a better understanding of the challenges facing three water services..

From the 2018 study (Report #1) a database was developed of all identified council owned and operated WWTPs. Where there were gaps in the data, assumptions were infilled with a range of available data sources including the Water NZ Database (WWTP inventory), Asset Management Plans and Annual Plans. The more recent 2019 study provided an opportunity to further improve the database by checking details on WWTPs directly with all councils.

Accordingly all councils in New Zealand were issued with the details held in the database relating to their WWTPs to provide an opportunity to review and correct information listed, and in addition to provide details of any planned upgrades. These details were issued in March 2018 as part of a data request that also covered wastewater overflows. 34 Councils responded to the data request.

The information returned has resulted in amendments to the details for WWTPs listed in the previous report, particularly some of the discharge locations. For example, in the 2018 report a number of plants identified as discharging via high infiltration were assumed as discharging to freshwater since it was not possible within the study scope to clarify groundwater attenuation affects. Where councils have identified through the data request that their plants discharge to ground this has now been amended. Some amendments also relate to a move by some councils to amalgamate treatment or discharge locations.

This Addendum report has been prepared to provide a summation of the cost estimates for the two studies. In addition, this report presents revised cost tables for the 2018 report for WWTPs discharging to freshwater.

2. WWTP Characteristics

2.1 WWTP discharge locations

Figure 1 shows graphically the updated distribution of discharge types that apply for New Zealand WWTPs. Based on this classification, nearly half of the nation's WWTPs discharge to freshwater, with approximately one third discharging to land and a fifth to the ocean.

Freshwater, land and ocean based discharges from publically owned treatment plants serve 16%, 8% and 76%, respectively, of New Zealand's total current connected population (3,943,000). A fraction of New Zealand's population is serviced either by WWTPs that are not owned by a council, or by their own private treatment facility (e.g. onsite wastewater treatment systems).

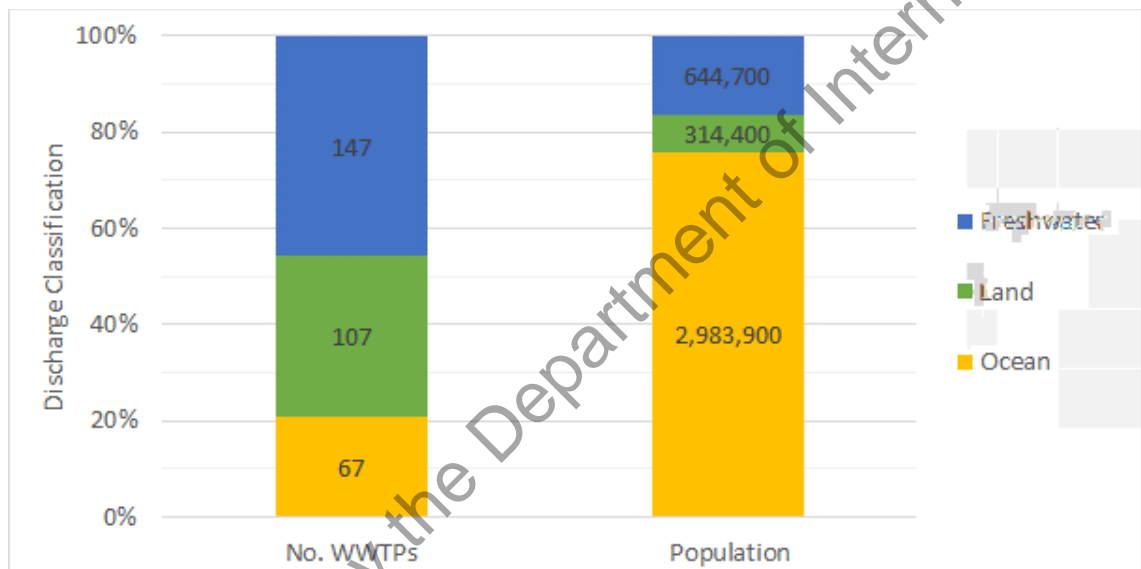


Figure 1 Discharge classifications for all council owned WWTPs in New Zealand

2.2 WWTP grouping

Table 1 summarises the distribution of WWTPs that discharge to the ocean and to freshwater by region and size. The study distinguishes among WWTPs based on the following population categories:

- Large – greater than 10,000 people
- Medium – 5,001-10,000 people
- Minor – 501 – 5,000 people
- Small – Less than 501 people

Table 1 Summary of WWTPs discharging to ocean and freshwater in New Zealand

Region	No. of WWTPs in each population category (Total / Ocean discharge / Freshwater discharge)				
	Large (>10,000)	Medium (5,001 – 10,000)	Minor (501 – 5,000)	Small (<501)	Total
Auckland	4 / 3 / 1	2 / 1 / 1	8 / 2 / 5	4 / 2 / 0	18 / 8 / 7
Bay of Plenty	4 / 3 / 0	3 / 1 / 1	7 / 2 / 3	2 / 0 / 1	16 / 6 / 5
¹ Canterbury	7 / 5 / 0	0 / 0 / 0	16 / 6 / 1	22 / 2 / 6	45 / 13 / 7
Gisborne	1 / 1 / 0	0 / 0 / 0	1 / 0 / 1	0 / 0 / 0	2 / 1 / 1
Hawke's Bay	2 / 2 / 0	0 / 0 / 0	5 / 1 / 4	3 / 0 / 2	10 / 3 / 6
Manawatu-Wanganui	4 / 1 / 2	3 / 0 / 3	16 / 0 / 12	16 / 0 / 9	39 / 1 / 26
Marlborough	1 / 1 / 0	0 / 0 / 0	3 / 2 / 1	0 / 0 / 0	4 / 3 / 1
Nelson	1 / 1 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	1 / 1 / 0
Northland	1 / 1 / 0	1 / 0 / 1	17 / 2 / 10	11 / 5 / 2	30 / 8 / 13
Otago	4 / 3 / 0	1 / 0 / 1	12 / 0 / 7	16 / 2 / 10	33 / 5 / 18
² Southland	1 / 1 / 0	1 / 0 / 1	11 / 2 / 6	10 / 0 / 7	23 / 3 / 14
³ Taranaki	2 / 2 / 0	1 / 0 / 1	4 / 1 / 3	2 / 0 / 1	9 / 3 / 5
Tasman	1 / 1 / 0	1 / 1 / 0	3 / 0 / 1	3 / 0 / 1	8 / 2 / 2
Waikato	5 / 0 / 4	9 / 1 / 5	20 / 2 / 9	21 / 0 / 7	55 / 3 / 25
Wellington	6 / 4 / 2	2 / 0 / 2	3 / 0 / 3	4 / 0 / 0	15 / 4 / 7
West Coast	0 / 0 / 0	1 / 0 / 1	6 / 2 / 4	6 / 1 / 5	13 / 3 / 10
Total	44 / 29 / 9	25 / 4 / 17	132 / 22 / 70	120 / 12 / 51	321 / 67 / 147

Lyttleton, Diamond Harbour, Governors Bay not assessed for upgrade assuming flows diverted to Bromley – cost included for flow diversion.

- Wallacetown not included since discharge is to plant operated by others.
- Eltham and Inglewood not assessed for upgrade as they act as transfer stations and discharge via alternative treatment plants.

The amendments made in discharge location have not changed the overall national picture. A predominance of WWTPs discharging to freshwater (82%) service small or minor populations. For large populations (>10,000) a majority of the WWTPs discharge to the ocean.

2.3 Population served

The population served by WWTPs that discharge to freshwater and to the ocean is summarised by region in Table 2.

Table 2 Summary of populations serviced by WWTPs discharging to ocean and freshwater

Region	Discharge to freshwater		Discharge to ocean	
	Total No. of WWTPs	Estimate of total population served	Total No. of WWTPs	Estimate of total population served
Auckland	7	38,370	8	1,366,130
Bay of Plenty	5	13,020	6	134,060
Canterbury	7	2,070	13	423,850
Gisborne	1	640	1	31,660
Hawke's Bay	6	8,270	3	125,060
Manawatu-Wanganui	26	142,510	1	39,060
Marlborough	1	690	3	34,960
Nelson	0	0	1	29,890
Northland	13	31,980	8	70,420
Otago	18	21,280	5	137,850
Southland	14	20,150	3	56,580
Taranaki	5	10,320	3	74,610
Tasman	2	2,250	2	53,140
Waikato	25	255,950	3	14,280
Wellington	7	79,130	4	386,560
West Coast	10	18,060	3	5,830
Total	147	644,700	67	2,983,900

3. Update to cost estimates WWTP discharging to freshwater

3.1 Cost estimates

Revised cost estimates for upgrades associated with WWTP's that discharge to freshwater follow. These cost estimates are associated with meeting NPS Freshwater Attribute B values for ammonia, nitrates and Ecoli at the point of discharge. The assumptions detailed in Report #1 should be referenced for cost build-up.

Table 3 Estimate of capital cost to upgrade WWTPs discharging to freshwater to meet NPS Freshwater Attribute B state in the discharge

Region	No. WWTPs affected	Pop affected	Estimate of probable capital cost (\$ Million)	Estimate of probable operating cost (\$ Million per annum)
Auckland	5	31,010	\$47 - \$70	\$1.2 - \$1.8
Bay of Plenty	5	13,020	\$33 - \$50	\$0.61 - \$0.91
Canterbury	7	2,070	\$43 - \$65	\$0.67 - \$1.0
Gisborne	1	640	\$3.5 - \$5.2	\$0.034 - \$0.05
Hawke's Bay	6	8,270	\$37 - \$56	\$0.65 - \$0.97
Manawatu-Wanganui	26	142,510	\$370 - \$550	\$14 - \$22
Marlborough	1	690	\$2.7 - \$4.1	\$0.021 - \$0.032
Nelson	0	0	NA	NA
Northland	13	31,980	\$130 - \$200	\$2.9 - \$4.4
Otago	18	21,280	\$100 - \$150	\$1.8 - \$2.7
Southland	13	20,000	\$83 - \$130	\$1.6 - \$2.4
Taranaki	5	10,320	\$81 - \$120	\$2.7 - \$4.0
Tasman	2	2,250	\$12 - \$18	\$0.16 - \$0.25
Waikato	20	91,460	\$300 - \$440	\$9.2 - \$14
Wellington	6	39,630	\$140 - \$210	\$5.4 - \$8.1
West Coast	10	18,060	\$120 - \$180	\$3.1 - \$4.7
Total	138	433,170	\$1500 - \$2200	\$45 - \$67

Table 4 Contribution based estimate of capital cost to upgrade WWTPs discharging to freshwater to meet NPS Freshwater Attribute B state

Region	Estimate of probable capital cost by relative contribution classification (\$ Million)			
	Small	Moderate	Large	Total
Auckland	\$27-\$41	\$19 - \$29	-	\$47 - \$70
Bay of Plenty	\$4.3 - \$6.4	\$29 - \$44	-	\$33 - \$50
Canterbury	\$12 - \$18	\$18 - \$26	\$14 - \$21	\$43 - \$65
Gisborne	\$3.5 - \$5.2	-	-	\$3.5 - \$5.2
Hawke's Bay	\$32 - \$48	\$4.9 - \$7.4	-	\$37 - \$56
Manawatu-Wanganui	\$260 - \$390	\$82 - \$120	\$24 - \$36	\$370 - \$550
Marlborough	\$2.7 - \$4.1	-	-	\$2.7 - \$4.1
Nelson	-	-	-	-
Northland	\$44 - \$66	\$50 - \$76	\$36 - \$55	\$130 - \$200
Otago	\$51 - \$77	\$47 - \$71	\$3.5 - \$5.3	\$100-\$150
Southland	\$51 - \$77	\$18 - \$28	\$13 - \$20	\$83 - \$130
Taranaki	-	\$81 - \$120	-	\$81 - \$120
Tasman	\$2.7-\$4.0	\$9.3 - \$14	-	\$12 - \$18
Waikato	\$100 - \$160	\$150 - \$220	\$41 - \$62	\$300 - \$440
Wellington	\$4.8 - \$7.2	\$120 - \$170	\$20 - \$31	\$140 - \$210
West Coast	-	\$95- \$140	\$24 - \$36	\$120 - \$180
Total	\$600- \$900	\$720 - \$1100	\$180 - \$260	\$1,500 - \$2,200

Table 5 Summary of WWTP upgrade costs to meet B Attribute target of NPS Freshwater at the WWTP by WWTP Size

WWTP Size (Population)	No. WWTPs affected	Population affected	Estimate of probable capital cost (\$Million)	Estimate of probable operating cost (\$Million/year)	Estimate of annual cost impact (\$Million/year)	Annual cost impact per household affected (\$/year)
Large (>10,000)	6	185,040	\$300 - \$450	\$16 - \$24	\$39 - \$59	\$714
Medium (5,001 – 10,000)	16	104,190	\$370 - \$550	\$13 - \$20	\$42 - \$63	\$1,359
Minor (501 – 5,000)	67	130,620	\$660 - \$1000	\$14 - \$21	\$66 - \$99	\$1,697
Small (<501)	49	13,320	\$170 - \$250	\$1.9 - \$2.9	\$15 - \$23	\$3,812
Total	136	430,410	\$1500 - \$2200	\$44 - \$66	\$160 - \$240	\$1,261

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Table 6 Summary of WWTP upgrade costs to meet B Attribute target of NPS Freshwater at the WWTP Discharge

Region	No. WWTPs affected	Population affected	Estimate of probable capital cost (\$Million)	Estimate of probable operating cost (\$Million/year)	Capital cost per population (\$/person)		Operating cost per population (\$/person/year)		Annual cost impact per household (\$/year)	
					Affected	Total	Affected	Total	Affected	Total
Auckland	5	31,010	\$47 - \$70	\$1.2 - \$1.8	\$1,880	\$41	\$50	\$1	\$531	\$12
Bay of Plenty	5	13,020	\$33 - \$50	\$0.61 - \$0.91	\$3,211	\$184	\$59	\$3	\$836	\$48
Canterbury	7	2,070	\$43 - \$65	\$0.67 - \$1.0	\$26,069	\$109	\$403	\$2	\$6,595	\$28
Gisborne	1	640	\$3.5 - \$5.2	\$0.034 - \$0.05	\$6,826	\$135	\$66	\$1	\$1,620	\$32
Hawke's Bay	6	8,270	\$37 - \$56	\$0.65 - \$0.97	\$5,615	\$348	\$98	\$6	\$1,450	\$90
Manawatu-Wanganui	26	142,510	\$370 - \$550	\$14 - \$22	\$3,218	\$2,187	\$126	\$86	\$1,021	\$694
Marlborough	1	690	\$2.7 - \$4.1	\$0.021 - \$0.032	\$4,973	\$96	\$38	\$1	\$1,154	\$22
Nelson	0	0	NA	NA	NA	NA	NA	NA	NA	NA
Northland	13	31,980	\$130 - \$200	\$2.9 - \$4.4	\$5,127	\$1,479	\$114	\$33	\$1,392	\$401
Otago	18	21,280	\$100 - \$150	\$1.8 - \$2.7	\$5,993	\$585	\$106	\$10	\$1,553	\$151
Southland	13	20,000	\$83 - \$130	\$1.6 - \$2.4	\$5,210	\$1,305	\$101	\$25	\$1,374	\$344
Taranaki	5	10,320	\$81 - \$120	\$2.7 - \$4	\$9,855	\$1,194	\$324	\$39	\$2,955	\$358
Tasman	2	2,250	\$12 - \$18	\$0.16 - \$0.25	\$6,668	\$258	\$91	\$4	\$1,654	\$64
Waikato	20	91,460	\$300 - \$440	\$9.2 - \$14	\$4,039	\$1,109	\$126	\$35	\$1,194	\$328
Wellington	6	39,630	\$140 - \$210	\$5.4 - \$8.1	\$4,462	\$379	\$171	\$15	\$1,404	\$119
West Coast	10	18,060	\$120 - \$180	\$3.1 - \$4.7	\$8,199	\$6,198	\$217	\$164	\$2,317	\$1,752
Total	138	433,170	\$1500 - \$2200	\$45 - \$67M per annum	\$4,325	\$475	\$129	\$14	\$1,261	\$139

Table 7 Summary of WWTP upgrade costs to meet B Attribute target of NPS Freshwater by region for large contributing plants

Region	Cost to meet NPS for (\$ Million):			Best practice (\$ Million)	Annual operating cost (\$ Million/year)	Annual cost impact per affected household (\$/year)
	E.coli	Ammonia	Nitrate			
Auckland	-	-	-	-	-	-
Bay of Plenty	-	-	-	-	-	-
Canterbury	\$0.25 - \$0.38	\$11 - \$16	-	\$14 - \$21	\$0.29 - \$0.43	\$5,467
Gisborne	-	-	-	-	-	-
Hawke's Bay	-	-	-	-	-	-
Manawatu-Wanganui	\$0.42 - \$0.63	\$19 - \$28	-	\$24 - \$36	\$0.48 - \$0.72	\$2,276
Marlborough	-	-	-	-	-	-
Nelson	-	-	-	-	-	-
Northland	\$0.65 - \$0.98	\$29 - \$44	\$3.5 - \$5.3	\$36 - \$55	\$0.86 - \$1.3	\$1,350
Otago	\$0.052 - \$0.078	\$3.4 - \$5.1	-	\$3.5 - \$5.3	\$0.035 - \$0.052	\$926
Southland	\$0.24 - \$0.36	\$10 - \$16	-	\$13 - \$20	\$0.27 - \$0.41	\$1,523
Taranaki	-	-	-	-	-	-
Tasman	-	-	-	-	-	-
Waikato	-	\$33 - \$50	\$20 - \$30	\$41 - \$62	\$1.2 - \$1.8	\$714
Wellington	-	\$16 - \$25	-	\$20 - \$31	\$0.62 - \$0.92	\$2,734
West Coast	\$0.42 - \$0.64	\$19 - \$28	-	\$24 - \$36	\$0.48 - \$0.72	\$5,070
Total	\$2.0 - \$3.1	\$140 - \$210	\$23 - \$35	\$180 - \$260	\$4.2 - \$6.4	\$1,421

Table 8 Summary of WWTP upgrade costs to meet B Attribute target of NPS Freshwater by region for moderate contributing plants

Region	Cost to meet NPS for (\$ Million):			Best practice (\$ Million)	Annual operating cost (\$ Million/year)	Annual cost impact per affected household (\$/year)
	E.coli	Ammonia	Nitrate			
Auckland	\$0.26 - \$0.39	\$13 - \$20	\$3.5 - \$5.2	\$19 - \$29	\$0.33 - \$0.49	\$989
Bay of Plenty	\$0.43 - \$0.65	\$20 - \$30	\$5.2 - \$7.8	\$29 - \$44	\$0.56 - \$0.84	\$796
Canterbury	\$0.29 - \$0.43	\$15 - \$23	-	\$18 - \$26	\$0.25 - \$0.38	\$7,303
Gisborne	-	-	-	-	-	-
Hawke's Bay	\$0.058 - \$0.087	\$4.8 - \$7.2	-	\$4.9 - \$7.4	\$0.044 - \$0.066	\$1,424
Manawatu-Wanganui	\$0.41 - \$0.62	\$67 - \$100	\$14 - \$20	\$82 - \$120	\$2.2 - \$3.3	\$1,796
Marlborough	-	-	-	-	-	-
Nelson	-	-	-	-	-	-
Northland	\$0.61 - \$0.92	\$41 - \$62	\$9 - \$13	\$50 - \$76	\$1.1 - \$1.6	\$1,225
Otago	\$0.77 - \$1.2	\$40 - \$60	\$21 - \$32	\$47 - \$71	\$0.93 - \$1.4	\$2,116
Southland	\$0.2 - \$0.3	\$18 - \$27	\$6.2 - \$9.3	\$18 - \$28	\$0.21 - \$0.31	\$1,874
Taranaki	\$1.7 - \$2.5	\$65 - \$97	-	\$81 - \$120	\$2.7 - \$4.0	\$2,955
Tasman	\$0.15 - \$0.22	\$7.3 - \$11	-	\$9.3 - \$14	\$0.14 - \$0.21	\$1,658
Waikato	\$1.5 - \$2.2	\$120 - \$180	\$29 - \$43	\$150 - \$220	\$4.9 - \$7.4	\$2,560
Wellington	\$2.2 - \$3.2	\$91 - \$140	-	\$120 - \$170	\$4.7 - \$7.1	\$1,324
West Coast	\$0.77 - \$1.2	\$72 - \$110	\$5 - \$7.6	\$95 - \$140	\$2.7 - \$4	\$2,056
Total	\$9.2 - \$14	\$570 - \$860	\$92 - \$140	\$720 - \$1100	\$21 - \$31	\$1,779

Table 9 Summary of WWTP upgrade costs to meet B Attribute target of NPS Freshwater by region for small contributing plants

Region	Cost to meet NPS for (\$ Million):			Best practice (\$ Million)	Annual operating cost (\$ Million/year)	Annual cost impact per affected household (\$/year)
	E.coli	Ammonia	Nitrate			
Auckland	-	\$11 - \$16	\$13 - \$20	\$27 - \$41	\$0.91 - \$1.4	\$415
Bay of Plenty	\$0.068 - \$0.1	\$4.1 - \$6.2	-	\$4.3 - \$6.4	\$0.049 - \$0.074	\$1,337
Canterbury	\$0.17 - \$0.25	\$9.9 - \$15	-	\$12 - \$18	\$0.13 - \$0.19	\$7,493
Gisborne	\$0.051 - \$0.077	\$3.4 - \$5.1	-	\$3.5 - \$5.2	\$0.034 - \$0.05	\$1,620
Hawke's Bay	\$0.11 - \$0.16	\$27 - \$41	-	\$32 - \$48	\$0.6 - \$0.91	\$1,454
Manawatu-Wanganui	\$2.3 - \$3.4	\$210 - \$310	\$1.7 - \$2.5	\$260 - \$390	\$12 - \$18	\$884
Marlborough	\$0.036 - \$0.054	\$2.7 - \$4	-	\$2.7 - \$4.1	\$0.021 - \$0.032	\$1,154
Nelson	-	-	-	-	-	-
Northland	\$0.57 - \$0.86	\$37 - \$56	\$10 - \$16	\$44 - \$66	\$0.97 - \$1.5	\$1,698
Otago	\$0.67 - \$1	\$41 - \$62	\$13 - \$20	\$51 - \$77	\$0.85 - \$1.3	\$1,282
Southland	\$0.47 - \$0.71	\$42 - \$63	-	\$51 - \$77	\$1.1 - \$1.7	\$1,238
Taranaki	-	-	-	-	-	-
Tasman	-	\$2.7 - \$4	-	\$2.7 - \$4	\$0.023 - \$0.035	\$1,636
Waikato	\$0.9 - \$1.4	\$77 - \$120	\$11 - \$16	\$100 - \$160	\$3.1 - \$4.7	\$783
Wellington	-	\$4.8 - \$7.2	-	\$4.8 - \$7.2	\$0.065 - \$0.097	\$906
West Coast	-	-	-	-	-	-
Total	\$5.3 - \$8	\$470 - \$710	\$50 - \$74	\$600 - \$900	\$20 - \$29	\$923

4. Combined Costs

The following tables combine the cost estimates for WWTPs that discharge to the coast and to freshwater to provide an overall national cost estimate. The assumptions detailed in the original reports (#1 and #2) apply.

Table 10 Estimate of probable costs to upgrade WWTPs discharging to freshwater and ocean

Region	No. WWTPs affected	Pop affected	Estimate of probable capital cost Range (\$ Million)	Estimate of probable operating cost Range (\$ Million per annum)
Auckland	9	45,010	\$100 - \$160	\$3.0 - \$4.4
Bay of Plenty	10	79,880	\$100 - \$160	\$3.2 - \$4.9
Canterbury	13	397,240	\$230 - \$350	\$7.0 - \$11
Gisborne	1	640	\$3.5 - \$5.2	\$0.034 - \$0.05
Hawke's Bay	9	133,330	\$65 - \$98	\$17 - \$26
Manawatu-Wanganui	27	181,570	\$370 - \$550	\$18 - \$27
Marlborough	4	35,650	\$88 - \$130	\$4.2 - \$6.3
Nelson	1	29,890	\$50 - \$75	\$2.2 - \$3.2
Northland	20	102,080	\$180 - \$260	\$4.4 - \$6.7
Otago	22	71,430	\$310 - \$460	\$15 - \$22
Southland	16	76,580	\$200 - \$310	\$8.4 - \$13
Taranaki	8	84,930	\$95 - \$140	\$12 - \$18
Tasman	3	10,550	\$35 - \$52	\$0.86 - \$1.3
Waikato	23	105,740	\$350 - \$520	\$11 - \$16
Wellington	7	55,450	\$170 - \$260	\$6.6 - \$9.9
West Coast	13	23,890	\$160 - \$240	\$4.4 - \$6.6
Total	186	1,433,830	\$2500 - \$3800	\$120 - \$180

Table 11 Summary of WWTP upgrade costs to meet B Attribute target of NPS Freshwater at the WWTP discharge (freshwater) and minimum standards for WWTPs discharging to ocean (ocean)

Region	No. WWTPs affected	Population affected	Estimate of probable capital cost (\$Million)	Estimate of probable operating cost (\$Million/year)	Capital cost per population (\$/person)		Operating cost per population (\$/person/year)		Annual cost impact per household (\$/year)	
					Affected	Total	Affected	Total	Affected	Total
Auckland	9	45,010	\$100 - \$160	\$3.0 - \$4.4	\$2,903	\$93	\$82	\$3	\$309	\$10
Bay of Plenty	10	79,880	\$100 - \$160	\$3.2 - \$4.9	\$1,622	\$569	\$51	\$18	\$178	\$62
Canterbury	13	397,240	\$230 - \$350	\$7.0 - \$11	\$739	\$595	\$22	\$18	\$80	\$64
Gisborne	1	640	\$3.5 - \$5.2	\$0.034 - \$0.05	\$6,792	\$135	\$66	\$1	\$597	\$12
Hawke's Bay	9	133,330	\$65 - \$98	\$17 - \$26	\$611	\$611	\$160	\$160	\$208	\$208
Manawatu-Wanganui	27	181,570	\$370 - \$550	\$18 - \$27	\$2,537	\$2,197	\$126	\$109	\$325	\$281
Marlborough	4	35,650	\$88 - \$130	\$4.2 - \$6.3	\$3,072	\$3,073	\$146	\$147	\$387	\$387
Nelson	1	29,890	\$50 - \$75	\$2.2 - \$3.2	\$2,085	\$2,085	\$90	\$90	\$253	\$253
Northland	20	102,080	\$180 - \$260	\$4.4 - \$6.7	\$2,161	\$1,989	\$54	\$50	\$223	\$206
Otago	22	71,430	\$310 - \$460	\$15 - \$22	\$5,395	\$1,766	\$262	\$86	\$684	\$224
Southland	16	76,580	\$200 - \$310	\$8.4 - \$13	\$3,342	\$3,206	\$137	\$132	\$399	\$383
Taranaki	8	84,930	\$95 - \$140	\$12 - \$18	\$1,395	\$1,391	\$180	\$180	\$290	\$289
Tasman	3	10,550	\$35 - \$52	\$0.86 - \$1.3	\$4,133	\$749	\$102	\$19	\$425	\$77
Waikato	23	105,740	\$350 - \$520	\$11 - \$16	\$4,131	\$1,311	\$128	\$41	\$451	\$143
Wellington	7	55,450	\$170 - \$260	\$6.6 - \$9.9	\$3,859	\$459	\$148	\$18	\$450	\$53
West Coast	13	23,890	\$160 - \$240	\$4.4 - \$6.6	\$8,290	\$8,290	\$229	\$229	\$877	\$877
Total	186	1,433,860	\$2500 - \$3800	\$120 - \$180	\$2,193	\$798	\$103	\$37	\$740	\$269

Table 12 Summary of WWTP upgrade costs to meet B Attribute target of NPS Freshwater at the WWTP and minimum standards for WWTPs discharging to ocean - by WWTP Size

WWTP Size (Population)	No. WWTPs affected	Population affected	Estimate of probable capital cost (\$Million)	Estimate of probable operating cost (\$Million/year)	Estimate of annual cost impact (\$Million/year)	Annual cost impact per household affected (\$/year)
Large (>10,000)	23	1,106,870	\$1000 - \$1500	\$81 - \$120	\$160 - \$240	\$489
Medium (5,001 – 10,000)	20	135,970	\$450 - \$680	\$17 - \$25	\$52 - \$78	\$1,291
Minor (501 – 5,000)	84	175,380	\$860 - \$1300	\$18 - \$27	\$85 - \$130	\$1,639
Small (<501)	59	15,610	\$190 - \$290	\$2.2 - \$3.3	\$17 - \$26	\$3,697
Total	186	1,433,830	\$2500 - \$3800	\$120 - \$180	\$310 - \$470	\$740

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[https://projects.ghd.com/oc/NewZealand1/waterreformstudies/Delivery/Documents/Report for DIA - WWTP Upgrade Costs Combined.docx](https://projects.ghd.com/oc/NewZealand1/waterreformstudies/Delivery/Documents/Report%20for%20DIA%20-%20WWTP%20Upgrade%20Costs%20Combined.docx)

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