

APPENDIX 1

Population, Flows and Loads

KINLOCH WATER AND WASTEWATER FORECAST

Division	Units	Existing Kinloch town	Infill of existing Kinloch lots	Outside Kinloch town	Consented lots (Kinloch Golf Resort, Lisland & Locheagles)	New subdivisions w/o consented lots	Total
No. lots	no.	610	140	200	649	531	2130
Water demand per lot	m ³ /lot	2.20	2.20	2.20	2.20	2.20	
Total water demand	m ³	1342	308	440	1427.8	1168.2	4686

Division	Units	Existing Kinloch town	Infill of existing Kinloch lots	Outside Kinloch town	Consented lots (Kinloch Golf Resort, Lisland & Locheagles)	New subdivisions w/o consented lots	Total
No. lots	no.	610	140	0	649	531	1930
Wastewater per lot	m ³ /lot	1	1	1	1	1	
Total wastewater	m ³	610	140	0	649	531	1930

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	Units	Currently Connected	To be connected by 2004	Bremner Development	Extra	Allowance for commercial development - lodges and infilling etc	Final Design Value
No. lots	no.	610	649	531	0	140	2000
Wastewater per lot	m ³ /lot	1	1	1	1	1	1
Total wastewater	m ³	610	649	531	0	140	2000

Actual Total 1930

Estimation of Loads from April 2001 Sampled Influent Data at Kinloch WWTP

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	Units	Average	Maximum	Minimum
COD	mg/L	1143	2090	344
cBOD5	mg/L	539	1395	180
Suspended Solids (SS)	mg/L	364	686	144
Volatile Suspended Solids (VSS)	mg/L	0.34	0.64	0.14
Ammonia	mg/L	72.7	95.4	57.7
Alkalinity	mg/L	292	423	214
VFA	mg/L	141	380	35
Total Phosphorus (TP)	mg/L	28.3	47.6	10.8
pH		7.08	7.53	6.28

Predicted Flow
= 2000 m³

	Units	Average	Maximum	Minimum	Original Design	Final Design
COD	kg/d	2286	4180	688	1765	2286
cBOD5	kg/d	1078	2790	360	706	1078
Suspended Solids (SS)	kg/d	728	1372	288		
Volatile Suspended Solids (VSS)	kg/d	0.68	1.28	0.28		
Ammonia	kg/d	145.4	190.8	115.4		
Alkalinity	kg/d	584	846	428	400	400
VFA	kg/d	282	760	70		
Total Phosphorus (TP)	kg/d	56.6	95.2	21.6	23.5	57
TKN					117.6	150

KINLOCH PLANT STUDY - April 2001

All data collected - excluding bad data

Raw Influent Unfiltered	COD	BOD5	SS	VSS	TKN	NH4N	ALK	VFA	pH	T.Phos
17/04/2001	650	339	259	64.75	80.1		235	62.5	7.13	14.4
19/04/2001	344	None	144	20.16	57.7	38.1	270	47.5	7.53	10.8
27/04/2001		180	174	29.58			214	35	7.52	
01/05/2001	1030	402	326	97.8	66.1	41.15	270	92.5	7.26	
Average	675	307	226	53.07	68.0	39.6	247	59	7.36	12.6
Maximum	1030	402	326	97.80	80.1	41.2	270	93	7.53	14.4
Minimum	344	180	144	20.16	57.7	38.1	214	35	7.13	10.8

Raw Influent Filtered	COD	BOD5	TKN	Total Phosphorus
17/04/2001	184	156	38	
19/04/2001	151	None	48.2	
27/04/2001		60		
01/05/2001		167		22.5
Average	167.5	128	43	23
Maximum	184	167	48.2	22.5
Minimum	151	60	38	22.5

Mixed Liquor

Tank 1	Settleability	MLSS	SVI	TSS	VSS
11/04/2001	480	1503	320	1419	1.19
17/04/2001	620	2259	274	1852	1.58
Average	550	1881	297	1636	1.39
Maximum	620	2259	320	1852	1.58
Minimum	480	1503	274	1419	1.19

Decant From SBR

Tank 1	SS	BOD5	TOXN	NO3	NH4
04/04/2001	26.8	19.8	1.66	0.76	16.58
11/04/2001	5.1	4.7	8.15	8.15	0.07
Average	16.0	12.3	4.91	4.46	8.33
Maximum	26.8	19.8	8.15	8.15	16.58
Minimum	5.1	4.7	1.66	0.76	0.07

Tank 2	Settleability	MLSS	SVI	TSS	VSS
11/04/2001	800	2224	360	2136	1.8
17/04/2001	950	2921	325	2716	2.33
Average	875	2572.5	342.5	2426	2.07
Maximum	950	2921	360	2716	2.33
Minimum	800	2224	325	2136	1.8

Tank 2	SS	BOD5	TOXN	NO3	NH4
04/04/2001	5.4	1.1	4.32	4.3	0.07
11/04/2001	6.3	2.2	12.98	12.98	0.02
Average	5.85	1.65	8.65	8.64	0.045
Maximum	6.3	2.2	12.98	12.98	0.07
Minimum	5.4	1.1	4.32	4.3	0.02

Sludge Holding Tank Decant Liquid

* this goes back to SBRs

Date	SS	BOD5	TKN	Volume over 24 h
10/04/2001	20	87	11.2	2.749
11/04/2001	26	42	12.4	16.69
12/04/2001	381	96		15.71
17/04/2001	16	53	16.1	10.41
18/04/2001	28	96	18.1	7.66
Average	94.2	74.8	14.45	10.64
Maximum	381	96	18.1	16.69
Minimum	16	42	11.2	2.75

Sludge Tank Wasting

*this is the volume of wasted

09/04/2001 15.119 m3 sludge from both SBR's over a 24 hour period

Sludge Tank Composite -on Transfer to Truck

18/04/2001 %Total solids = 1.02
%Volatile solids = 83.5

APPENDIX 2

Existing Wastewater Discharge Resource Consent

RESOURCE CONSENT



HAMILTON OFFICE
3 Cook Street, Hamilton
PO Box 4010, Hamilton East
Telephone 07 856 7184
Facsimile 07 856 0551

File Number: 60 55 10A
Resource Consent Number: 930282

TAUPO OFFICE
283 Broadlands Road, Taupo
Telephone 07 378 6539

PAEROA OFFICE
13 Opatito Road, Paeroa
Telephone 07 862 8376

Pursuant to the Resource Management Act 1991, the Waikato Regional Council hereby grants consent to:

Taupo District Council
Private Bag 2005
TAUPO

(hereinafter referred to as the Consent Holder)

This consent authorises the Consent Holder to: discharge up to 475 cubic metres per day of treated domestic effluent into the ground for domestic waste disposal purposes in the vicinity of Kinloch, Taupo at or about map reference NZMS 260 U18:646-791

On the land described as: property Pt 2 DPS 12496 Blk XVI Marotiri S.D. Blk VI Tuhingamata SD

For a term to expire on: 31 July 2011

Subject to the following conditions:

General

- 1 The consent holder shall retain a suitably qualified and experienced person to review and provide a management plan for this site. This plan is intended to address how the treatment system will be operated and maintained to optimise nutrient removal and prevent loss of nutrients to ground or surface water. This plan shall include appropriate procedures to monitor and manage effects of effluent discharge on the environment. It shall include as a minimum the following matters;
 - (i) comprehensive description of the treatment and disposal facility;
 - (ii) procedures for monitoring treatment processes and providing a log of relevant events e.g. significant equipment failure and weather conditions;
 - (iii) management procedures and lines of responsibility;
 - (iv) contingency measures to address unusual events;
 - (v) reporting procedures; and,
 - (vi) procedures for reviewing and improving the operations manual.
 The management plan shall be to Waikato Regional Council satisfaction and provided within 6 months of the date of granting of this consent.
- 2 The total nitrogen concentration of the treated effluent discharged to the ground shall not exceed 45 grams per cubic metre.
- 3 The total nitrogen concentration of the treated effluent discharged shall not exceed 30 grams per cubic metre for greater than 25 per cent of the time based on all samples collected for any 30 day period.
- 4 The wastewater treatment system shall be operated, maintained and managed in accordance with the management plan accepted by Waikato Regional Council under condition (1) of this consent, or any subsequent update to that manual as accepted in writing by Waikato Regional Council.
- 5 The consent holder shall retain appropriately experienced personnel to operate the sequential batch reactor treatment and disposal system.
- 6 Any erosion control works that become necessary as a result of wastewater discharge shall be undertaken at the expense of the consent holder to the satisfaction of Waikato Regional Council.

Monitoring

- 7 The quality, quantity and variability of the treated waste water discharged into the ground shall be determined by the consent holder. To this end the consent holder shall undertake the following monitoring to the satisfaction of Waikato Regional Council during the period 1 November to 31 March inclusive:
 - (i) determine the volume of effluent discharged on a daily basis;
 - (ii) determine the total nitrogen, nitrate-nitrogen, and total phosphorus concentrations, also suspended solids and 5 day biochemical oxygen demand (BOD₅) on all effluent discharged into the ground on a weekly basis(see note 1).
 The results of this monitoring shall be provided to Waikato Regional Council by April of each year in an agreed analysed report and data form. Mean monthly concentration derived from the weekly monitoring results for these parameters shall be included.
- 8 The consent holder shall retain an appropriately experienced person to develop a monitoring programme to evaluate the environmental effects of this effluent discharge. This programme shall be to the satisfaction of Waikato Regional Council. The completed description of this programme shall be provided to Waikato Regional Council within six months of the granting of the consent. This programme shall address at least the following:

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8/1/97

- (i) A proposal for the construction of piezometers to monitor groundwater quality and contaminant migration. It is suggested that these comprise an up-gradient control site and a minimum of three down-gradient monitoring piezometers. This work should be completed within one year of the date of granting of this consent.
 - (ii) Information should be provided on groundwater flow direction, groundwater gradient and depth to the water table along with estimates of hydraulic conductivity and effective porosity from which to estimate groundwater velocity relevant for contaminant transport. This information should be provided to Waikato Regional Council within two years of the granting of this consent.
 - (iii) Groundwater levels should be monitored in the monitoring piezometers on a quarterly basis. The relative level of all piezometers should initially be obtained by surveying.
 - (iv) Monitoring of groundwater quality in the monitoring piezometers should be carried out on a quarterly basis. Groundwater samples should be analysed for NO₃-N and NH₄-N, conductivity and enterococci bacteria (see note 1).
 - (v) Monitoring to check for potential surface water runoff or seepage from the plant should be undertaken. Any runoff should be analysed for nutrient and bacterial contamination.
 - (vi) The results of this monitoring shall be provided to Waikato Regional Council at six monthly intervals in an agreed analysed report and data form unless otherwise agreed to in writing by Waikato Regional Council.
- (9) The consent holder shall undertake the environmental monitoring programme referred to in conditions (7) and (8) above. The written report required as part of this programme will be forwarded to Waikato Regional Council by the period specified in those conditions or such other time as agreed upon in writing by Waikato Regional Council.

Odour

- 10 As a result of the exercise of this consent there shall be no odour detectable beyond the legal boundary of the treatment site which causes an objectionable or offensive effect.
- 11 Should an event occur which has an objectionable or offensive effect, the consent holder shall, within 5 days of being advised of this event by Waikato Regional Council, provide a written report to Waikato Regional Council specifying:
 - (i) the cause or likely cause of the event and any factors which influenced its severity;
 - (ii) the nature and timing of any measures implemented by the consent holder to avoid, remedy or mitigate any adverse effects;
 - (iii) the steps to be taken in the future to prevent a recurrence of similar events.

Practice Note:

For the purpose of condition (11) of this consent, the Waikato Regional Council will consider an effect that is objectionable or offensive to have occurred if any appropriately experienced officer of the Waikato Regional Council deems it so having regard to:

- (i) the frequency, intensity, duration, amount and location of the effect(s) of the odour, and/or,
- (ii) a written declaration from no less than three individuals that the effect odour was objectionable or offensive. That declaration shall include the individuals' names and addresses, the date and time that the nuisance event occurred and when it was detected. Where a declaration is made following a number of discharge events having objectionable or offensive effects, that declaration shall provide details of the frequency, intensity, duration and location of those events. The individuals shall also state the circumstances which led to the declaration (for example, called upon by another individual, detected from a distance). The declaration shall be signed and dated. And/or,
- (iii) relevant written advice or a report from an Environmental Health Officer of a territorial authority or Health Authority.

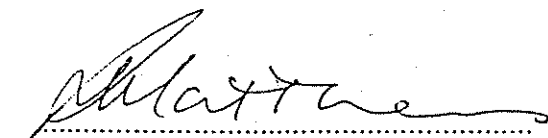
Administration

- 12 Waikato Regional Council may review the conditions of this consent five years from the date of the granting of this consent, for any of the purposes specified in Section 128 of the Resource Management Act 1991, and specifically for the purpose of reviewing any adverse effects on ground or surface water due to the discharge of domestic effluent into the ground as authorised by this consent.
- 13 Pragmatic operational alternatives for optimising nutrient treatment and minimising the effects of effluent discharge on the environment should be considered and the findings reported in writing to Waikato Regional Council five years after granting the consent. This may include methods for the reduction in nutrients discharged into the environment and/or the utilisation of the treated effluent in some manner, such as by vegetative uptake. The consent holder should also ensure that the best practicable option is adopted to minimise the amount of nitrogen leaching from the treatment site. Modification of the effluent soakage trenches to reduce nutrient loading at the point of discharge would be likely to provide a means of mitigation.
- 14 Alternatives for the long-term treatment of wastewater should be considered and pragmatic alternatives reviewed within the life of this consent term. Waikato Regional Council policy encourages utilisation rather than disposal of effluent. Such utilisation may include land treatment alternatives.
- 15 The consent holder shall pay to Waikato Regional Council any administrative charge fixed in accordance with section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under section 360 of the Resource Management Act.

Note 1: All water quality sample analyses required shall be undertaken using standard methods as detailed in the "Standard Methods For The Examination Of Water And Waste Water, 1995" 19th edition by A.P.H.A. and A.W.W.A. and W.E.F. and any subsequent updates or by some other method, approved in advance by the Waikato Regional Council.

Dated at Hamilton this 3TH day of JANUARY 1997

For and on behalf of the
Waikato Regional Council


.....
for Secretary

APPENDIX 3

Turangī Wastewater Resource Consent

Schedule

A. Resource consent (102927)

Consent type: Discharge permit
Consent subtype: Discharge to water
Applicant: Taupo District Council
Private Bag 2005
TAUPO 2730

Activity authorised: Discharge treated domestic effluent to the Hangarito Stream and Taupo South wetland

Location: (Turangi Sewage) Awamate Rd - Turangi
Map Reference: NZMS 260 T19: 516-442

Consent duration: Granted for a period expiring fifteen years from the date of commencement of this consent

Conditions:

1. The wastewater treatment and disposal system shall be operated and maintained in accordance with:
 - (a) the application for this resource consent; and
 - (b) the document titled "Taupo District Council Application to renew Resource Consent 900103 for the Discharge of Treated Wastewater from the Turangi Wastewater Treatment Plant – Assessment of Environmental Effects (Brian T Coffey and Associates) and the associated Appendices; and
 - (c) the letter regarding "Turangi Wastewater Treatment Plant RC Application No. 102927, Section 92, RMA 1991 Request Response" dated 20 September 2002, from Taupo District Council; andsubject to the conditions of this resource consent.
2. The consent holder shall upgrade the treatment plant so that it is capable of producing an effluent at least equivalent to an Activated Sludge Plant, and that it will meet the conditions of this consent. Concept design of the plant shall be submitted to the Waikato Regional Council for approval prior to any construction work commencing.
3. The treatment plant and discharge shall be managed and operated by an appropriately trained operator.
4. The consent holder shall provide easy access for Waikato Regional Council staff to the treatment plant and disposal facilities for the measurement of flow and quality of the discharge.
5. The consent holder shall ensure contractors are made aware of the conditions of this resource consent and ensure compliance with those conditions.
6. The consent holder shall pay to the Waikato Regional Council any administrative charge fixed in accordance with section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under section 360 of the Resource Management Act.

Discharge Constraints and Quality

7. The maximum volume of treated wastewater discharged shall not exceed 2,100 cubic metres in any 24-hour period.
8. The consent holder shall meet condition 9 of this consent following the installation and commissioning of the new treatment plant at the treatment plant site or from the second anniversary of the commencement of this consent, whichever ever occurs first. Prior to this time condition 9 of this consent shall not apply and the consent holder shall meet the following discharge standards at the point of discharge from the existing oxidation ponds:

Median *90% ile*

Discharge Standards		
Total Phosphorus	6	9.6
Biochemical Oxygen Demand (CBOD ₅)	20	60
Chemical Oxygen Demand	Monitor only	Monitor only
Suspended Solids	25	50
Ammoniacal Nitrogen	6	16
Total Nitrogen	12	25
Faecal coliform	5,000	20,000
Input volume	1000 m ³ /day	2100 m ³ /day (max)

All values are calculated as 100 day rolling values. N.B. The "100 day rolling" median is the median value of all the monitoring data collected over the 100 days previous to the date of calculation of the median. The median is a "rolling" median in that at the end of the 101st day the data collected on day 1 is ignored and replaced by data collected on the 101st day.

9. The consent holder shall ensure that the quality of the discharge from the Treatment Plant (being an AS Plant or equivalent) is equal to or less than the concentrations outlined in the table below as follows:

Total Phosphorus	gm ⁻³	<1.7	<4
Total Phosphorus	kgd ⁻¹	2.5	
CBOD ₅	gm ⁻³	15	30
Suspended Solids	gm ⁻³	20	30
Ammoniacal Nitrogen	gm ⁻³	2.5	5
Total Nitrogen	kgd ⁻¹	12	
Total Nitrogen	gm ⁻³	8	15
pH		7	6 -9
Faecal coliform	MPN per 100 ml	100	400*

N.B. All values are calculated as 100 day rolling values.

* Eighty-percentile value (ANZECC, 2000).

10. Notwithstanding the stated limits in conditions 8, and 9 of this consent, the consent holder shall make all reasonable and practical efforts to ensure that the final effluent quality is maximised within the capabilities of the treatment system in operation.
11. The consent holder shall ensure that after reasonable mixing the discharge does not cause any of the following effects in any receiving water body or wetland:
 - (a) The production of any conspicuous oil or grease film, scum, foam, or floatable or suspended materials;

- (b) Any conspicuous change in the colour or visual clarity;
 - (c) Any emission of objectionable odour;
 - (d) The rendering of fresh water unsuitable for contact recreation either in the South Taupo Wetland or the Tokaanu Tailrace; and
 - (e) Any significant adverse effects on aquatic life or fauna or flora.
12. The discharge from the treatment plant shall be via a ground infiltration or rock trench system. Representatives of Ngati Turangitukua shall be offered the opportunity of having input into the disposal system design. The design of the disposal system, and any comments shall be provided to the Waikato Regional Council, who shall approve the design as being satisfactory in terms of the conditions of this consent, before construction begins.

Monitoring and Reporting

13. The consent holder shall characterise the quality, quantity and variability of the discharge of sewage effluent to the satisfaction of the Waikato Regional Council. To this end, the consent holder shall develop a monitoring plan in consultation with the Waikato Regional Council and representatives of Ngati Turangitukua for approval by Waikato Regional Council to address the following matters:
- (a) The monitoring requirements and compliance standards for the period of plant operation up to completion of the proposed upgrade;
 - (b) The location of monitoring sites and sampling required to measure the specified contaminants in the effluent discharged following completion of the Treatment Plant upgrade;
 - (c) The operational performance of the plant shall be monitored. As a minimum this monitoring should involve measurement of daily inflow volumes to the plant plus fortnightly cBOD₅ (carbonaceous biochemical oxygen demand), COD, Ammonia, Total Nitrogen and Total Phosphorous at the plant inlet based on 24 hr composite sampling. Effluent quality from the Activated Sludge Plant or approved alternative shall be monitored and shall include as a minimum fortnightly composite sample cBOD₅, COD, Total Ammonia; Nitrate, Nitrite, TKN (Total Kjeldahl Nitrogen), faecal coliforms, and pH. All sampling should be cycled to sample on a different day each fortnight;
 - (d) Monitoring of the environmental compliance of the plant effluent at the point of discharge in accordance with the requirements of this consent;
 - (e) The impact of contaminant and nutrient discharge to the South Taupo Wetland (STW). In particular the monitoring plan should be designed to establish gradients and the zone of influence of the discharge from the discharge point to the wetland through to Lake Taupo and to measure: changes in soil and foliage nutrient levels; and vegetation diversity and composition within the STW resulting from the effluent discharge;
 - (f) Establish monitoring of the seepage of groundwater into the Tokaanu Tailrace to identify and measure impacts on water quality. This should include TN, TP and faecal coliform levels as a minimum requirement;
 - (g) Identify the frequency of monitoring required to minimise the level of environmental risk involved in accordance with NZ Municipal Wastewater Monitoring Guidelines (Ministry for the Environment, 2002).
 - (h) The monitoring of DO in the Hangarito Stream and the STW;
 - (i) The monitoring of heavy metals in the STW and its effects on fauna and flora using appropriate indicator species.

This Plan shall be lodged with the Waikato Regional Council for approval within three months of the commencement of this consent, for written approval.

14. All sample analyses shall be undertaken in accordance with the methods detailed in the "Standard Methods For the Examination of Water And Waste Water, 1998" 20th edition by A.P.H.A. and A.W.W.A and W.E.F, or any other method approved in advance by the Waikato Regional Council.

Reporting

15. The consent holder shall provide to the Waikato Regional Council and Ngati Turangitukua a written monitoring report by 1 July each year that this consent is current. As a minimum this report shall include the following:

- (a) A summary of the monitoring results required by condition 12 of this consent for 1 April to 31 March of the preceding year and a critical analysis of the information in terms of compliance and environmental effects;
- (b) A comparison of data with previously collected data identifying any emerging trends;
- (c) Comment on compliance, and any reasons for non-compliance or difficulties in achieving compliance, with conditions 8 and 9 of this consent;
- (d) Comment on any works that have been undertaken, or that are proposed to be undertaken in the up-coming year, to improve the environmental performance of the treatment and/or disposal system;
- (e) Report on and discuss any complaints received regarding the treatment and/or discharge of treated effluent; and
- (f) Any other issues considered important by the consent holder.

Notification of limits being exceeded

16. The consent holder shall notify the Waikato Regional Council as soon as practicable and as a minimum requirement within 48 hours, of the consent holder becoming aware of the limits specified in condition 8 and 9 of this consent being exceeded and/or of any accidental discharge, plant breakdown, or other circumstances which are likely to result in the limits of this consent being exceeded. The consent holder shall, within 7 days of the incident occurring, provide a written report to the Waikato Regional Council identifying the exceedance, possible causes, steps undertaken to remedy the effects of the incident and measures that will be undertaken to ensure future compliance.

Management Plan

17. The consent holder shall provide the Waikato Regional Council with a management plan that details the procedures that will be implemented to operate in accordance with the conditions of this resource consent. This plan shall be developed in consultation with representatives of Ngati Turangitukua and shall be lodged with the Waikato Regional Council within 6 months of the commencement of this consent. The plan shall be reviewed and updated as a minimum every two years that this consent is operative and shall address, but may not be limited to, the following:
- (a) A description of the entire treatment system facility;
 - (b) A description of routine maintenance procedures to be undertaken;
 - (c) An outline of the methods to be utilised to monitor the treatment plant in an operational sense including:
 - (d) Monitoring of influent waste water
 - (e) Monitoring of treatment performance

- (f) Specific management procedures for the efficient functioning of the treatment system;
- (g) Procedures for recording routine maintenance and all repairs that are undertaken;
- (h) Contingency measures in place to deal with unusual events such as any process failure in the activated sludge plant;
- (i) Other actions necessary to comply with the requirements of this resource consent;
- (j) Procedures for improving and/or reviewing the management plan; and
- (k) Flow balancing, including for purposes of holding back wastewater during flood events (refer condition 18).

The consent holder shall manage the wastewater treatment and discharge in accordance with the management plan outlined in this condition. The consent holder following consultation with the Waikato Regional Council shall confirm any changes to the plan in writing.

18. In order to minimise the potential for effluent to reach the Mangakopikopiko Urupa, the consent holder shall investigate the potential for holding back discharges of effluent during flood events. These investigations and chosen management strategies shall be discussed with the Waikato Regional Council and representatives of Ngati Turangitukua, and implementation of the management options shall be such as to limit discharges during flood events to the satisfaction of the Waikato Regional Council.

Site Rehabilitation

19. Any areas of the current treatment and disposal system that are no longer required (such as ponds, spray irrigation field and confined wetland) shall be remediated to the satisfaction of the Waikato Regional Council. Remediation plans for the redundant areas shall be developed in consultation with the Waikato Regional Council and Ngati Turangitukua and approved by Waikato Regional Council, and shall be designed to be in keeping with the surrounding area.

Odour

20. The operation of the sewage treatment plant shall be carried out in such a way that the potential for odours is kept to a practicable minimum. The treatment and discharge of effluent shall be undertaken in such a manner that they do not produce an objectionable or offensive odour at or beyond the outer boundary of the land containing the Turangi Wastewater Treatment Plant being that land described as parts Tokaanu B 1L1, B 1K, B1J, B1G and B1G2 Blocks (N.Z. Gazette 1985 p.251).

For the purpose of this condition the Waikato Regional Council will consider an effect that is objectionable or offensive to have occurred if any appropriately experienced officer of the Waikato Regional Council deems it so after having regard to:

- (a) The frequency, intensity, duration, amount, effect and location of the effect(s) of the offensiveness of an odour; and/or
- (b) Receipt of complaints from neighbours or the public; and/or
- (c) Relevant written advice or a report from an Environmental Health Officer of a territorial authority or health authority.

21. Should an event occur which results in an objectionable or offensive odour, the consent holder shall provide written information on the odour incident including all of the details required by the complaints register of the site as outlined in condition 21 of this consent.

This information shall be forwarded to the Waikato Regional Council within 5 days of the complaint being received.

Erosion

22. The discharge structure to the Hangarito Stream shall be designed and constructed to ensure that local scour is avoided.
23. The consent holder shall be responsible for the structural integrity and maintenance of the discharge structure and for any erosion control works that become necessary to preserve the integrity and stability of the stream channel and/or to control erosion as a result of the exercise of this consent.

Complaints Register

24. The consent holder shall maintain and keep a complaint register for all complaints made about the treatment and disposal site received by the consent holder. The register shall record:
- (a) The date, time and duration of the event/incident that has resulted in a complaint;
 - (b) Any corrective action undertaken by the consent holder in response to the complaint including actions taken to prevent similar events in the future;
 - (c) The location of the complainant when the event was detected;
 - (d) The possible cause of the event;
 - (e) The weather conditions and wind direction at the site when the odour event occurred.

The register shall be available to the Waikato Regional Council at all reasonable times. Complaints received by the consent holder that may infer non-compliance with the conditions of this consent shall be forwarded to the Waikato Regional Council within 5 days of the complaint being received.

Signage

25. The consent holder shall construct and place a sign in the vicinity of the discharge to the Hangarito Stream and the South Taupo Wetland in such a way that it is conspicuous to stream and wetland users, advertising the presence of the wastewater discharge.

Review

26. The Waikato Regional Council may in the month following each two yearly anniversary of the commencement of this consent, serve notice on the consent holder under section 128 (1) of the Resource Management Act 1991, of its intention to review the conditions of this resource consent for the following purposes:
- (a) to review the effectiveness of the conditions of this resource consent in avoiding or mitigating any adverse effects on the environment, in particular effects on the Hangarito Stream, The Tokaanu Tailrace and the South Taupo Wetland, from the exercise of this resource consent and if necessary to avoid, remedy or mitigate such effects by way of further or amended conditions; or
 - (b) if necessary and appropriate, to require the holder of this resource consent to adopt the best practicable option to remove or reduce adverse effects on the surrounding environment due to contaminants entering the environment; or
 - (c) to review the adequacy of and the necessity for monitoring undertaken by the consent holder.

Costs associated with any review of the conditions of this resource consent will be recovered from the consent holder in accordance with the provisions of section 36 of the Resource Management Act 1991.

Advice notes

1. In accordance with section 125 RMA, this consent shall lapse two (2) years after the date on which it was granted unless it has been given effect to before the end of that period.
2. Where resource consent has been issued in relation to any type of construction (e.g. dam, bridge, jetty) this consent does not constitute authority to build and it may be necessary to apply for Building Consent from the relevant territorial authority.
3. This resource consent does not give any right of access over private or public property. Arrangements for access must be made between the consent holder and the property owner.
4. This resource consent is transferable to another owner or occupier of the land concerned, upon application, on the same conditions and for the same use as originally granted (s.134-137 RMA).
5. The consent holder may apply to change the conditions of the resource consent (except for the duration) if circumstances change (s.127 RMA).
6. The reasonable costs incurred by Waikato Regional Council arising from supervision and monitoring of this consent will be charged to the consent holder. This may include but is not limited to routine inspection of the site by Waikato Regional Council officers or agents, liaison with the consent holder, responding to complaints or enquiries relating to the site, and review and assessment of compliance with the conditions of consents.

APPENDIX 4

Cost Summary

Kinloch Infrastructure Cost Estimates Summary

Revised 18-May-04

Capital Expenditure	Water Intake and Treatment	Water Retic and Reservoir	Wastewater Retic	Wastewater Treatment	Wastewater Irrigation P/S and Retic	Wastewater Disposal System	Wastewater Land (Land Purchase and Fees)	Total
Capacity Increase	\$302,000	\$2,874,000	\$353,600	\$3,535,000	\$2,717,000	\$2,461,000	\$170,000	\$12,412,600
Level of Service Inc.	\$753,000			\$1,858,000				\$2,611,000
Total Capex	\$1,055,000	\$2,874,000	\$353,600	\$5,393,000	\$2,717,000	\$2,461,000	\$170,000	\$15,023,600
Cost Per Lot								
Capacity								
Number of Lots (New Lots Only)	1320	1320	1320	1320	1320	1320	1320	
Cost per Lot	\$229	\$2,177	\$268	\$2,678	\$2,058	\$1,864	\$129	\$9,403
Level of Service								
Number of Lots (All)	1930	1930	1930	1930	1930	1930	1930	
Cost per Lot	\$390	\$0	\$0	\$963	\$0	\$0	\$0	\$1,353
Total Cost per Lot	\$619	\$2,177	\$268	\$3,641	\$2,058	\$1,864	\$129	\$10,756
Assumptions, Exclusions	Lot Numbers Assumed*							
*Estimates based on current information from Taupo DC and developers	Kinloch Existing 610							
Estimates include land costs for treatment plant expansion	Golf Course Dev. 289							
Contribution of land by developers excluded	Lisland (Stage3&4) 160							
Assumes all new lots contribute to new infrastructure capacity	Locheagles 200							
Water Level of service as per Draft NZ Drinking Water Standards	Future areas 531							
Wastewater Level of Service as per expected new consent conditions	Infill/Comm/Other** 140							
*Household Equivalent Units (HEU) as per Development Contributions Policy	Total Lots 1930							
** Infill (60 HEU), Commercial-LochEagles (10 HEU), Other land (50 HEU)	1320 New Lots Only							

Kinloch Infrastructure Cost Estimates - Sensitivity Analysis

Revised 16-Jun-04

Base Case

04_16237.1

	Water Intake and Treatment	Water Retic and Reservoir	Wastewater Retic	Wastewater Treatment	Wastewater Irrigation P/S and Retic	Wastewater Disposal (Excluding Land)	Wastewater Land (Land Purchase and Fees)	Total
Capital Expenditure								
Capacity Increase	\$302,000	\$2,874,000	\$353,600	\$3,535,000	\$2,717,000	\$2,461,000	\$170,000	\$12,412,600
Level of Service Inc.	\$753,000			\$1,858,000				\$2,611,000
Total Capex	\$1,055,000	\$2,874,000	\$353,600	\$5,393,000	\$2,717,000	\$2,461,000	\$170,000	\$15,023,600
Cost Per Lot								
Capacity								
Number of Lots (New Lots Only)	1320	1320	1320	1320	1320	1320	1320	
Cost per Lot	\$229	\$2,177	\$268	\$2,678	\$2,058	\$1,864	\$129	\$9,403
Level of Service								
Number of Lots (All)	1930	1930	1930	1930	1930	1930	1930	
Cost per Lot	\$390	\$0	\$0	\$963	\$0	\$0	\$0	\$1,353
Total Cost per Lot	\$619	\$2,177	\$268	\$3,641	\$2,058	\$1,864	\$129	\$10,756
Assumptions, Exclusions				Lot Numbers Assumed				
Estimates exclude land costs				Kinloch Existing	610			Existing
Contribution of land by developers excluded				Golf Course Dev.	289			
Assumes all new lots contribute to new infrastructure capacity				Lisland (Stages3&4)	160			
Water Level of service as per Draft NZ Drinking Water Standards				Locheagles	200			
Wastewater Level of Service as per expected new consent conditions				Future areas	531			
				Infill/Commercial	140			New Lots Only
				Total Lots	1930			

Sensitivity Analysis Future Area = 1000 Lots

Capital Expenditure	Water Intake and Treatment (Pro rata)	Water Retic and Reservoir (+ 10%)	Wastewater Retic (No change)	Wastewater Treatment (Pro rata)	Wastewater Irrigation P/S and Retic (Pro rata)	Wastewater Disposal (Excluding Land) (Pro rata)	Wastewater Land (Land Purchase and Fees)	Total
Capacity Increase	\$325,667	\$3,161,400	\$353,600	\$4,394,023	\$3,377,245	\$3,059,036	\$170,000	\$14,840,972
Level of Service Inc.	\$935,983			\$2,309,504				\$3,245,487
Total Capex	\$1,261,650	\$3,161,400	\$353,600	\$6,703,527	\$3,377,245	\$3,059,036	\$170,000	\$18,086,458

Cost Per Lot

Capacity	1789	1789	1789	1789	1789	1789	1320	
Number of Lots (New Lots Only)								
Cost per Lot	\$182	\$1,767	\$198	\$2,456	\$1,888	\$1,710	\$129	\$8,329
Level of Service								
Number of Lots (All)	2399	2399	2399	2399	2399	2399	1930	
Cost per Lot	\$390	\$0	\$0	\$963	\$0	\$0	\$0	\$1,353
Total Cost per Lot	\$572	\$1,767	\$198	\$3,419	\$1,888	\$1,710	\$129	\$9,682

Assumptions, Exclusions

Estimates exclude land costs
 Contribution of land by developers excluded
 Assumes all new lots contribute to new infrastructure capacity
 Water Level of service as per Draft NZ Drinking Water Standards
 Wastewater Level of Service as per expected new consent conditions

Lot Numbers Assumed

Kinloch Existing	610	Existing
Golf Course Dev.	289	
Lisland (Stage3&4)	160	
Locheagles	200	
Future areas	1000	
Infill/Commercial	140	New Lots Only
Total Lots	2399	

Sensitivity Analysis Future Area = 250 Lots

Capital Expenditure	Water Intake and Treatment (Pro rata)	Water Retic and Reservoir (- 5%)	Wastewater Retic (No change)	Wastewater Treatment (Pro rata)	Wastewater Irrigation P/S and Retic (Pro rata)	Wastewater Disposal (Excluding Land) (Pro rata)	Wastewater Land (Land Purchase and Fees)	Total
Capacity Increase	\$223,854	\$2,730,300	\$353,600	\$3,020,319	\$2,321,416	\$2,102,689	\$170,000	\$10,922,177
Level of Service Inc.	\$643,366			\$1,587,483				\$2,230,849
Total Capex	\$867,220	\$2,730,300	\$353,600	\$4,607,802	\$2,321,416	\$2,102,689	\$170,000	\$13,153,026
Cost Per Lot								
Capacity								
Number of Lots (New Lots Only)	1039	1039	1039	1039	1039	1039	1320	
Cost per Lot	\$215	\$2,628	\$340	\$2,907	\$2,234	\$2,024	\$129	\$10,477
Level of Service								
Number of Lots (All)	1649	1649	1649	1649	1649	1649	1930	
Cost per Lot	\$390	\$0	\$0	\$963	\$0	\$0	\$0	\$1,353
Total Cost per Lot	\$606	\$2,628	\$340	\$3,870	\$2,234	\$2,024	\$129	\$11,830
Assumptions, Exclusions								
Estimates exclude land costs								Existing
Contribution of land by developers excluded								
Assumes all new lots contribute to new infrastructure capacity								
Water Level of service as per Draft NZ Drinking Water Standards								
Wastewater Level of Service as per expected new consent conditions								
Lot Numbers Assumed								
Kinloch Existing								610
Golf Course Dev.								289
Lisland (Stage3&4)								160
Locheagles								200
Future areas								250
Infill/Commercial								140
Total Lots								1649
								New Lots Only

APPENDIX 5

Water Supply Cost Schedules

Kinloch Water Supply

Augment and Upgrade Intake and WTP

Item	Size	Qty.	Unit	Unit Cost	Cost
Intake Pump Station					
Additional intake screen	Same	1 u		\$5,000.00	\$5,000.00
Raise up switch box	-	1 lot		\$3,000.00	\$3,000.00
Additional pumps in PS	Same	1 u		\$20,000.00	\$20,000.00
Additional pipework in PS	Same	1 lot		\$2,000.00	\$2,000.00
Additional electricals for PS	-	1 lot		\$2,500.00	\$2,500.00
Upgrade transformer		1 lot		\$5,000.00	\$5,000.00
Upgrade mains cable for increased power		1 lot		\$23,000.00	\$23,000.00
Upgrade switchboard for increased power, additional pump and to raise up the switchboard		1 lot		\$17,000.00	\$17,000.00
Additional rising main	150NB	270 m		\$130.00	\$35,100.00
					\$112,600.00
WTP and Reservoir					
Excavation		1 PS		\$30,000.00	\$30,000.00
UV system	120m ³ /h x 2	1 lot		\$105,000.00	\$105,000.00
UV room	-	1 lot		\$15,000.00	\$15,000.00
Upgrade transformer	Increase by 20kW	1 PS		\$10,000.00	\$10,000.00
Upgrade mains cable for increased power	Increase by 20kW	1 PS		\$20,000.00	\$20,000.00
Upgrade switchboard for increased power	Increase by 20kW	1 lot		\$15,000.00	\$15,000.00
Concrete plinth for pre-treatment units	8 x 4m	32 m ²		\$200.00	\$6,400.00
Bypass valves and piping for pre-treatment units	-	1 lot		\$8,000.00	\$8,000.00
Chlorine injection system	200NB spool with multi-jet injection	1 lot		\$6,500.00	\$6,500.00
New flow-meter for Cl ₂ and UV control	200NB	1 u		\$7,000.00	\$7,000.00
New inlet pipe into chlorine contact reservoir	200NB	10 m		\$120.00	\$1,200.00
Residual chlorine monitor		1 u		\$15,000.00	\$15,000.00
					\$239,100.00
Total installed capital cost					\$351,700.00

Pre-treatment Plant for Algae Removal

Booster Pumps	120m ³ /hr @ 4bar	2 u		\$16,000.00	\$32,000.00
Arkal Spin-Klin Disc Filter set/Or DAF and Filter		1 u		\$250,000.00	\$250,000.00
Carbon Filter Steel Pressure Vessel	Dia. 1.8m	2 u		\$32,000.00	\$64,000.00
Activated Carbon	-	2800 kg		\$5.50	\$15,400.00
Automatic valves for Booster Pumps and Carbon Filter	-	1 lot		\$41,500.00	\$41,500.00
Air compressor	2.2kW	1 u		\$4,500.00	\$4,500.00
Control Panel for the plant	-	1 lot		\$22,000.00	\$22,000.00
Cost of pre-treatment plant for algae removal					\$429,400.00

Note:

Costs include transport, installation, wiring, prelims and profits
 Cost of imported equipment may vary with future exchange rate

Contingency	20%	\$781,100.00
Engineering	10%	\$156,220.00
Total		\$1,015,430.00

Kinloch Water Reticulation

		Length (m)	Dia (mm)	\$/m	Cost
Ring Main	Rising Main	2400	225	180	\$432,000
	Gravity Main	1470	225	180	\$264,600
	Gravity Main	900	200	150	\$135,000
	Gravity Main	750	150	130	\$97,500
				Subtotal	\$929,100
Reservoir*	3000 m3 Concrete Tank (inlcuding Geotech. Excavation)				950,000
				Subtotal	\$950,000
Pump Station					250,000
Physical Works Total					\$2,129,100
	Contingency			20%	\$425,820
	Engineering/Geotech			15%	\$319,365
Total					\$2,874,285

APPENDIX 6

Wastewater Cost Schedules

Membrane Bio-Reactor Plant - Budget Estimate - Kinloch WWTP			
Capital Cost Estimates	Qty	Unit Cost	Total Initial Cost
Inlet Works			\$ 255,000
Civil for inlet works	1	\$ 70,000	\$ 70,000
New Screen and Screw Press	1	\$ 80,000	\$ 80,000
Grit Removal	1	\$ 100,000	\$ 100,000
Bypass Weir + Slide Gates	1	\$ 5,000	\$ 5,000
Influent Storage			\$ 66,000
Pond	1	\$ 66,000	\$ 66,000
Lifting Pump Station			\$ 34,000
Structure	1	\$ 5,000	\$ 5,000
Modifications to SBR	1	\$ 10,000	\$ 10,000
Pumps	2	\$ 6,000	\$ 12,000
VSD's	2	\$ 3,500	\$ 7,000
Reactor			\$ 1,921,000
Tank	2	\$ 250,000	\$ 500,000
Internal walls	4	\$ 10,000	\$ 40,000
Accesses	2	\$ 25,000	\$ 50,000
Mixers	4	\$ 5,000	\$ 20,000
Membranes	16	\$ 71,300	\$ 1,140,800
Pipework, Valves, Fittings	16	\$ 10,000	\$ 160,000
Service Water Return	1	\$ 10,000	\$ 10,000
Aeration System			\$ 256,000
Diffusers + Pipework	240	\$ 400	\$ 96,000
Blowers	8	\$ 16,000	\$ 128,000
VSDs	4	\$ 8,000	\$ 32,000
Internal Recycle Pump Station			\$ 27,000
Pump	2	\$ 5,000	\$ 10,000
VSD	2	\$ 3,500	\$ 7,000
Pump Station / Accessories	1	\$ 10,000	\$ 10,000
Operator Building + Blower Enclosure			\$ 150,000
Building modifications	1	\$ 150,000	\$ 150,000
Alum Dosing			\$ 33,000
Tanks	1	\$ 20,000	\$ 20,000
Civils	1	\$ 2,000	\$ 2,000
Pumps	1	\$ 3,500	\$ 3,500
Mixers	1	\$ 7,850	\$ 7,850
Alkalinity Dosing			\$ 85,000
Dosing System	1	\$ 85,000	\$ 85,000
WAS Pump Station			\$ 129,000
Pumps	2	\$ 6,000	\$ 12,000
VSD's	2	\$ 3,500	\$ 7,000
WAS Tank	2	\$ 30,000	\$ 60,000
Civils	1	\$ 50,000	\$ 50,000
Irrigation Storage Pond			\$ 69,000
Pond and liner	1	\$ 69,000	\$ 69,000
Instrumentation and Electrical			\$ 470,000
Instruments	1	\$ 145,000	\$ 145,000
Electrical + Control	LS	\$ 250,000	\$ 250,000
Power Supply Upgrade	LS	\$ 75,000	\$ 75,000
Miscellaneous			\$ 502,000
Installation	LS	\$ 116,000	\$ 116,000
Membrane Installation	LS	\$ 86,000	\$ 86,000
Pipework + Fittings	LS	\$ 225,000	\$ 225,000
Valves	LS	\$ 75,000	\$ 75,000
P&G and Site Prep	1	\$ 100,000	\$ 100,000
Physical Works Cost			\$ 4,097,000
Non Works Costs			\$ 1,288,130
Engineering/Documentation/Project Management/Commissioning	%	14	\$ 573,580
Contingency	%	15	\$ 614,550
Consenting Cost Estimate	LS		\$ 100,000
Total Budget Estimate - Capital Costs			\$ 5,385,130

Kinloch WWTP Future Upgrade

N:\04\16237_1\400 Tech\470 Costings[Preliminary Costs.xls]Disposal

Indicative Irrigation Costs

Size	Description	Data	U	Q	R	\$
Kinloch WWTP - Rapid Infiltration						\$ 447,500
	Irrigation Disposal System		m ²	5	72,900	\$ 393,660
	Central Control System			1	11,250	\$ 11,250
	Control Cable		m	1.7	109	\$ 183
	Piping Costs					
	Buffer along borders		m	20	1,320	\$ 26,400
	Groundwater monitoring wells		No.	4	4,000	\$ 16,000
Golf Resort Irrigation						\$ -
	Pipeline Costs					
Golf Resort - Rapid Infiltration						\$ 333,900
	Irrigation Disposal System		m ²	5	50,000	\$ 270,000
	Central Control System			2	11,250	\$ 22,500
	Control Cable		m	1.7	224	\$ 377
	Piping Costs					
	Re-grassing area		m ²	0.5	50,000	\$ 25,000
	Groundwater monitoring wells		No.	4	4,000	\$ 16,000
Kinloch Golf Course - Rapid						\$ 739,300
	Irrigation Disposal System		m ²	5	118,000	\$ 637,200
	Central Control System			2	11,250	\$ 22,500
	Control Cable		m	1.7	344	\$ 580
	Piping Costs					
	Re-grassing area		m ²	0.5	118,000	\$ 59,000
	Groundwater monitoring wells		No.	5	4,000	\$ 20,000
Land Available from Future						\$ 460,200
	Irrigation Disposal System		m ²	5	76,000	\$ 410,400
	Central Control System			1	11,250	\$ 11,250
	Control Cable		m	1.7	276	\$ 466
	Piping Costs					
	Buffer along borders		m	20	1,103	\$ 22,060
	Groundwater monitoring wells		No.	4	4,000	\$ 16,000
SUB TOTAL						\$1,980,900
	Establishment, Installation and disengagement		LS			not included
	Geotechnical investigation					not included
	Design Engineering		LS	\$1,980,900	10%	\$ 198,090
	Control System Programming		LS	1	15000	\$ 15,000
	Project Management & Attendance			\$1,980,900	1.0%	\$ 19,809
	Inspection, Testing, & Commissioning		LS	\$1,980,900	1.0%	\$ 19,809
	Training, O&M Manuals		LS	1	4000	\$ 4,000
	Legal and Valuation Costs					not included
SUB TOTAL						\$2,237,608
	Contingency		LS	\$2,237,608	10%	\$ 223,761
TOTAL						\$2,461,400

Exclusions/Assumptions

Assumed that Pump Station upgrade is a separate item not included in this cost estimate.

Assumed that the additional irrigation storage (required at the LDS) is a separate item not included in this cost estimate

Kinloch Sewer Reticulation

Gravity Sewer down Kinloch Road and behind proposed Lisland subdivision lots to join existing gravity main to WWTP

Refer Wastewater Infrastructure Concept Plan

Sewer	Gravity	Length (m)	Dia (mm)	\$/m	Cost
		1600	200	150	\$240,000
Manholes		16		2000	\$32,000
Sewer Main Total					\$272,000
		Contingency		20%	54400
		Engineering		10%	27200
Total					\$353,600

Assumptions

Approx 2m depth, in road reserve
Manholes at approx 100m spacings

Taupo District Council
Kinloch WWTP New Pump Station & Rising Main
Preliminary Cost Estimate

Item	Description	Unit	Rate	Quantity	Total (\$)
1.0	Preliminaries				
1.1	Preliminary and General allow for establishment on site, insurances, trial shutdowns, notifications and programme of works(5%)	%	3.00		60254.54
2.0	Rising Main - supply and install by open trenching including bedding, backfill material and Reinstatement				
2.1	160NB PE80 MDPE - SDR11	m	180.00	1550	279000.00
2.2	250NB PE80 MDPE - SDR11	m	220.00	4350	957000.00
2.3	315NB PE80 MDPE - SDR11	m	280.00	10	2800.00
	250NB PE80 MDPE - SDR11 Directional Drilling	m	750.00	200	150000.00
3.0	Fittings - supply and install valves and fittings including marker posts, boxes and risers				
3.1	250NB x 160NB PE Reducers - Plain ended	No	480.00	1	480.00
3.2	250NB x 250NB PE Tee - Plain ended	No	2164.00	5	10820.00
3.3	250NB PE 90 deg bend - Plain ended	No	3961.00	1	3961.00
3.4	315NB x 250NB PE Tee - Plain ended	No	4159.00	1	4159.00
3.5	315NB x 250NB PE Reducers - Plain ended	No	1765.65	1	1765.65
3.60	250NB PE 45 deg bend - Plain ended	No	1560.00	2	3120.00
	160NB PE 90 deg bend - Plain ended	No	1038.00	2	2076.00
	160NB PE 45 deg bend - Plain ended	No	570.00	2	1140.00
	160NB x 160NB PE Tee - Plain ended	No	678.00	1	678.00
	250NB Air Release Valve and Chamber	No	5000.00	8	40000.00
	160NB Air Release Valve and Chamber	No	4800.00	3	14400.00

	250NB Control Valve and Chamber	No	11000.00	6	66000.00
	160NB Control Valve and Chamber	No	10300.00	2	20600.00
	250NB Sluice Valve and Chamber	No	4000.00	6	24000.00
	160NB Sluice Valve and Chamber	No	1485.00	1	1485.00
5.0	Pumping Station				
5.1	Flygt CP3231/705 125kw 430mm impeller Submersible wastewater pump	No	40000.00	2	80000.00
5.2	Flygt CT3231/705 125kw 430mm inline wastewater pump	No	40000.00	2	80000.00
5.3	Wet well - 4m x 3.5m precast concrete box section, 3.5m deep with precast base slab	LS	100000.00	1	100000.00
5.4	Chamber - 6m x 5.5m concrete block walls, 2.8m deep with concrete base slab	LS	40000.00	1	40000.00
5.5	Control Systems & Telemetry	LS	75000	1	75000.00
5.6	Misc Siteworks	LS	50000.00	1	50000.00
5.7	Pipeowrks	LS	50,000	1	50000.00
6.0	Contingencies				
6.1	Contingencies allows for unexpected costs and occurrences in the course of the project (10%)	%	20.00		401696.93
	Sub Total				2,008,484.65
	Total				2,470,436.12

Engineering % 10 247043.61

TOTAL \$2,717,479.73