

New Plymouth District Council  
Inglewood WWTP  
Monitoring Programme  
Annual Report  
2018-2019

Technical Report 2019-11

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## Executive summary

The New Plymouth District Council (NPDC) operates a municipal wastewater treatment plant (WWTP) located on Lincoln Road at Inglewood, in the Kurapete catchment. This report for the period July 2018 to June 2019 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of NPDC's activities.

NPDC holds one resource consent to intermittently discharge treated wastewater to the Kurapete Stream, which includes a total of nine conditions setting out the requirements that they must satisfy.

### **During the monitoring period, NPDC demonstrated an overall high level of environmental performance.**

The Council's monitoring programme for the year under review included three inspections, wastewater effluent analyses, and biological surveys of the receiving waters of the Kurapete Stream.

NPDC's maintenance programme continues to generally enhance the operation and appearance of the plant and effectively control any produced odour. No complaints were received in relation to the operation of the WWTP. Regular inspections indicated no immediate problems with the performance of the plant. No consented overflows were recorded during the monitoring year.

During the year, NPDC demonstrated a high level of environmental and administrative performance with the resource consents.

For reference, in the 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that the consent holder's performance remains at a high level.

This report includes recommendations for the 2019-2020 year.



## Table of contents

	Page	
1	Introduction	1
1.1	Compliance monitoring programme reports and the Resource Management Act 1991	1
1.1.1	Introduction	1
1.1.2	Structure of this report	1
1.1.3	The Resource Management Act 1991 and monitoring	1
1.1.4	Evaluation of environmental and administrative performance	2
1.2	WWTP system	3
1.2.1	Inflow and infiltration reduction	4
1.3	Resource consents	5
1.4	Monitoring programme	5
1.4.1	Introduction	5
1.4.2	Programme liaison and management	5
1.4.3	Data Review	5
1.4.4	Site inspections	6
1.4.5	Chemical sampling	6
1.4.6	Biomonitoring surveys	6
2	Results	7
2.1	Inspections	7
2.2	Results of effluent monitoring	8
2.2.1	Dissolved oxygen levels	8
2.2.2	Microfloral component	10
2.2.3	Emergency overflow monitoring	10
2.3	Results of receiving environment	13
2.3.1	Biological monitoring surveys	13
2.4	Incidents, investigations, and interventions	14
3	Discussion	15
3.1	Discussion of site performance	15
3.2	Environmental effects of exercise of consents	15
3.3	Evaluation of performance	15
3.4	Recommendations from the 2017-2018 Annual Report	17
3.5	Alterations to monitoring programmes for 2019-2020	17
4	Recommendations	18

Glossary of common terms and abbreviations	19
Bibliography and references	21
Appendix I Resource consents held by New Plymouth District Council	

## List of tables

Table 1	Resource consent held by NPDC in relation to the Inglewood WWTP	5
Table 2	Dissolved oxygen measurements from the Inglewood WWTP	9
Table 3	Chlorophyll-a levels and main pond appearance	10
Table 4	Summary of NPDC and TRC overflow effluent data	12
Table 5	Location of sampling sites	13
Table 6	Summary of performance for consent 1449-5	15
Table 7	Evaluation of environmental performance over time	16

## List of figures

Figure 1	Aerial location map of sampling sites in relation to Inglewood WWTP	13
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## List of photos

Photo 1	Inglewood WWTP	4
Photo 2	The Inglewood WWTP main pond	8
Photo 3	Dissolved oxygen monitoring	9

# 1 Introduction

## 1.1 Compliance monitoring programme reports and the Resource Management Act 1991

### 1.1.1 Introduction

This report is for the period July 2018 to June 2019 by the Council describing the monitoring programme associated with resource consents held by New Plymouth District Council (NPDC). NPDC operates a municipal wastewater treatment plant (WWTP) situated on Lincoln Road at Inglewood.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consent held by NPDC that relates to the intermittent discharge of treated wastewater in the Kurapete catchment. This is the 32<sup>nd</sup> annual report to be prepared by the Council to cover NPDC's discharge and its effects.

### 1.1.2 Structure of this report

**Section 1** of this report is a background section. It sets out general information about:

- consent compliance monitoring under the *Resource Management Act 1991* (RMA) and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held by NPDC in the Kurapete catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Inglewood WWTP.

**Section 2** presents the results of monitoring during the period under review, including scientific and technical data.

**Section 3** discusses the results, their interpretations, and their significance for the environment.

**Section 4** presents recommendations to be implemented in the 2019-2020 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

### 1.1.3 The Resource Management Act 1991 and monitoring

The RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

- a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
- b. physical effects on the locality, including landscape, amenity and visual effects;
- c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
- d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
- e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the

obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

#### 1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by the Company, this report also assigns them a rating for their environmental and administrative performance during the period under review.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with the Company's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

##### Environmental Performance

**High:** No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

**Good:** Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self reports, or in response to unauthorised incident reports, but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.

**Improvement required:** Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.



**Poor:** Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

#### Administrative performance

**High:** The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.

**Good:** Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

**Improvement required:** Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

**Poor:** Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.<sup>1</sup>

## 1.2 WWTP system

Since late 1999, municipal wastewater from the Inglewood WWTP (Photo 1) has been pumped and gravity-fed to the New Plymouth WWTP, for further treatment prior to discharge to the Tasman Sea. Due to the limited capacity of the Moa-Nui pipeline from the Inglewood WWTP, overflows are likely to occur during extreme peak flows, when stormwater and groundwater infiltration are excessive. Overflow facilities are used during peak storm flows to treat pond effluent before discharge to the stream occurs. These consist of a shallow primary aeration pond that flows into the main pond for longer-term storage prior to pumping to New Plymouth. No continuous discharge occurs from the ponds' system in the long term.

The present population serviced by the Inglewood system is close to 3,000 persons, and industrial waste is a minimal component of the wastewater loading on the system. Historical problems relating to siltation of the treatment ponds and refurbishment measures undertaken by NPDC have been documented in several annual reports prepared by the Council (TRC, 2015(b)).

No additional trade wastes connections to the sewerage reticulation were recorded during this monitoring period. It should be noted that industrial waste disposal tankers are not encouraged to use the plant for disposal and treatment purposes, but preferably to utilise the New Plymouth WWTP (NPDC, pers. comm.). Controlled facilities also exist at the Stratford and Hawera oxidation ponds treatment systems for wastes disposal of this nature from within those districts.

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<sup>1</sup> The Council has used these compliance grading criteria for 15 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018



Photo 1 Inglewood WWTP

### 1.2.1 Inflow and infiltration reduction

Development and implementation of a stormwater infiltration reduction programme, as required by Special Condition 5 of the consent was instigated by NPDC, and progress has been reported at required intervals.

Considerable work has been reported, including a manhole replacement programme, lateral replacements, on-going sewer patching, and continued flow monitoring. NPDC have committed to reducing influent volumes to achieve a nil overflow situation. This will achieve the ultimate objective of no wastewater discharges to the Kurapete Stream. Achieving this outcome depends to some extent on the existing condition of the reticulation.

During the 2017-2018 period, an inflow and infiltration assessment was carried out using distributed temperature sensing (DTS) methodology at a cost of \$63,000. From the report it was recommended that specific investigations occur at 14 locations from which a remediation strategy can then be prepared. The recommended inspections were:

- 12 manhole inspections;
- 14 CCTV inspections over a total distance of 700 m;
- Up to 50 property inspections.

During 2018-2019 work was carried out directly related to these recommendations, with \$7,000 spent on CCTV inspections, and \$4,000 spent on smoke testing and inspections for low gully traps on properties. While remediation works including relining 112 m of pipe was also undertaken at a cost of \$27,000.

In total within the Inglewood catchment during 2018-2019:

- \$66,000 was spent on pipe lining
- \$71,000 was spent on pipeline renewals and rehabilitating defects identified during previous CCTV inspections.

Arrangements have been made to install flow meters during 2019-2020 in the catchments where inspections were carried out to provide NPDC with data to gauge the level of success in reducing inflow and infiltration.

### 1.3 Resource consents

NPDC holds one resource consent in relation to the Inglewood WWTP, the details of which are summarised in the table below. A summary of the conditions attached to the permit is set out in Section 3 of this report.

A summary of the various consent types issued by the Council is included Appendix I, along with a copy of the permit.

Table 1 Resource consent held by NPDC in relation to the Inglewood WWTP

Consent number	Purpose	Granted	Review	Expires
1449-5	To intermittently discharge treated municipal wastewater from the Inglewood oxidation ponds system into the Kurapete Stream	June 2016	June 2022	June 2033

### 1.4 Monitoring programme

#### 1.4.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations and seek information from consent holders.

The monitoring programme for the Inglewood WWTP consisted of five primary components.

#### 1.4.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- in discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

#### 1.4.3 Data Review

NPDC undertake a significant amount of self-monitoring of the performance of the WWTP. The data gathered is reported to the Council on a monthly basis, and is reviewed by the Council to determine compliance with consent conditions.

#### 1.4.4 Site inspections

The Inglewood WWTP was visited three times during the monitoring period. The main points of interest were plant operation, maintenance, upgrades, and occurrence of any discharges of treated wastewater. These inspections provided for the operation, internal monitoring, and supervision of the plant to be reviewed by the Council.

#### 1.4.5 Chemical sampling

The Council undertook sampling of the secondary pond effluent from the site three times, for the purposes of monitoring dissolved oxygen and algal populations in the system.

#### 1.4.6 Biomonitoring surveys

Biological surveys were performed on two occasions in the Kurapete Stream. The purpose of these surveys is to monitor the effects of consented overflows from the system (there were none during the 2018-2019 period), and to also document recovery of biological communities following the removal of the continuous discharge to the stream.

## 2 Results

### 2.1 Inspections

#### 18 September 2018

An inspection was conducted in cloudy weather with light northerly wind conditions. The rainfall recorded at the Inglewood WWTP council weather station in the month prior was 147 mm.

NPDC contractors were onsite carrying out maintenance around the primary screen influent area. Mild odours were noted in the vicinity of the step screen. The primary aeration pond was a turbid brown colour and discharging a relatively clear flow into the main pond. The aerator was not in operation.

The main pond was a turbid green-brown colour with a low level of 0.69 m. There was no discharge to the NPWWTP as the contractors had isolated both discharge pumps in order to carry out routine biennial maintenance on the pumps and wet well sump. No odour was detected along the pond perimeter. There were several mallard and paradise ducks as well as black swans on the surface of the pond at the time.

There was no sign of recent overflow discharge to the Kurapete Stream. The WWTP facilities and surrounds were in good condition and well maintained.

#### 18 February 2019

An inspection was conducted in fine weather with moderate south-west wind. The rainfall recorded at Inglewood WWTP council weather station in the month prior was 32 mm.

The primary screen was operating and wastes were fully contained. The primary aeration pond was a turbid green colour, with bright green accumulations on the side of the pond that were attributed to seasonal cyanobacterial algal blooms. The aerator was not operating at the time and there was no sign of discharge into the main pond.

The main pond was a slightly turbid, green-brown colour, with a low level of 0.59 m. The discharge flow rate to the New Plymouth WWTP was measured at 59 m<sup>3</sup>/hr. Approximately 350 paradise and mallard ducks and several black swans were observed on the pond.

There was no sign of recent overflow discharges into the Kurapete Stream. The WWTP and facilities were operating satisfactorily, with the pond perimeter tracks recently mown. No odours were noted onsite.

#### 20 May 2019

An inspection was conducted in fine weather with light wind. Rainfall of 276 mm of rain was recorded at the Inglewood WWTP Council weather station in the month prior.

The primary screen was operating and wastes were fully contained. The primary aeration pond was a turbid brown colour. The aerator was operating at the time, and there was a small amount of discharge into the main pond.

The main pond was a slightly turbid, green-grey colour, with a moderate level of 1.13 m. The discharge flow rate to the New Plymouth WWTP was measured at 120 m<sup>3</sup>/hr. Approximately 200 mallard ducks and several black swans were observed on the pond.

There was no sign of recent overflow discharges into the Kurapete Stream, which was running at a moderate flow and was clear and uncoloured at the time. The WWTP and facilities were operating satisfactorily, with no significant odour issues noted.



## 2.2 Results of effluent monitoring

In past monitoring periods, samples of the plant system's effluent have been analysed as a component of summer assessments of effects in the receiving waters of the Kurapete Stream. Since the wastewater diversion to the New Plymouth WWTP was completed prior to the summer of 1999-2000, no summer physicochemical effluent or receiving water sampling has been necessary, although regular sampling of the main pond (Photo 2) is carried out to assess the performance of the ponds. Any periods of overflow events are monitored by the consent holder (wastewater only), with samples collected and analysed by NPDC at the time of each event. There is also provision in the monitoring programme for the Council to collect samples from the discharge and from three sites in the Kurapete Stream should any overflow events occur.

Measurements of chlorophyll-a, dissolved oxygen and temperature were taken from the surface of the main pond (Photo 2) adjacent to the final section during each scheduled inspection. The results from this monitoring are presented in Sections 2.2.1 and 2.2.2.



Photo 2 The Inglewood WWTP main pond

### 2.2.1 Dissolved oxygen levels

The dissolved oxygen (DO) concentration in WWTPs varies both seasonally and during the day as a result of a combination of factors. The photosynthetic activity of the pond's microflora together with fluctuations in influent waste loadings on the system are the major influencing factors. Minimum DO concentrations are generally recorded in the early hours of daylight, and therefore pond performance has been evaluated by standardising sampling times toward mid-morning for all regular inspection visits during the monitoring period.

The Inglewood WWTP effluent was analysed for DO and temperature, and the results are displayed in Table 2.

Table 2 Dissolved oxygen measurements from the Inglewood WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m <sup>3</sup> )	Saturation (%)
18 Sep 2018	1000	14.9	13.6	137
18 Feb 2019	0905	22.3	5.98	70
20 May 2019	1030	12.3	5.60	62

Results in Table 2 indicate a relatively wide range of DO concentrations (between 62% and 137% saturation) in the surface layer of the main pond near the outlet (Photo 3). These results were similar to those usually recorded at this point (the historical median is 71%, with super-saturation recorded in around 15-20% of samples), and indicated that DO was present at all times in the surface layer of the pond. The variation in saturation levels measured to date has been typical of a biological treatment system in which the photosynthetic contribution of the microfloral population often causes wide DO variations.



Photo 3 Dissolved oxygen monitoring

## 2.2.2 Microfloral component

Pond microflora are very important for the stability of the symbiotic relation between aerobic bacteria in the pond. These phytoplankton may be used as a bio-indicator of pond conditions, for example cyanobacteria are often present in under-loaded conditions and chlorophyceae are present in overloaded conditions. To maintain facultative conditions in a pond system there must be an algal community present in the surface layer.

The principal function of algae is the production of oxygen which maintains aerobic conditions while the main nutrients are reduced by biomass consumption. Elevated pH (due to algal photosynthetic activity) and solar radiation combine to reduce faecal bacteria numbers significantly.

Samples of the main pond effluent were collected during each inspection for chlorophyll-a analyses. Chlorophyll-a concentration can be a useful indicator of the algal population present in the system. Pearson (1996) suggested that a minimum in-pond chlorophyll-a concentration of 300 mg/m<sup>3</sup> was necessary to maintain stable facultative conditions. However, seasonal change in algal populations and also dilution by stormwater infiltration might be expected to occur in any WWTP which, together with fluctuations in waste loadings, would result in chlorophyll-a variability.

The results of the main pond effluent analyses are provided in Table 3 together with field observations of pond appearance.

Table 3 Chlorophyll-a levels and main pond appearance

Date	Time (NZST)	Appearance	Chlorophyll-a (mg/m <sup>3</sup> )	Range for the period 2000 -mid 2018	
				Range	Median
18 Sep 2018	1000	Turbid	270	<1.0-169	16.6
18 Feb 2019	0905	Bright green algae	18		
20 May 2019	1030	Slightly turbid, green-grey	2		

Poor microfloral populations were indicated by low chlorophyll-a concentrations in late summer and late autumn. This pond historically exhibits low chlorophyll-a levels, with 270 mg/m<sup>3</sup> recorded in September 2018 the highest concentration recorded to date (since 2013). This has been attributed to ingress and flushing of stormwater during wet weather events.

## 2.2.3 Emergency overflow monitoring

Since the wastewater diversion to the New Plymouth WWTP was completed prior to 2000, only intermittent discharges from the Inglewood WWTP have occurred, related to intense rainfall events and high stormwater inflows. Any periods of overflow events are monitored by NPDC (wastewater only), with samples collected and analysed by them at the time of each event.

Prior to the wastes diversion, the consent holder had been required to monitor effluent quality on a two-monthly basis, as a special condition of discharge permit 1449, and report these results to the Council. This monitoring commenced in January 1992, continuing at two monthly intervals, until the diversion of the wastewater from the stream discharge. The renewed consent does not require effluent monitoring by the consent holder. A summary of historical effluent quality from monitoring by the consent holder and the Council is presented in Table 4.

This data is presented for reference purposes as it provides an historical summary of the variability in effluent quality for the Inglewood WWTP, both pre- and post-diversion to the NPDC WWTP.



Plant effluent sampled during overflow events to date has had a relatively clear appearance with very good effluent quality due to the extensive dilution provided by the stormwater infiltration. Nearly all parameters' levels have been well below historical median levels, particularly BOD<sub>5</sub>, suspended solids, and faecal coliform bacteria numbers which have shown the influence of considerable stormwater dilution. In this regard, concentrations of BOD<sub>5</sub> and suspended solids have been significantly lower than previously recorded on almost every occasion.

There were no overflow events during the 2018-2019 period.

Table 4 Summary of NPDC and TRC overflow effluent data

Parameter	Unit	NPDC			TRC			
		Pre-diversion	Overflows		Pre-diversion		Overflows	
		(1992-1999)	(2010-mid 2018)		(1986-1999)		(2000-mid 2018)	
		Range	Range	Median	Range	Median	Range	Median
BOD <sub>5</sub> *	g/m <sup>3</sup>	8.0-57	<1-10	5	11.0-56.0	26	1.1-2.5	1.8
Conductivity*	mS/m	14.7-43.3	13.4-21.9	15.3	11.8-38.6	25	15.0-16.3	15.6
DO	g/m <sup>3</sup>	<0.2-15.0	-	-	<0.1-25	5.3	2.2-18.1	7.55
Faecal coliform bacteria	nos/100ml	<1-720,000	<10-10,300	898	210-1,000,000	12,000	110-1,100	190
pH		6.8-8.9	6.9-8.8	7.4	6.9-8.9	7.4	7.0-7.2	7.1
SS	g/m <sup>3</sup>	<5-178	<5-38	12.5	10-160	36	3	3
<b>Nutrient analyses</b>								
NH <sub>4</sub>	g/m <sup>3</sup> N	1.2-32	0.1-4.4	1.2	0.71-22	9.17	2.74-3.16	2.95
NNN	g/m <sup>3</sup> N	<0.2-13.5	-	-	<0.01-0.46	0.08	0.62-0.92	0.77
DRP	g/m <sup>3</sup> P	-	-	-	1.08-6.55	2.64	0.19-0.22	0.20

Note: \* carbonaceous BOD for NPDC; conductivity for NPDC measured @ 25°C and for TRC @ 20°C

## 2.3 Results of receiving environment

Physicochemical receiving water surveys are no longer required due to the relative infrequency of overflow events and/or absence of measurable effects on receiving water quality.

### 2.3.1 Biological monitoring surveys

The biological monitoring component of the receiving water monitoring programme was performed in the Kurapete Stream on two occasions (spring and summer). Both surveys were performed as reduced, two-site surveys (at sites 1 and 4) in recognition of the minimal usage of the WWTP overflow facility to the Kurapete Stream in recent years. The sites are described in Table 5 and Figure 1 below.

Table 5 Location of sampling sites

Site No.	Location	GPS Location	Site code	Survey
1	Upstream of WWTP discharge	E1705225 N5665510	KRP000300	Spring/Summer
2	Approx. 75 m d/s of WWTP discharge	E1705337 N5665530	KRP000311	-
3	Approx. 300 m d/s of WWTP discharge	E17054814 N5665637	KRP000330	-
4	Approx. 6 km d/s of WWTP discharge	E1709239 N56467481	KRP000660	Spring/Summer

Figure 1 Aerial location map of sampling sites in relation to Inglewood WWTP



The Council's standard 'kick-sampling' technique was used at two established sites on 10 October 2018 and 26 February 2019 to collect streambed macroinvertebrates from the Kurapete Stream. Samples were processed to provide the number of taxa (richness), MCI score, SQMCI score, and %EPT taxa for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to

environmental conditions. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. It may provide more relevant information in relation to non-organic impacts. Differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

Taxa richness was moderate at both sites during the spring survey, with only one taxon difference. MCI and SQMCI scores indicated that the stream community was in typical 'fair' health at both sites with no significant differences between the 'control' and 'impact' sites and between the current survey and historic medians.

During the summer survey macroinvertebrate taxa richness at the upper control site was moderately low and ten taxa below its historic median, while the downstream impact site had moderate taxa richness similar to its historic median. The MCI score at both sites indicated 'fair' health, with no significant difference between the two sites and no significant differences between current scores and historic medians. This indicated that macroinvertebrate communities present at the time of the survey were in typical health with no evidence of any negative effect from discharges from the Inglewood WWTP. The SQMCI score for the control site indicated 'very good' health, which was significantly higher than its historic median and the equal highest score to date for the site, indicating better than normal macroinvertebrate health. The downstream 'impact' site score indicated it was in 'fair' health, which was slightly higher than its historic median indicating that the site had typical macroinvertebrate health.

Overall, there was no evidence that the Inglewood waste water treatment plant had had any significant detrimental impacts on the macroinvertebrate communities of the Kurapete Stream which would be expected given that no discharges had occurred preceding the survey.

Copies of biomonitoring reports for this site are available from the Council upon request.

## 2.4 Incidents, investigations, and interventions

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with NPDC. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach, that in the first instance avoids issues occurring, is favoured.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

In the 2018-2019 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with NPDC's conditions in resource consents or provisions in Regional Plans.

## 3 Discussion

### 3.1 Discussion of site performance

The Inglewood WWTP system has continued to perform satisfactorily, with aerobic conditions maintained throughout the monitoring period. There were no consented overflow events during the current monitoring year, a vast improvement on the eight events recorded in the previous monitoring period. It is unclear as to whether this was due to the much lower volume of rainfall received in the 2018-2019 period (a 30% decrease compared with 2017-2018), or if inflow and infiltration works carried out by NPDC are successfully reducing influent volumes.

Monitoring of the microfloral component of the main pond (using chlorophyll-a measurements) indicated that the system continued to contain a low algal content, particularly following heavy rainfall events. Microfloral populations have not indicated poor performance of the treatment system to date.

The WWTP system and surrounds continue to be maintained in good condition, with no issues with the step screen or odour from the system. Pond level management (for storage purposes) was good during this period as was maintenance of the pond system with mainly passive aeration of the primary aeration pond and regular maintenance of the treatment system. Diversion of wastes to New Plymouth WWTP continued, with the pumps operating at their maximum speed for 18% of the 2018-2019 year.

During 2018-2019 NPDC continued to work towards a reduction in stormwater infiltration into the Inglewood township sewerage reticulation, as required by consent conditions. CCTV inspections, smoke testing and inspections for low gully traps on properties, and remediation works including the relining of 112 metres of pipe were undertaken.

Arrangements have been made to install flow meters during 2019-2020 in the catchments where inspections were carried out to provide NPDC with data to gauge the level of success in reducing inflow and infiltration.

### 3.2 Environmental effects of exercise of consents

Wastewater from the Inglewood WWTP was contained and diverted to the New Plymouth WWTP at all times during the 2018-2019 period.

Biological monitoring carried in both spring and summer found no evidence that the Inglewood wastewater treatment plant had had any significant detrimental impacts on the macroinvertebrate communities of the Kurapete Stream, which would be expected given that no discharges occurred during the year.

### 3.3 Evaluation of performance

A tabular summary of NPDC's compliance record for the year under review is set out in Table 6.

Table 6 Summary of performance for consent 1449-5

<b>Purpose: To intermittently discharge treated municipal wastewater from the Inglewood oxidation ponds system into the Kurapete Stream</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Consent holder to adopt best practicable option	Inspections, liaison with consent holder	Yes

<b>Purpose: To intermittently discharge treated municipal wastewater from the Inglewood oxidation ponds system into the Kurapete Stream</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
2. Limits on timing of discharges	No discharges during the period under review	N/A
3. Requirements for outlet screening	Inspections – outlet screen in place, however there were no discharges during the period under review	Yes
4. Requirements of Management Plan	Plan received in 2001, inspections	Yes
5. Requirements of overflow recording and reporting	Records provided to Council on a monthly basis, no overflow events during the monitoring period	Yes
6. Notification of overflows to TDHB	No discharges during the period under review	N/A
7. Implementation of a stormwater reduction programme	Report on progress during the year received	Yes
8. Limits on effects in receiving waters	No discharges during the period under review	N/A
9. Optional review provisions	Next optional review scheduled in June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

N/A = not applicable

**Table 7 Evaluation of environmental performance over time**

<b>Year</b>	<b>High</b>	<b>Good</b>	<b>Improvement req</b>	<b>Poor</b>
2010	1	-	-	-
2011	1	-	-	-
2012	1	-	-	-
2013	1	-	-	-
2014	-	1	-	-
2015	1	-	-	-
2016	1	-	-	-
2017	1	-	-	-
2018	1	-	-	-
Totals	8	1	0	0

During the year, NPDC demonstrated a high level of environmental and administrative performance with the resource consents as defined in Section 1.1.4.

### 3.4 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Inglewood WWTP in the 2018-2019 year continue at the same level as in 2017-2018.
2. THAT should there be issues with environmental or administrative performance in 2018-2019, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendation one was implemented, while it was not considered necessary to undertake additional investigation or interventions as per recommendation two.

### 3.5 Alterations to monitoring programmes for 2019-2020

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

It is proposed that for 2019-2020 monitoring of the Inglewood WWTP be amended from that of 2018-2019 by removing the spring biomonitoring survey. The summer survey will continue as a reduced two site survey (sites 1 and 4), with provision in the monitoring programme to extend the survey to four sites in the event of significant overflow discharges from the WWTP.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2019-2020.

## 4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Inglewood WWTP in the 2019-2020 year be amended from that undertaken in 2018-2019 by the removal of the spring biomonitoring survey.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.



## Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in mS/m.
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
<i>E.coli</i>	<i>Escherichia coli</i> , an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
g/m <sup>3</sup>	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m <sup>2</sup>	Square Metres.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH <sub>4</sub>	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH <sub>3</sub>	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).

NNN	Nitrate-Nitrite nitrogen
NO <sub>3</sub>	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NO <sub>2</sub>	Nitrite, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
WWTP	Wastewater Treatment Plant

For further information on analytical methods, contact a Science Services Manager.

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# Appendix I

## Resource consents held by New Plymouth District Council

(For a copy of the signed resource consent  
please contact the TRC Consents department)

Consent number	Purpose	Granted	Review	Expires
1449-5	To intermittently discharge treated municipal wastewater from the Inglewood oxidation ponds system into the Kurapete Stream	June 2016	June 2022	June 2033

### Water abstraction permits

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

### Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

### Air discharge permits

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

### Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

### Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Land use permits are issued by the Council under Section 87(a) of the RMA.

### Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Coastal permits are issued by the Council under Section 87(c) of the RMA.

**Discharge Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder:                      New Plymouth District Council  
Private Bag 2025  
New Plymouth 4342

Decision Date:                        28 June 2016

Commencement Date:                28 June 2016

**Conditions of Consent**

Consent Granted:                      To intermittently discharge treated municipal wastewater  
from the Inglewood oxidation ponds system into the  
Kurapete Stream

Expiry Date:                            1 June 2033

Review Date(s):                        June 2019 and 3-yearly intervals thereafter

Site Location:                          Lincoln Road, Inglewood

Grid Reference (NZTM)                1705219E-5665557N

Catchment:                                Waitara

Tributary:                                 Manganui  
Kurapete

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

**General condition**

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

**Special conditions**

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The discharge shall only occur at times when inflow to the plant exceeds the rate that effluent can be pumped to the New Plymouth Waste Water Treatment Plant, and there is no available storage.
3. The discharge shall pass through a screen with a maximum aperture of 6 mm.
4. The site shall be operated in accordance with a 'Management Plan' prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The plan shall detail how the site will be managed to achieve compliance with the conditions of this consent.
5. The consent holder shall record the time and duration of each overflow to the Kurapete Stream, as authorised by special condition 2, and report these records to the Chief Executive, Taranaki Regional Council, at six monthly intervals.
6. The consent holder shall immediately notify the Taranaki District Health Board of any discharge.
7. The consent holder shall continue to implement a stormwater infiltration reduction investigation for the township of Inglewood and report annually on progress to the Chief Executive, Taranaki Regional Council for the period up to 30 June.
8. The overflow discharges shall not give rise to all or any of the following effects in the receiving waters of the Kurapete Stream 100 metres downstream of the discharge:
  - a) the production of conspicuous oil or grease films, scums or foams, 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 consumption by farm animals;
  - e) any significant adverse effect on aquatic life.



## Consent 1449-5.0

9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice or review during the month of June 2019 and at 3-yearly intervals thereafter, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 28 June 2016

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**Director - Resource Management**