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**REPORT 3**  
*(1215/52/IM)*

## **MOA POINT WASTEWATER TREATMENT PLANT – RESOURCE CONSENT APPLICATION**

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### **1. Purpose of Report**

The purpose of this paper is to seek Committee approval to recommend to Council the adopted position for the Moa Point wastewater treatment plant (WTP) resource consents application to be lodged on 6 July 2007.

### **2. Executive Summary**

The Council is seeking resource consents from Greater Wellington Regional Council for the continued operation of the Moa Point WTP. The existing four resource consents expire in January 2008.

The Council is required to offer mitigation options to address bypass overflow discharges from the long outfall that occur during extreme wet weather events when the capacity of the Moa Point WTP is exceeded by flows arriving at the plant. The mitigations options are discussed below in Section 5.2.

The short outfall at the Moa Point WTP is available to enable emergency discharges to occur in situations, such as natural disaster or unforeseen major mechanical failure, when wastewater cannot be pumped up to and discharged from the Moa Point WTP. Section 5.4 of this paper outlines the steps necessary to mitigate the risk of such discharges.

Consultation on the resource consent application has been undertaken. The results of the consultation are summarised in Section 6 of this paper. The full Cultural Impact Reports from iwi associated with the resource consent application are also attached.

The term of the consents granted is expected to reflect the degree of confidence the consent authority has in the mitigations proposed by the Council in the application.

On the basis of mitigation options Council officers consider appropriate, it is recommended the Council apply for terms of 35 years for the resource consents for the continued operation of the Moa Point WTP.

### **3. Recommendations**

It is recommended that the Committee:

- 1. Receive the information.*

2. *Recommend to Council that it:*
  - a. *Agree to implement option 2 (Inlet pump station improvements) in 2007/08 using existing funding and, if necessary, by reprioritising existing works.*
  - b. *Instruct Council officers to investigate and develop policies for options 3 (Inflow and infiltration policy changes) and present these to the Committee for consideration in 2008.*
  - c. *Instruct Council officers to implement a pilot plant to determine the effectiveness of option 4 (UV treatment) in improving the quality of bypassed wastewater.*
  - d. *Agree that option 4 (UV treatment) be implemented subject to the pilot plant verifying the proposal is effective in improving the quality of bypassed wastewater.*
  - e. *Instruct officers to explore option 5 (Storage) as a contingency to option 4, and investigate securing potential sites for a storage facility.*
  - f. *Agree that option 6 (Eastern suburbs inflow and infiltration reduction) will not be pursued.*
  - g. *Instruct Council officers to implement necessary works to provide greater capacity in the inlet pump station (Option 7).*
  - h. *Agree that funding for the above initiatives be included in the wastewater asset management plan for consideration through the 2008/09 annual plan budgeting process.*
  - i. *Agree that a term of 35 years for the resource consent is included in the AEE.*

#### **4. Background**

This part of the report provides a background on issues relating to the resource consents the Council is seeking from Greater Wellington Regional Council for the continued operation of the Moa Point WTP.

The Moa Point WTP operates under four existing consents that expire in January 2008. These consents are to:

1. occupy the foreshore and seabed of the coastal marine areas for the long outfall
2. continuously discharge deodorised air from the WTP's ventilation system
3. continuously discharge disinfected secondary treated effluent to Cook Strait via the long outfall during 'normal operating' conditions
4. occasional discharge mixed disinfected secondary treated and milliscreened wastewater during and/or immediately after heavy rainfall when the quantity of wastewater arriving at the Moa Point Plant exceeds 3000 l/s (bypass consent).

In the course of preparing the application and accompanying assessment of environmental effects (AEE) three issues have arisen:

1. Potential non-compliance with the current resource consent requirements for discharge of wastewater through the long outfall during and/or immediately after heavy rainfall events (bypass overflow discharges).
2. Mitigation options that could be offered as part of the new resource consent application required for bypass overflow discharges.
3. The prospect of Greater Wellington Regional Council (GW) requiring the Council to apply for resource consent for discharges of wastewater through the short outfall.

Each of these issues is discussed in this report.

#### **4.1 Capacity of the Moa Point WTP**

The operation of the Moa Point WTP is detailed in Appendix 1. In summary, the pump station at the plant is contracted to pump up to 4,000 litres per second (l/s) of wastewater to the plant. The pump station currently has capacity to meet this contractual requirement, with allowance for the outage of one pump.

The primary sedimentation tanks, biological process unit and Ultra-Violet (UV) disinfection unit at the plant, have a capacity to treat 3,000 l/s. This capacity is four times the 2006 average dry weather flow (ADWF) of 760 l/s and three times the predicted ADWF of 980 l/s for the year 2043. The treated effluent is discharged to Cook Strait through the 1.8km long outfall to the south of Lyall Bay. The long outfall has the design capacity to discharge up to 4,500 l/s.

#### **4.2 Wet weather overflow bypass discharges through the long outfall**

During extreme wet weather events, flows arriving at the plant can exceed the plant's capacity of 3,000 l/s due to stormwater entering the wastewater system. Any flows exceeding 3,000 l/s are screened and degrittied before automatically bypassing the primary, secondary, and UV treatment processes and passing directly into the long outfall. This bypassed wastewater mixes with the fully treated effluent and is discharged through the long outfall. The Council has resource consent for these short-term bypass events.

On average there have been three bypass overflow discharges per year (although there were seven in 2006) from the Moa Point WTP, which represent 0.05% of the annual volume of discharge. Since the Moa Point WTP began operation in 1998, bypass overflow discharges have occurred for a total of 127 hours, or 0.153% of the time.

Modelling of the wastewater network predicts that by the year 2043, assuming the Council's current approach to network management is maintained, the frequency of bypass overflow discharges from the Moa Point WTP will increase from the current average of three times per year to an average of nine times per year. The year 2043 was selected as it is 35 years after the current resource consents expire. Thirty-five years is the maximum duration possible for these types of resource consent under the Resource Management Act.

The effects of climate change on wastewater flows arriving at the Moa point WTP are expected to be much less significant than annual climatic variation. Actual rain events between 1991 and 2006 have been modelled allowing for three additional scenarios involving a 10% reduction in flow and infiltration, maintaining the present inflow and infiltration, and allowing for a 10% increase in inflow and infiltration. These scenarios enable a range of climatic events to be catered for.

### 4.3 Potential adverse effects

With regards to the consent application for the continued operation of the Moa Point WTP, the main potential adverse effects arising from the bypass overflow discharges for consideration are:

- Amenity effects
- Contact recreation effects
- Impact on food gathering
- Cultural/spiritual effects

The issue of odour from the Moa Point WTP has been raised by residents living close to the plant. Odour management is recognised as an issue that will continue to present a significant challenge to the Council. To assist with this issue, the development of an odour management plan is proposed which will, among other things, include a process for notifying the Community Liaison Group of programmed maintenance activities.

#### 4.3.1 *Amenity, recreation and food gathering effects*

The current resource consent for bypass overflow discharges requires signs to be placed at Lyall Bay and Tarakena Bay for seven days after each event warning of the potential risk. While the signage endeavours to mitigate the potential health risks, it also affects the amenity and recreation values of the coastal area, particularly when the requirement for signage exceeds the periods of the bad weather. For the seven bypass overflow discharges in 2006, signage was required for a total of 41 days in total (some of the seven bypass overflow discharges overlapped, hence the total was 41 days rather than 49).

If the current requirement for seven days of warning signage continues, the amenity effect of having signage up for much longer periods will also increase as the number of bypass overflow discharges increases as predicted over the life of the consents being applied for.

The assessment of effects undertaken to date concludes (Table 1) that during and following overflow bypass discharges, there is a risk of infection for those engaged in contact recreation (e.g. surfing, diving, and windsurfing) and food gathering. As with amenity values, the risk of infection is expected to increase over time as the number of bypass overflow discharges increases.

Table 1: Moa Point Wastewater Treatment Plant – Summary of Potential Adverse Effects

<i>Assessment Criteria</i>	<i>2006/2007 Current Operations Potential Adverse Effects</i>		<i>2043 predictions Potential Adverse Effects(before mitigation)</i>	
	<i>Normal operation &lt;3000 L/s</i>	<i>Bypass Discharges in Wet Weather when wastewater flow &gt; 3000 L/s, occurs on average 3 times per year (7 events in 2006)</i>	<i>Normal operation &lt;3000 L/s</i>	<i>Bypass Discharges in Wet Weather when wastewater flow &gt; 3000 L/s, predicted to occur 9 times per year on average (more often in wet year)</i>
Public health risk – contact recreation	minor	Increased infection risk during and after bypass but overall risk is minor due to low number of events	minor	Increased infection risk during and after bypass which may occur, on average, 9 times per year
Public health risk – shellfish gathering	minor	Increased infection risk during and after bypass but overall risk is minor due to low number of events. Paua and kina are present in the area but green lipped mussels (filter feeders) are absent.	minor	Increased infection risk during and after bypass which may occur, on average, 9 times per year Paua and kina are present in the area but green lipped mussels (filter feeders) are absent.
Regional Coastal Plan water quality criteria <i>Contact recreation</i>	complies	Probably complies	complies	Increased risk of non-compliance
Regional Coastal Plan water quality criteria <i>Shellfish gathering waters</i>	complies	Probably complies	complies	Increased risk of non-compliance
Amenity values/public perception	minor	Warning signs at Lyall Bay and Tarakena Bay beaches for 7 days after each event – loss of amenity and recreation value for 41 days in 2006	minor	Warning signs at Lyall Bay and Tarakena Bay beaches for 7 days after each event – loss of amenity and recreation value 63 days on average per year (more in wet years)
Tangata Whenua spiritual/cultural	Effects – discussed in Section 6	Effects – discussed in Section 6	Effects – discussed in Section 6	Effects – discussed in Section 6

#### *4.3.2 Cultural/spiritual effects*

Consultation undertaken by the Council as part of the preparation for filing the applications for resource consent is set out in detail in Section 6 of this report. This consultation has included consultation with iwi, as well as obtaining Cultural Impact Reports (CIRs) from both Te Runanga o Toa Rangatira and Raukura Consultants in consultation with the Te Atiawa / Taranaki Whanui tangata whenua groupings including: Wellington Tenth Trust, Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui Inc and Te Atiawa ki Te Upoko o te Ika a Maui Potiki Trust. The CIRs are attached to this paper and address the cultural and spiritual effects in detail.

Tangata Whenua consider any discharge to water of effluent containing human wastes to be culturally abhorrent. Te Runanga o Toa Rangatira and Raukura Consultants both state that the bypass overflow discharges to the South Coast are not acceptable for cultural and environmental reasons and wish to see the South Coast bypass overflow discharges eliminated in the longer term. Both Te Runanga o Toa Rangatira and Raukura Consultants take the view that the term of consent should be 10 years for the bypass consent to allow the Council time to determine how these overflow bypass discharges can be eliminated.

#### *4.3.3 Conclusion on effects*

The overall adverse effects arising from bypass overflow discharges are currently assessed as being minor due to the small number and small volume of bypass overflow discharges. The assessment of effects of the discharges indicates that the effects are likely to remain minor during normal operation (see Table 1).

However, if the number of bypass overflow discharges increases as predicted, so too will the overall impact. Therefore, the Council is unlikely to be able to support the new application for resource consent for the bypass overflow discharge for a term of 35 years unless measures are put in place to mitigate these effects to an acceptable level.

Accordingly, a range of options for mitigating the frequency and effects of wet weather bypass overflow discharges have been identified and are discussed below in Section 5.2.

### **4.4 Short outfall discharges**

The Council does not hold RMA discharge consent for the short outfall. Before the Moa Point WTP was commissioned, effluent was continually discharged through the short outfall, which resulted in significant adverse effects on the environment in the vicinity of the outfall.

The short outfall is currently available to enable emergency discharges to occur in situations, such as natural disaster or unforeseen major mechanical failure, when wastewater cannot be pumped up to and discharged from the Moa Point WTP. If short outfall discharges occur in emergencies, there is a statutory defence available to the Council against prosecution.

The inlet pump station at the Moa Point WTP currently has ten pumps. A further two pumps are kept on site, but are not installed. The ten pumps in the wet well have a

theoretical design capacity in excess of 4,000 l/s. Due to the time required for pump replacement in cases of pump failure, the pump station is sometimes not capable of pumping that volume.

Peak extreme wet weather flows are currently approaching 4,000 l/s and are forecast to exceed that amount over the term of the consent due to factors such as population growth. If the contractor, United Water International (UWI), is unable to pump flows of greater than 4,000 l/s an unauthorised discharge from the short outfall would result.

At present, discharges from the short outfall occur only in emergencies, not for foreseeable under-capacity. It is not proposed to seek resource consent for short outfall discharges because the plant is designed to avoid foreseeable under-capacity and repeated discharges would have more than minor adverse effects on the environment. Section 5.4 of this paper outlines the steps necessary to mitigate the risk of such discharges (Option 7).

#### **4.5 The Council's current approach towards management of the public wastewater network**

The wastewater network has finite capacity and therefore finite ability to deal with wet weather flows. The Council currently has a systematic programme of asset renewals to maintain the performance of the network and spends annually \$16.3 million on treatment plant operating expenditure, \$7.0 million on wastewater network renewals, and \$3.9 million on wastewater network operations and maintenance. This level of expenditure is provided for in the Council's Wastewater Asset Management Plan and LTCCP and is envisaged to continue beyond the period of the current LTCCP.

The Council manages the wastewater network by:-

1. running network operations and maintenance contracts to cater for planned and unplanned maintenance and repairs
2. renewing parts of the network for performance or condition reasons, including the replacement of poorly jointed ceramic pipe with more watertight plastic pipe
3. upgrading the network to cater for increasing demand or to optimise its performance.

These network management practices provide a sound background for this consent application. An expansion of the Council's network renewal practices is presented to reinforce understanding of the active processes the Council employs to optimise network performance.

The Council budgets to renew approximately 1% of its wastewater network annually. Potential network renewals are identified and prioritised from three sources:

- network faults arising from requests for service
- pollution causing faults identified from the monitoring of water quality followed by source isolation and investigation
- condition-driven renewals resulting from the pro-active inspections of drains.

It is expected that network renewal practices will arrest any potential increase in wet weather flows as:-

- leaking pipes and joints are replaced with watertight materials with superior jointing systems
- pollution causing faults (exfiltration) are detected and repaired, leading to a reduction in infiltration into the wastewater network
- more attention is placed on reducing the contribution of inflow and infiltration from the private wastewater network.

The Council holds consents to discharge stormwater contaminated with wastewater, which have required the Council to fix leaking pipes and joints, predominantly from the wastewater network, between 1993 and 2004. This work, conducted as part of the Sewage Pollution Elimination (SPE) project, has been so effective at improving stormwater quality that the pollution detection and renewal practices have now been incorporated into continuing network management practices.

Under the SPE project, the Council also inspected 48,000 properties for cross connections between wastewater and stormwater systems and required property owners to remedy faults. These inspections involved visual, dye and smoke testing, but did not include pressure testing or closed circuit television (CCTV) inspection of private wastewater laterals for inflow or infiltration faults. The Council has invested significantly over the last fifteen years to reduce sewage pollution, predominantly on the public wastewater network, and is now considering further measures to improve inflow and infiltration performance in order to reduce wet weather flows.

Whilst the Council has active processes to reduce inflow and infiltration into the public wastewater network detailed above, the same cannot currently be said for the private network. Policy options to address unsatisfactory inflow and infiltration performance arising from private wastewater laterals are discussed in option 3 in Section 5.2.

## **5. Discussion**

### **5.1 Mitigation options for the long outfall bypass overflow discharges**

This part of the paper discusses mitigation options in the application for the resource consents for Moa Point WTP. The options suggested aim to reduce the potential adverse effects of the discharges at Moa Point. This approach is consistent with the Council's economic, social, cultural and environmental objectives and is necessary to gain long term resource consent for the continued operation of the Moa Point WTP. The application will be supported by an Assessment of Environmental Effects (AEE) of the operation of the Moa Point WTP.

The paper considered by the Strategy and Policy Committee on 1 March 2007 (Appendix 1) considered the effects of operating the wider wastewater network. Options to mitigate the effects of the activity were considered, including the containment of flows in the network and conveyance of all flows to the Moa Point WTP. The Council decided that both these approaches would be too disruptive and disproportionately costly to mitigate the level of adverse effects.

An assessment of the effects of the operation of the Moa Point WTP has been completed and a range of options to mitigate the effects has been developed. The options to either reduce the frequency of bypass overflow discharges or mitigate the effects of the bypass overflow discharges are summarised below in Table 2.

The options are discussed in terms of the Local Government Act 2002 requirement that the community's social, cultural, environmental, and economic well-being is taken into account in expenditure decisions as well as the Resource Management Act 1991 requirement to take into account environmental effects, mitigation of effects and the outcome of consultation in preparing the Council's resource consent application.

When considering options to mitigate bypass overflow discharges at the Moa Point WTP, it is necessary to take into account not only the public network, but also the private network, which is the responsibility of private property owners. The rationale for considering the private network is to address at source the private network's estimated contribution of 40%-60% of wet weather flows to the wastewater network.

It should be noted that the options discussed below relate to the mitigation of bypass overflow discharges from the Moa Point WTP only and not from the wider wastewater network. The current consent application is concerned with mitigating adverse effects of operating the Moa Point WTP. Wider network issues will be dealt with in terms of applications for consent to discharge stormwater contaminated with wastewater, which come up for renewal between 2008 and 2016.

## **5.2 Discussion of mitigation options for long outfall bypass overflow discharges**

### *Option 1: Maintaining the Council's current approach towards management of the public wastewater network*

The Council's current approach to the management of the wastewater network is set out in Section 4.5.

Network modelling predicts that by the year 2043, assuming the current maintenance and asset renewal approach does not change, the frequency of overflow bypass events from the Moa Point WTP will increase from the current average of three times per year to an average of nine times per year. While the potential adverse effects of normal operating conditions at the plant will continue to be minor, by 2043 the predicted increase in the frequency and volume of bypass overflow discharges would increase the public health risk from contact recreation and shellfish gathering during and after bypass events, and will also have social and cultural impacts (summarised in Table 1).

In addition, if the current requirement for 7 days of restricted recreation and shellfish collection and associated signage during and following a bypass overflow discharge is not changed, the amenity and recreation value of the area could be affected by around 63 days on average per year by 2043.

**Table 2: Moa Point wastewater treatment plant: mitigation options**

Option	Option Description	Cost	Location	Effect of Option on frequency or quality of discharge	Effect on bypass flows in 2007	Effect on bypass flows in 2043	Implementation timeframe
	<b>Bypass mitigation options</b>						
<b>1</b>	Maintain Current service levels	Annual Cost \$16.3 m treatment plant opex; \$7.0 m wastewater network renewals; \$3.9 m wastewater network operations and maintenance	Public wastewater network	Bypass overflows will continue	Average 3 bypass overflows annually between 1998 and 2007	If no alterations to current levels of service, bypass events are expected to increase to 9 events per annum on average	N/A
<b>2</b>	Inlet pump station improvements: variable speed pump drives, improved control equipment	< \$1 m	Public treatment plant	Reduces 35% of low volume discharges; enables plant to treat 3000 l/s without bypassing	Will reduce the frequency of bypass flows.	If no alterations to current levels of service, bypass events are expected to increase to 9 events per annum on average	This is being considered for implementation in 2007
<b>3</b>	Inflow and Infiltration policy changes – Requiring defective wastewater laterals to be upgraded	Costs will be determined during policy development and will be dependent on option agreed to by the Council	Private wastewater network plus Council implementation costs	Assist to reduce the rate of increase in dry and wet weather flows	Assist to reduce the frequency and volume of bypass discharges	The condition of WW laterals will improve over time as periodic inspections are carried out throughout city.	Policy changes to be developed for Council consideration in 2008.
<b>4</b>	Treat bypass flows with additional UV unit	Pilot plant - \$200,000  UV treatment plant, if implemented - \$6 million	Public treatment plant	UV reduced bacterial concentration in combined discharge by up to 99% <sup>1</sup>	Improves quality of mixed discharge during bypass events. Effect on contact recreation / shellfish and receiving water standards is being investigated in more detail.	Improves quality of mixed discharge during bypass events. Effect on contact recreation / shellfish and receiving water standards is being investigated in more detail.	Pilot plant to be implemented within 12 months of resource consent being granted. Full plant implementation within 5 years of resource consent being granted if pilot plant effective
<b>5</b>	Build storage near Moa Point	Approximately \$11 m	Public wastewater network	Build a 10 MI storage near Moa Point to store peak flows > 3000l/s for later treatment. Level of service: 1.5 year ARI	This would have eliminated 16 of 21 (76%) of bypass discharges between 1998 and 2006	Effectiveness is currently being re-assessed	Subject to evaluation of effectiveness of Option 4.
<b>6</b>	Eastern Suburbs Inflow and Infiltration reduction	Approximately \$28 m	Public wastewater	Class 2 Inflow and Infiltration reduction in Miramar / Seatoun <sup>2</sup>	Has potential to address worst Inflow and Infiltration problem downstream of Mt Victoria Tunnel		Option not proposed for implementation.
Option	Option Description	Cost	Location	Effect of Option on frequency or quality of discharge	Effect on bypass flows in 2007	Effect on bypass flows in 2043	Implementation timeframe
	<b>Short outfall mitigation option</b>						
<b>7</b>	Increase capacity of inlet pump station to 4,400 l/s	Approximately \$2 million	Inlet pump station		Eliminates bypass discharges from short outfall except in unforeseen emergencies	Eliminates bypass discharges from short outfall except in unforeseen emergencies	Proposed for implementation within two years

<sup>1</sup> UV treatment is expected to achieve a 100-fold reduction in the faecal coliform content of bypass flows (may vary between 10 and 100-fold reduction), which is diluted by at least 3 to 1 when mixed with treated effluent. On this basis, the faecal coliform content of the combined discharge would typically be <10,000 per 100 ml, but may vary between 1000 and 80,000 per 100 ml.

<sup>2</sup> Class 1 infiltration and inflow works involve the removal of all inflow defects identified through a programme of house-to-house inspections, smoke testing and manhole inspections. Class 2 works include Class 1 works plus additional works to complete sealing of all the public sewers within a catchment. Class 3 works include Class 2 works plus sealing all the private property laterals up to the house.

Council officers do not consider the option of maintaining the current network management approach can be adopted for the resource consent application taking into account the potential adverse effects. Further, it is unlikely a term of 35 years for the application resource consent will be supported unless some of the measures set out below are put in place to mitigate these effects to an acceptable level.

#### *Option 2: Inlet pump station improvements*

There have been 22 bypass overflow discharges through the long outfall since 1998. Under the current resource consent, overflow bypass discharges are only allowed to occur during or immediately after heavy rainfall and when the quantity of wastewater arriving at the Moa Point WTP exceeds 3,000l/s. Some of the bypass overflow discharges to date have been low volume events not permitted by the resource consent and have been caused by the current pump station configuration.

It is imperative to address the issue of overflow bypass events to ensure ongoing compliance with the requirements of the existing resource consent. This can be achieved by reconfiguring and installing variable speed drives to some of the pumps at the inlet pump station.

This option, if it had been implemented, would have eliminated seven of the 22 bypass overflow discharges that have occurred since 1998. If implemented now, this option, will reduce the short duration, low volume bypass discharges and, accordingly, the overall *frequency* of bypass discharges, but will not significantly reduce the total *volume* of bypass discharges.

The preliminary cost estimate for implementing this option is less than \$1 million.

#### *Option 3: Inflow and Infiltration policy changes*

The Council has a systematic network renewal process for the public wastewater network, but there is no corresponding renewal process for the private network.

The Council has spent in excess of \$50 million since 1993 upgrading the public wastewater drainage network specifically to reduce pollution of stormwater by wastewater, but repair or upgrading work is only undertaken on the private network when required. Based on results achieved in investigations carried out by the Council elsewhere in New Zealand and overseas, estimates of the contribution of the private network to wet weather flow volumes on the public network range from 40% - 60% of the total flow volumes.

Private property owners are responsible for their own wastewater pipes connecting to the public network. Council officers are looking at options that can be implemented requiring private property owners to repair their drains where they are found to be contributing to inflow and infiltration flows.

The development of policy options is proposed to address the private network contribution at source in tandem with improvements to the public network, including the requirement for wastewater laterals to be periodically inspected and, where necessary, repaired or replaced.

The renewal of the private network, involving the replacement of damaged and leaking pipes with watertight ones, would, over time, assist in arresting any increase in inflow and infiltration in the public network and reduce the frequency and volume of overflow bypass discharges from Moa Point. It is likely these works will result in a reduction of inflow and infiltration volumes.

Council officers will prepare a report for Council consideration in 2008 which will propose options for policy changes to address inflow and infiltration from the private network. However, agreement is required to commence work to identify options available requiring the testing and upgrading/replacing of private drains, which are contributing to inflow and infiltration in the public network.

#### *Option 4: Ultra-Violet (UV) treatment of overflow bypass flows*

Three options for the treatment of wet weather flows have been considered, but two of the options have been discounted for reasons including uncertainty around the treatment potential offered. The option discussed below, however, offers improvement in the treatment potential of wet weather flows.

Bypass overflow discharges could be treated by UV with the installation and operation of an additional UV unit at the Moa Point WTP. The treatment is expected to achieve, on average, a 100-fold reduction in faecal coliform numbers in bypass flows. The bypassed wastewater would dilute further by mixing with treated effluent in the long outfall. This option would significantly reduce the public health risk of enterovirus infection associated with contact recreation and shellfish gathering activities near the outfall during and immediately after bypass overflow discharges. The improved discharge quality would also minimise the risk of the discharge being found to be in breach of Regional Coastal Plan contact recreation and shellfish gathering guidelines.

A first phase of implementing this option would include a 2-year pilot plant to provide the information needed to correctly design and size the UV plant to ensure its effectiveness in minimising the public health risk. It would also allow a more accurate costing of the option. Council officers seek approval for implementing the pilot plant within twelve months of resource consent being granted at an estimated cost of about \$200,000.

The full UV treatment plant could be implemented, if required, within five years of obtaining resource consent, which would enable the Council to complete investigations, design and budget allocation through future asset management plan and LTCCP processes. The preliminary cost estimate for implementing this option is around \$6 million.

Work is underway to review the necessary duration of the warning signage during and following overflow bypass discharges. Discussions will be held with Regional Public Health and Greater Wellington Regional Council regarding this issue.

#### *Option 5: Storage near Moa Point*

Adding storage to the network would enable peak flows greater than 3,000 l/s to be retained in the network for later treatment and discharge. Costs have been prepared based on a 10,000m<sup>3</sup> facility, which would provide adequate storage for bypass

overflow discharges caused by extreme wet weather events with an Average Return Interval (ARI) of 1.5 years.

The preliminary cost estimate for implementing storage of 10,000m<sup>3</sup> is \$11 million. Modelling suggests that this storage would have eliminated 17 of 22 bypass overflow discharges that occurred between 1998 and 2007.

Four sites around Moa Point have been investigated for the possible construction of storage to contain wet weather flows in the network. Further investigation work is required to determine whether Council can secure any of these sites.

#### *Option 6: Eastern suburbs inflow and infiltration reduction*

The Council has studied the Moa Point wastewater catchment to determine whether there would be significant benefit in doing further inflow and infiltration reduction work. Whilst the study conducted was catchment-wide, with regard to this application interest focused on the extent of potential inflow and infiltration reduction in the catchment downstream of the Mount Victoria wastewater tunnel.

Analysis of wet weather flows concluded that the Miramar-Seatoun catchment was the worst performing sub-catchment downstream of the Mount Victoria wastewater tunnel, with on average 6.3%, and up to 9.9%, of rainfall volume finding its way into the wastewater network. Typical works to address this issue would normally involve Class 2 inflow and infiltration works (house-to-house cross-connection inspections, smoke testing and manhole inspections, plus the sealing of all public wastewater drains in a catchment). Potential works to address this issue are estimated to cost in the vicinity of \$28 million in the Miramar-Seatoun catchment.

The proportion of inflow and infiltration in the Miramar-Seatoun catchment is below the level other Councils are finding cost effective to reduce. For example, North Shore City is finding it is not cost effective to support inflow and infiltration reduction programmes where the level of rainfall retention is less than 15%.

It is considered difficult to justify undertaking additional inflow and infiltration reduction works in this catchment given:

- The relatively low level of inflow and infiltration in this area of the network
- The cross connection studies were completed in the Miramar-Seatoun catchment from 1994-1997
- There is an ongoing programme of drain renewal for condition and performance reasons
- The Council is considering implementing policy changes in respect of private laterals to reduce defective laterals' contribution to inflow and infiltration.

### **5.3 Conclusion on mitigation options for bypass overflow discharges**

Action is required to reduce the potential adverse effects of the bypass overflow discharges. Options 2, 3 and 4 offer the greatest potential for reduction in effects and reduction in frequency. In terms of Option 4 (UV treatment), pilot treatment work is required to ensure it achieves what is predicted by desktop studies. Accordingly, Council officers seek agreement on a strategy drawing together a number of the options

set out above to include in the Council's application and AEE for the new consents for the operation of Moa Point WTP. The proposed strategy is:

- Implementation of inlet pump station improvements (option 2) to mitigate the frequency of short duration, small volume bypass overflow discharges
- Investigation and development of inflow and infiltration policy options (option 3) to mitigate the contribution of the private network to wet weather flows in the public network
- Implementation of a pilot plant for 2 years to determine the effectiveness of UV treatment of bypass flows (option 4) in terms of improving the quality of bypassed wastewater
- Implementation of the UV treatment of bypass overflows option should the pilot plant determine the effectiveness of UV treatment in improving the quality of bypassed wastewater
- Exploration of storage (option 5) as a contingency to option 4 and investigation of potential sites for a storage facility proposed in option 5.

#### **5.4 Mitigation of short outfall discharges (Option 7)**

Short outfall discharges are currently unconsented and unauthorised by any RMA approvals. Greater pumping capacity is needed to provide a level of redundancy and to mitigate the risk of short outfall discharges because of under-capacity. Increased capacity can be achieved through either replacement of the existing pumps with larger ones if feasible or an increased number of pumps or an enlarged wet well. As the long outfall has a reported design capacity of 4,500 l/s, there is scope to increase pump capacity to a similar amount, providing the screens and grit removal facilities are also capable of handling this flow.

Implementing option 7 would improve the plant's ability to manage flows greater than 4,000 l/s. Modelling has indicated that with an inlet pump station capacity in the vicinity of 4,350 l/s, short outfall discharges are unlikely in 2043 with the inflow and infiltration levels as per the current infrastructure. Installing these pumps would be prudent management of the Council's infrastructure and necessary to mitigate unconsented short outfall discharges.

Council officers consider an appropriate approach would be to increase inlet pump station capacity with additional pumps to pump 4,400l/s, with the provision of sufficient capacity to mitigate unconsented short outfall discharges. Council officers seek agreement to implement necessary works to provide greater capacity in the inlet pump station within two years.

The preliminary cost estimate for implementation of this option is \$2 million, with a view to co-ordinating with work on variable speed drives (Option 2).

## **6. Consultation**

The consultation process has involved a two stage pre application process. The first stage involved feedback on issues and the second has provided for feedback on the Draft Assessment of Environmental Effects (AEE).

While the opportunity to comment on the draft AEE has been made widely available, feedback has been received from only four parties. These are:

- ❑ Moa Point Wastewater Treatment Plant Community Liaison Group (CLG).
- ❑ Regional Public Health (RPH).
- ❑ Department of Conservation (DOC)
- ❑ Betty Weeber of Coutts Street, Rongotai (BW).

Two Cultural Impact Reports (CIRs), referred to in section 4.4.2, have also been commissioned. The CIRs appended to this report provide information on cultural and spiritual effects as well as feedback on mitigation issues. As part of this process, a workshop was held with Councillors in March to enhance understanding of these effects. Questions on improvements to the Plant have also been included in the 2007 Community Satisfaction Survey. The following summarises the consultation feedback on key issues.

### 6.1 Odour Effects

CLG	<ul style="list-style-type: none"> <li>• Supports the retention of the existing consent condition that there be no “discernible” odour beyond the boundaries of the site and wants the pump station consent aligned with this.</li> <li>• Recommends that the wet well be permanently covered to control odour.</li> <li>• That odour monitoring be broadened.</li> <li>• That masking agents should not be used during maintenance works.</li> </ul>
Ngati Toa	<ul style="list-style-type: none"> <li>• Recommends that an Odour Management Plan be required.</li> </ul>
BW	<ul style="list-style-type: none"> <li>• Considers odour control has not been acceptable.</li> </ul>

### 6.2 Quality of effluent

Most parties acknowledge the significant investment in the Moa Point WWTP has resulted in significant improvements to water quality, public health risk and the social and economic conditions of the south coast. In particular:

DOC	<ul style="list-style-type: none"> <li>• Considers that review conditions are necessary to ensure that “best possible” standards are achieved.</li> </ul>
Ngati Toa	<ul style="list-style-type: none"> <li>• Imperative that there is no reduction in the quality of effluent discharges, existing monitoring conditions are retained and a plant failure contingency plan prepared.</li> </ul>
Raukura Consultants	<ul style="list-style-type: none"> <li>• Ensure regular shoreline water quality monitoring.</li> </ul>

### 6.3 The short outfall

All parties consider use of the short outfall as a contingency to be unacceptable and that it’s use should be limited to major emergencies. Regional Public Health supports the proposed measures to improve the reliability of the pump station.

## 6.4 Management of peak wet weather flows

The frequency and effects of bypass overflow discharges at the Moa point WTP is the most significant issue raised in all submissions. In terms of mitigation options most parties place a high priority on reducing inflow and infiltration:

CLG	<ul style="list-style-type: none"> <li>• Prevent sea water infiltration and increase Inflow and Infiltration funding.</li> <li>• Recommends UV treatment of bypass flows.</li> </ul>
BW	<ul style="list-style-type: none"> <li>• Upgrade Plant to treat all wet weather flows.</li> </ul>
DOC	<ul style="list-style-type: none"> <li>• Aim to eliminate bypass events over time.</li> <li>• Give priority to Inflow and Infiltration reduction in combination with other methods with a realistic timeframe.</li> <li>• Considers that marine mammals, particular dolphins, are at greatest risk from bypass discharges.</li> </ul>
RPH	<ul style="list-style-type: none"> <li>• Considers that the public health risks are acceptable</li> <li>• Consumption of shell fish in the vicinity of any urban areas should be discouraged because of the risk from contaminated stormwater.</li> <li>• Supports any measures to mitigate the effects of bypass events</li> </ul>
Ngati Toa	<ul style="list-style-type: none"> <li>• Concerns over potential health risk for those diving for customary purposes and considers that the scope of warning signs should be widened.</li> <li>• Opposed to discharge of bypass flows and this should be eliminated in the long term.</li> <li>• Reduction in Inflow and Infiltration is considered a high priority</li> <li>• Preferred mitigation is to increase the interceptor capacity and convey peak flows to Moa Point and expand the treatment capacity of the Plant.</li> <li>• Mitigation through storage would also be supported on condition that any facility was not in the vicinity of waahi tapu.</li> <li>• Partial treatment of bypass discharges is not supported</li> </ul>
Raukura Consultants	<ul style="list-style-type: none"> <li>• High priority for Inflow and Infiltration works.</li> <li>• Prefer storage of peak flows and consideration of improvements to the capacity of the Plant.</li> <li>• A minimum requirement is UV treatment of bypass flows.</li> <li>• Concern for the effects on fisheries</li> </ul>

## 6.5 Term of consent

Progress on resolving strategies to mitigate bypass events has had a significant influence on feedback on the term of consent that should be granted and the extent of review clauses. Feedback on acceptable terms includes:

DOC	<ul style="list-style-type: none"> <li>• 25 years</li> </ul>
CLG	<ul style="list-style-type: none"> <li>• 15 years</li> </ul>
BW	<ul style="list-style-type: none"> <li>• 10 years</li> </ul>
Ngati Toa	<ul style="list-style-type: none"> <li>• 15-20 years for normal operation and 10 years for bypass and air</li> </ul>

## 7. Conclusion

The Council is seeking resource consents for the continued operation of the Moa Point WTP. An assessment of the effects of the operation of the wastewater treatment plant has been completed and a range of options to mitigate the effects of the activity has been provided.

The overall risk of adverse effects arising from bypass overflow discharges is largely mitigated by the relatively small number and small volume of overflow bypass discharges. However, network modelling predicts the frequency and volume of bypass overflow discharges will increase to an average of nine events per year by 2043. The increased frequency will significantly increase the public health risk from contact recreation and shellfish gathering during and after overflow bypass discharges and increase the effects on amenity and will have spiritual and cultural impacts.

Feedback has been received on the mitigation options discussed above and recommendations made as follows:

1. *Maintaining the Council's current approach towards the network* is not sustainable because of the potential public health risk and modelling which shows that the frequency of bypass overflow discharges will increase over time.
2. *Inlet pump station improvements (variable speed drives and improved control equipment)* will mitigate the frequency of short duration, small volume discharges.
3. *Inflow and Infiltration policy changes* will mitigate at source the contribution of the private network to wet weather flows on the public network.
4. *Ultra-Violet (UV) treatment of bypass flows* should be implemented subject to work on the effectiveness of UV treatment of bypass wastewater.
5. *Storage near Moa Point* should be implemented if UV treatment is shown to be ineffective in mitigating the effects of bypass overflow discharges.
6. *Eastern Suburbs Inflow and Infiltration reduction* – of the range of options discussed, Option 4 (UV treatment) offers better value for money than this option and option 5 (Storage) would require an increase in wastewater flows to make this option a requirement.

On the basis of the foregoing discussion and feedback received, and in terms of each of the issues identified and discussed in this report, Council officers are seeking:

1. Approval for the installation of variable speed pumps in 2007/08 to ensure bypass overflow discharges do not occur outside the terms of the current resource consent.
2. Approval for proposed bypass overflow discharge mitigation measures, as detailed above, which will then be included in the resource management consent application.

3. Approval to create additional pump capacity at the inlet pump station to mitigate further short outfall discharges, unless due to unforeseeable emergency, and 'future proof' this part of the plant.

Council officers consider that:

- the first item is necessary to ensure compliance with the current (and future) consents for the operation of the Moa Point WTP.
- the second item is necessary to enable the Council to put the best possible application together for resource consent for the bypass overflow discharges and to justify a 35 year consent term. Officers hold the view that the effects of this discharge are unlikely to remain 'minor' over the life of the consent and accordingly, more needs to be done to mitigate effects to enable this discharge to be consented.
- the third item is necessary to ensure compliance with the requirements of the Resource Management Act 1991 (RMA) (i.e. if discharges from the short outfall are foreseeable, then resource consent is required and Wellington City Council cannot rely on the statutory defence under the RMA).

With regard to point 2 above, Council officers seek:

- agreement to implement option 2 (Inlet pump station improvements) in 2007/08
- instructions to investigate and develop policies for option 3 (Inflow and infiltration policy changes) and present these to the Council in 2008
- Instructions to implement a pilot plant for option 4 (UV treatment) to determine the effectiveness of option 4 in improving the quality of bypassed wastewater and to implement option 4 if the pilot plant verifies the effectiveness of UV treatment.
- Instructions to explore option 5 (Storage) as a contingency to option 4 (UV treatment) and to investigate securing potential sites for a storage facility.
- Agreement that option 6 (Eastern suburbs inflow and infiltration reduction) will not be pursued.
- Instructions to implement necessary works to provide greater capacity in the inlet pump station (option 7) to mitigate short outfall discharges.
- Agreement that funding for the above initiatives be included in the wastewater asset management plan for consideration through the annual plan budgeting process.

It is likely that, even with the range of mitigation options offered above, there will be conditions on any consent obtained requiring the Council to take frequent reviews of technological improvements and continuous upgrades of systems over time where these are found to be affordable, and effective.

Council officers recommend applying for a term of 35 years for the resource consent for the continued operation of the Moa Point WTP on the basis the above mitigation measures are approved.

**Contact Officers:** *Kevin Robertson, Strategic Projects Manager, Capacity and Nicholas Kildare, Policy Analyst, Capacity*

## **Supporting Information**

### **1) Strategic Fit / Strategic Outcome**

*The conclusions and recommendations in this report take into account the Council's strategic priorities and outcomes.*

### **2) LTCCP/Annual Plan reference and long term financial impact**

*The decisions the Council makes with regard to the options discussed in this report will have a financial impact on the Council. Further work is required to finalise the costs of the initiatives agreed to by the Council. Approval for funding of the initiatives will be sought through the Asset Management Plan and Annual Plan budgeting processes.*

### **3) Treaty of Waitangi considerations**

*Iwi representatives have been consulted on the issues and proposals contained in this report.*

### **4) Decision-Making**

*This is a key decision for the Council. Section 4 sets out the key issues relating to the Moa Point WTP. Section 5 sets out the decisions the Council will need to make before lodging the resource consent application.*

### **5) Consultation**

#### **a) General Consultation**

*The opportunity to comments on the draft AEE was made widely available. Feedback received is outlined in Section 6 of this report.*

#### **b) Consultation with Maori**

*Cultural Impact reports were commissioned from Ngati Toa and Raukura Consultants. The reports are summarised in Section 6 of this report and attached in full as appendices.*

### **6) Legal Implications**

*The Council's lawyers have been consulted during the development of this report.*

## **APPENDIX 1**

***Report to Wellington City Council  
Strategy and Policy Committee 1 March 2007.***

***Moa Point Wastewater Treatment Plant and  
Carey's Gully Sludge Dewatering Plant –  
Resource Consent Application Progress Update.***

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**REPORT 4**  
*(1215/52/IM)*

## **MOA POINT WASTEWATER TREATMENT PLANT AND CAREY'S GULLY SLUDGE DEWATERING PLANT – RESOURCE CONSENT APPLICATION PROGRESS UPDATE**

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### **1. Purpose of Report**

The purpose of this report is seek the Council's approval of the information to be provided for public consultation in the draft Assessment of Environmental Effects (AEE) for the reconsenting of the operation of the Moa Point wastewater treatment plant. In particular, the draft AEE will present the range of options available to mitigate the effects of the continued operation of the plant.

Following consultation on the draft AEE, the options will be considered by the Council and a decision made under the Local Government Act 2002's decision-making framework.

A progress update on the reconsenting of the Carey's Gully sludge dewatering plant is also provided.

### **2. Executive Summary**

This report provides information on the wastewater network and the Moa Point treatment plant, including predictions made from hydraulic and hydrologic modelling of the interceptor network on likely increases in the frequency of bypass overflows from Moa Point by 2043.

The report also discusses the effects of operating the wastewater network and the Moa Point treatment plant and outlines options for mitigating the effects of these activities. These options are:

Option 1: Conveyance

Option 2: Storage

Option 3: Overflow treatment:

Option 4: Combined overflow treatment at Murphy Street and downstream storage

Option 5: Combined overflow storage at Murphy Street and downstream conveyance

Option 6: Combined overflow storage and downstream overflow treatment

The Committee is asked to rule out the option of conveying all wastewater flows to the Moa Point treatment plant.

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This report also recommends information to be supplied in the draft AEE on the approach to be taken in consenting the operation of the plant and provides a progress update on consenting the Carey's Gully sludge dewatering plant.

## 3. Recommendations

It is recommended that the Committee:

1. *Receive the information.*
2. *Agree that complete elimination of overflows occurring in extreme wet weather events is not affordable.*
3. *Agree that the conveyance of all flows occurring in extreme wet weather events to Moa Point is ruled out as a practical option.*
4. *Agree that the options for reducing the frequency and/ or effects of bypass overflows in section 4.5 and section 4.6 will be presented in the draft Assessment of Environmental Effects.*

## 4. Discussion

### 4.1 Structure of this report

This paper:

- presents background information on the wastewater network and the Moa Point treatment plant
- discusses the effects of operating the wastewater network and the Moa Point treatment plant
- discusses the options for mitigating the effects of the above activities
- asks the Committee to rule out conveyance of all extreme wet weather wastewater flows to the Moa Point treatment plant
- recommends information to be provided in the draft AEE regarding the approach to be taken in consenting the operation of the plant
- provides a progress update on the consenting of the Carey's Gully sludge dewatering plant at the Southern Landfill.

### 4.2 Previous considerations

Existing resource consents for the operation of the Moa Point plant expire in January 2008. Applications for resource consent for the continued operation of the plant must be lodged by early July 2007. The most significant of these consents are:

- the discharge of disinfected secondary treated wastewater through the 1.8km long outfall during normal operating conditions, and
- the occasional discharge of disinfected secondary treated wastewater mixed with up to 1000 l/s of screened wastewater (bypass overflow) through the long outfall

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during extreme wet weather events when the plant's treatment capacity of 3,000 l/s is exceeded.

Initial consultation with Tangata Whenua was conducted to obtain feedback on proposals for the consent application. Where possible the feedback has been incorporated in the discussion in this paper. A more detailed summary on feedback received to date from consultation is provided in Section 7 of this report.

On 7 December 2006 the Strategy and Policy Committee considered a report (attached as Appendix 1) that detailed three key issues requiring decisions by the Council for the re-consent application:

- whether to maintain or alter the effluent quality standard discharged through the long outfall during 'normal operating' conditions
- to what degree the wastewater system will contain peak wet weather flows prior to discharge
- the duration of the consents that will be sought at time of application (a maximum duration of 35 years is allowed under the Resource Management Act 1991).

The following sections of this report discuss progress to date on addressing these three issues in preparation for a further report to SPC in June 2007 that will seek the Council's approval for an approach for the re-consent application process to be included in the AEE.

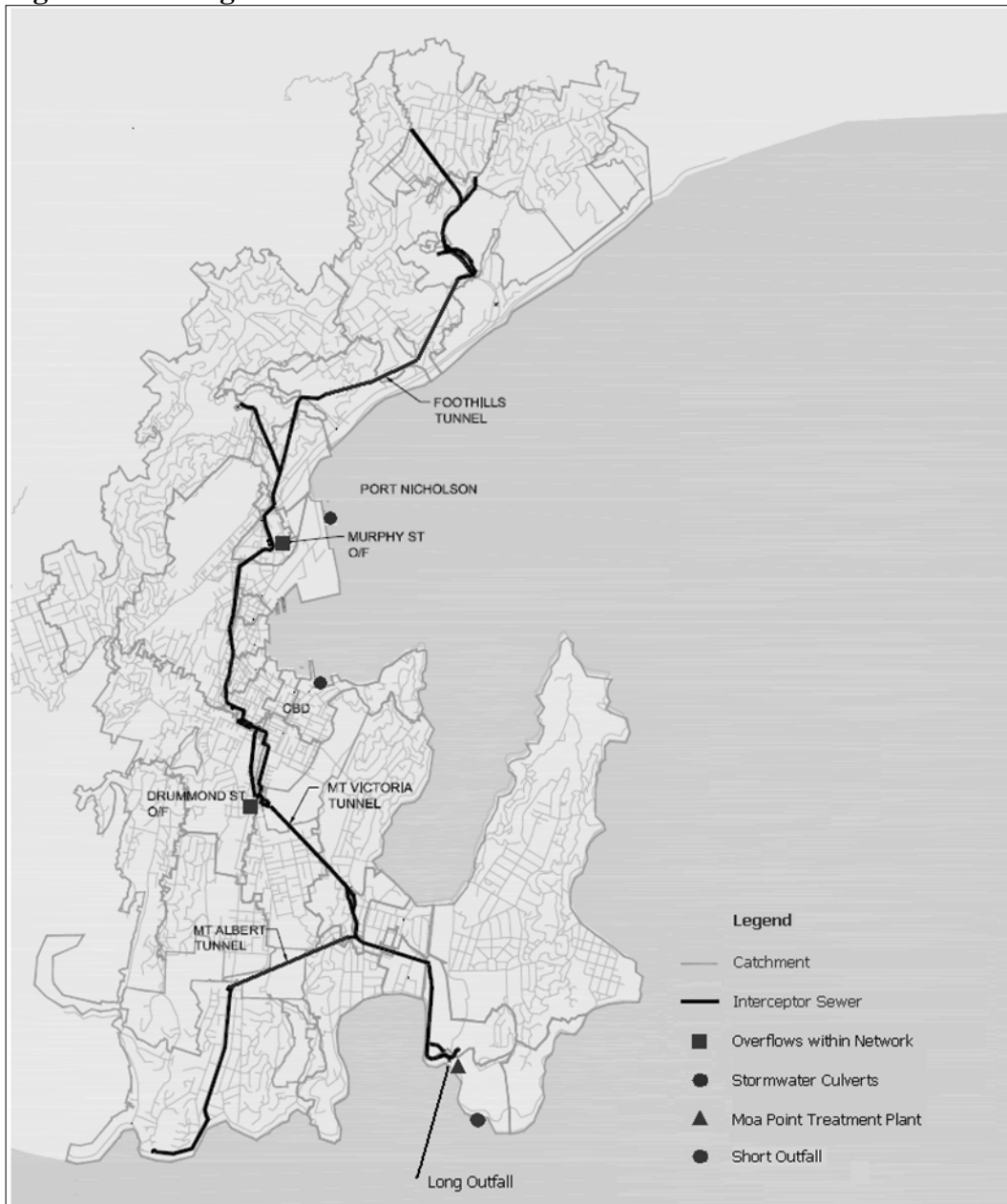
## **4.3 Operation of the wastewater network and the Moa Point wastewater treatment plant**

The wastewater network (Figure 1) delivering to the Moa Point plant comprises around 820km of wastewater pipes of varying age and a series of interceptor sewers that begin in Ngauranga Gorge and finish at Moa Point, travelling through the Kaiwharawhara and Ngaio foothills, Thorndon, the western part of the central business district, Newtown and under Mt Victoria, and through Kilbirnie. The network transports around 25 million m<sup>3</sup> of wastewater to Moa Point every year for treatment.

Treated wastewater is discharged through a 1.8km long outfall around 2.5km from the Lyall Bay shoreline. Sludge removed during the treatment process is pumped through an underground pipeline pipe to the Southern Landfill at Carey's Gully, where it is dewatered and converted to compost or landfilled.

The Moa Point plant has the capacity to treat and discharge 3,000 l/s of wastewater during normal operating conditions. During extreme wet weather event, any flow arriving at Moa Point in excess of the plant's 3,000 l/s capacity automatically bypasses the sedimentation and biological treatment processes and UV disinfection unit and passes directly into the ocean outfall, where it is mixed with the fully treated effluent and discharged to Cook Strait (see Appendix 1 for a more detailed discussion on the operation of the Moa Point plant).

**Figure 1: Wellington Wastewater Network**



In addition, during extreme wet weather events overflows from the wastewater network discharge to stormwater drains, and ultimately receiving environments around the City: to streams, the harbour, and the South Coast. The Council currently holds resource consents for 11 wastewater contaminated stormwater discharges, which expire between 2008 and 2013.

The most significant wastewater overflows in the wider network are:

- Murphy Street wastewater overflows on the interceptor in Thorndon, discharging to the harbour at Aotea Quay near the container terminal on average 4 times per year, and

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- Drummond Street wastewater overflows on the interceptor in Newtown, discharging to the harbour near the Overseas Passenger Terminal on average once every two years.

A hydraulic and hydrologic model of the interceptor sewer and associated pump station catchments has been developed as a tool through which to achieve a better understanding of the hydraulic performance of the interceptor sewer during dry weather and wet weather events. The model assumes no new capital works in the reticulation system over and above the current ongoing maintenance and renewals programme, which aims to replace 1% of the reticulation system per year.

The key issues to be considered in the Resource Management Act application are the effects of the Moa Point plant during dry (normal operating conditions) and wet weather (bypass overflows). Odour at the plant is also an issue that will be included in the draft AEE, although it is not anticipated that the current odour management practices will be changed significantly.

The existing resource consents for the bypass overflows from Moa Point plant require the Council to investigate ways to eliminate overflows through a variety of means, including:

- storage of peak flows at various locations including Murphy St, Moa Point and wastewater pump stations,
- improved capacity of the interceptor sewer,
- augmentation of the Moa Point treatment plant,
- inflow and infiltration (I/I) reduction,
- treatment of excess flows during wet weather, and
- sustainable engineering technologies.

Existing consent conditions impose high quality effluent standards including a 20g/m<sup>3</sup>; 30g/m<sup>3</sup>; 200 per 100ml for biochemical oxygen demand (BOD), suspended solids and faecal coliform bacteria respectively. The plant consistently meets the required standards and effluent discharged is normally of a significantly higher quality than required by consent conditions.

With regard to the effluent treatment standard during normal operating conditions, the possible alternatives are to:

1. retain the existing 20:30:200 treatment standard
2. retain the existing standard, but enhance the treatment processes
3. relax the treatment quality standard.

#### **4.4 Effects of operating the Moa Point plant under normal and wet weather conditions**

The Local Government Act 2002 requires the Council to assess options to mitigate bypass overflows from Moa Point by taking into account the impacts of the proposals. The criteria for assessments made are the effect on contact recreation and shellfish

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gathering, marine ecology, public health, amenity values, cost and cultural impacts. The effects are discussed in more detail below.

## **4.4.1 Effects under normal operating conditions**

During the normal operation of the Moa Point plant, the discharge through the long outfall meets the relevant indicator bacteria standards for contact recreation and shellfish gathering after initial dilution. However, a comprehensive risk assessment focusing on enteric viruses found that the risks associated with the collection and consumption of uncooked shellfish from rocks some 700m distance from the outfall are above the acceptable range for part of the time. Further work is being undertaken on the nature of the risk and possible mitigation, including increasing the UV disinfection target dose. The Council will consult with the Ministry of Health on this issue and obtain its feedback.

The discharge has no significant effect on receiving water temperature, pH or dissolved oxygen levels and the risk of toxicity in the water column or in seabed sediments around the outfall is low. Potential effects on visual clarity, aesthetics and amenity values have been assessed as being minor and, at most times, the discharge plume is not discernable even from directly above the point of discharge.

Tangata Whenua considers any discharge to water of effluent containing human wastes to be culturally abhorrent. Although improvements in water quality have occurred since the plant was commissioned, these concerns have not been allayed. Tangata Whenua have indicated that they would like to see all discharges to water phased out over time.

A recommendation regarding the effluent quality standard will be made in June 2007 following consideration of submissions received on the draft AEE and the further work done on the comprehensive risk assessment.

## **4.4.2 Effects during wet weather events**

During and immediately after a bypass overflow there are elevated risks of illness from contact recreation and shellfish gathering in the vicinity of the outfall (1.8km off shore) due to the increased microbiological content of the wastewater. The risk associated with the discharge is mitigated by the infrequent occurrence of bypass overflows and the use of signage at nearby beaches warning of the bypass events.

The possible effects on visual water clarity and aquatic life are also likely to be minor because of efficient mixing and dispersion of the discharge plume (dilution) and the infrequent occurrence and short duration of such events.

An increase in the frequency of bypass overflows predicted by the hydraulic and hydrologic modelling is predicted to significantly increase the risks associated with contact recreation and shellfish gathering activities near the outfall and the effects on aesthetics and marine ecology.

## 4.5 Mitigation of bypass overflows and overflows from the wider wastewater network

Modelling predicts the frequency of bypass overflows through the long outfall gradually increasing over the next 35 years from the current average of three per year (although there were seven in 2006) to an average of around nine per year by 2043. Analysis of the modelling is being also being undertaken to determine the potential for overflows from the network over the 35-year period up to 2043. Options to mitigate increased frequency of overflows on the network would be developed in response to identified issues.

Evaluation of approaches to mitigate overflows must consider those occurring from the network and the Moa Point plant. The model has therefore been used to evaluate a number of approaches to mitigate overflows from the network as a whole:

- **Conveyance**, which would involve augmentation of the Moa Point plant and upgrading of the network's ability to transport, to an agreed level of service, wet weather flows to Moa Point for treatment and/or discharge through the long outfall
- **Storage**, which would involve the utilisation of storage and/or diversions, to an agreed level of service, at one or several locations on the network to reduce the wet weather peak flows reaching Moa Point and influence the frequency, duration and volume of bypass overflows out the long outfall
- **Treatment**, which would involve the fine screening of wastewater overflows at one or several locations on the network prior to diversion to stormwater, with the effect of reducing the pollutant loads of overflows reaching receiving waters through stormwater outlets.

Additionally, a focused inflow and infiltration reduction programme conducted in parallel with the approaches above could be implemented to reduce the contribution of stormwater ingress to wastewater flows in public and private pipes. This focus could include the consideration of changes to policy to address the contribution made to inflow and infiltration by private pipes.

The optimal solution to mitigate flows will likely be some combination of the above approaches.

To minimise the frequency of overflows from the network, consideration is required on the level of service the interceptor is expected to meet to contain wet weather flows prior to treatment and/or discharge. This level of service is often referred to as a 'containment standard', which produces an associated environmental effect at an average recurrence interval (ARI), expressed in months or years. For example, a containment standard of two years is likely to be exceeded once every two years, or have a 50% chance of being exceeded in any given year.

Practices elsewhere in New Zealand and Australia indicate that a level of service for locations on the network (taking into account adverse effects, available budgets and

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ratepayers' willingness to pay) of between 6 months and 2 years would be appropriate. As this level of service is close to the current average, maintaining or improving the existing performance for the network is achievable with the implementation of mitigation works.

Work to date has identified several possible options, which are discussed below. The options are presented with the estimated costs against a range of ARIs. It should be noted that the preliminary nature of the cost estimates could significantly underestimate the final cost of each option. Further detailed work is required.

## **Option 1: Conveyance**

Transporting flows to Moa Point for treatment and/or discharge would require increasing the capacity of the network upstream of the Mt Victoria wastewater tunnel to minimise overflows to the inner harbour, augmentation of the Mt Victoria wastewater tunnel to eliminate the current constriction in the network, further augmentation of the interceptor sewer downstream of the Mt Victoria wastewater tunnel to Moa Point and augmentation of the Moa Point treatment plant.

The effect of this option would be to increase the wet weather flows reaching Moa Point, increasing the frequency, volume, and duration of bypass overflows. The Moa Point plant would require augmentation to cope with the increased wet weather flows, the estimated cost of which could range up to \$30 million. Further detailed work would be required to finalise the costs and to verify that the biological process could cope with the increased wet weather volumes without an increase in biological load.

Increased flows and frequency of bypass overflows would have adverse effects, although the extent of these has yet to be assessed. Tangata Whenua have an ongoing concern with discharges to water of effluent containing human wastes, particularly with regard to the protection of the Mauri and the achievement of Kaitiakitanga, and have indicated a preference for the complete elimination of discharges over time. Initial consultation indicates that the Tenth's Trust's main concern is with the inner harbour, while that of Ngati Toa is the South Coast.

Eliminating discharges to the inner harbour would mitigate cultural concerns with regard to the inner harbour. However, continued discharge, irrespective of the treatment quality, from Moa Point would continue to impact on the Mauri of the South Coast. Treatment of the overflows would mitigate to an extent the environmental, social, and cultural effects of the discharges, but beyond a selected level of service the effects would remain.

Conveyance would require a significant capital investment. The Mt Victoria wastewater tunnel is central to the conveyance option because it is a critical constriction in the network. Conveying flows to Moa Point to eliminate overflows to the inner harbour would require augmentation of the tunnel.

The Council will need to take into consideration available budgets and ratepayers' willingness to pay when comparing this option with others. The table below estimates

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the costs of conveyance to Moa Point against a range of ARIs, including the costs of augmenting the treatment plant.

ARIs	6 month	1 year	2 year	5 year	10 year
Conveyance (\$M)	108.8	118.5	131.8	145.3	180.4

## Option 2: Storage

The construction of storage tanks at Murphy Street and other locations downstream of Murphy Street to manage peak wastewater flows would contain flows, to an agreed level of service (ARI), within the network. The stored flows would be released back into the wastewater network over time to ensure the flows reaching Moa Point for treatment remained within the plant's existing capacity. The environmental effects associated with overflows in excess of the containment standard ARI would remain.

Locating sites for storage would be problematic as available sites are few and Tangata Whenua have concerns regarding Waahi Tapu, particularly in the Pipitea area of Thorndon. The table indicates that the estimated cost for storage to mitigate flows across a range of ARIs.

ARIs	6 month	1 year	2 year	5 year	10 year
Storage (\$M)	29.8	48.2	64.9	96.0	108.8

Further detailed work is required to firmly estimate the flows expected in 2043 and the storage requirements.

## Option 3: Overflow treatment

Overflows could be treated to an agreed standard at one or a number of locations on the network, such as Murphy Street and downstream of the Mt Victoria wastewater tunnel using screening and UV treatment to reduce faecal contamination of overflows. Assuming an acceptable treatment standard was in place, treatment would reduce the pollutant loads of overflows reaching receiving waters, but would not mitigate the frequency of the overflows.

Pilot plant trials conducted on raw wastewater have produced contaminant removal rates of between 68% to 92% BOD, 86 to 94% Suspended Solids, and up to 99.5% removal of faecal coliforms. Operating on dilute wastewater overflows, the removal rates are likely to be less. Further work would be required to more accurately predict the ability of these devices to mitigate effects.

The table indicates the estimated cost, depending on the ARI adopted, to implement the treatment option.

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ARIs	6 month	1 year	2 year	5 year	10 year
Overflow Treatment (\$M)	12.8	13.7	14.7	15.7	16.7

## Option 4: Overflow treatment at Murphy Street and downstream storage

This option would involve the construction of a small storage incorporating overflow treatment at Murphy Street to reduce the pollutant loads of overflows reaching receiving waters, and storage at downstream locations on the network to reduce overflows and peak flows reaching Moa Point.

This option would maintain the average overflow and discharge to receiving waters at a frequency of once every three months at Murphy Street. Stored flows would be released back into the wastewater network over time to ensure the flows reaching Moa Point for treatment remained within the plant's existing capacity.

Further detailed work is required to firmly estimate the flows expected in 2043 and the storage requirements.

The table indicates the estimated cost of this option across a range of ARIs.

ARIs	6 month	1 year	2 year	5 year	10 year
Murphy Overflow Treatment and Downstream Storage (\$M)	7.9	12.2	16.0	23.2	29.1

## Option 5: Overflow storage at Murphy Street and downstream conveyance

This option would involve storage for the Murphy Street overflows, to an agreed level of service, augmentation of the interceptor sewer from Mt Victoria to Moa Point and the upgrade of the Moa Point treatment plant.

Storage, to an agreed level of service, would retain flows in the wastewater network for transport to Moa Point. The effects of overflows from Murphy Street would be mitigated, but, because overflows would not be completely eliminated, the effects of occasional overflows would remain.

Increasing the capacity of the interceptor sewer from Mt Victoria to Moa Point would increase flows reaching Moa Point and the frequency of bypass overflows. Adverse effects on the South Coast would be partially mitigated by augmentation of the Moa Point plant.

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The table indicates the estimated cost, depending on the ARI adopted, of this option.

ARIs	6 month	1 year	2 year	5 year	10 year
Murphy Overflow Storage and Downstream Conveyance (\$M)	52.3	58.1	59.7	87.8	93.8

## Option 6: Overflow storage and downstream overflow treatment

This option would involve storage for Murphy Street overflows, a smaller storage and overflow treatment facility at Moa Point, and overflow treatment facilities at seven other high risk overflow locations between Mt Victoria and Moa Point.

This option would maintain the average overflow and discharge to receiving waters at a frequency of once every three months at Murphy Street. Stored flows would be released back into the wastewater network over time to ensure the flows reaching Moa Point for treatment remained within the plant's existing capacity. Assuming an acceptable treatment standard was in place, treatment would reduce the pollutant loads of overflows reaching receiving waters.

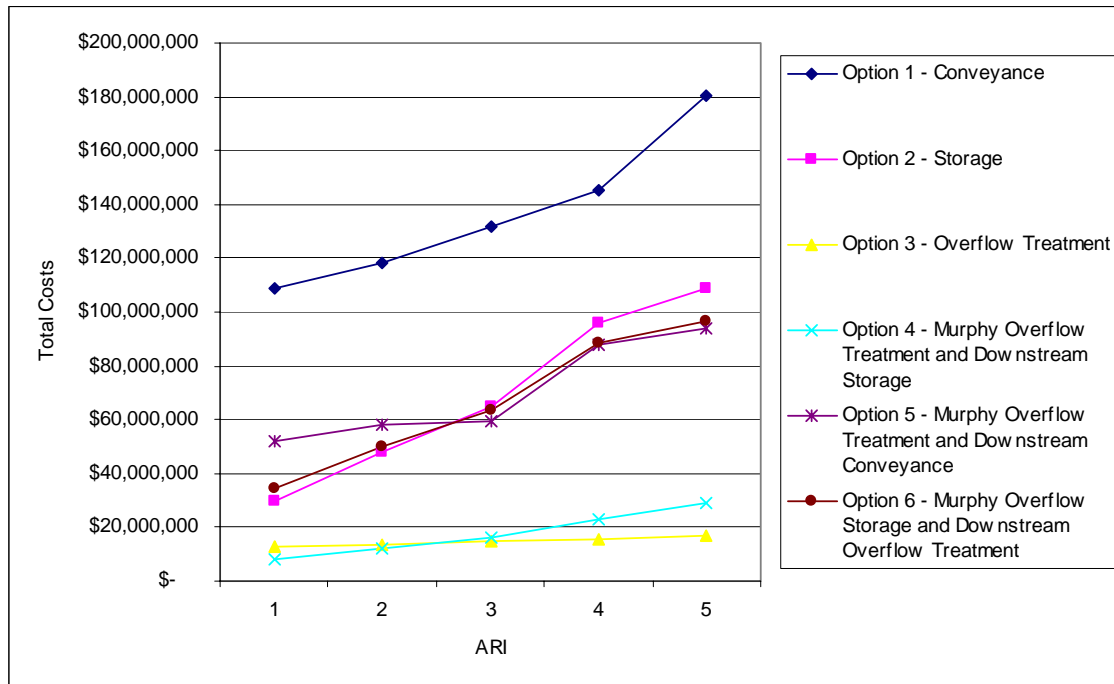
Adverse effects would be mitigated but not eliminated. The predicted increase in the frequency of bypass overflows at Moa Point would not be mitigated.

The table indicates the estimated cost, depending on the ARI adopted, of this option.

ARIs	6 month	1 year	2 year	5 year	10 year
Murphy Overflow Storage and Downstream Overflow Treatment (\$M)	34.7	49.7	63.6	88.5	96.4

Figure 2 illustrates the relative costs of each options identified above for comparison purposes.

**Figure 2: relative costs of identified options**



## 4.6 Discussion of options

Although the options above mitigate the environmental effects to the level of service selected, it is not standard practice, nationally or internationally, to contain all wastewater flows within networks and to treat all wastewater at all times. Listed below are the containment standards aimed for by major authorities in Australasia:

- Hutt City – 6 months to two year, depending on environmental effects and location
- Kapiti Coast District Council - 2 years
- Watercare (Auckland) – 6 months
- Manukau Water – 1 year
- North Shore City – 6 months
- Christchurch City – 2 years
- Sydney Water – dependent on location
- Melbourne water and retail companies – 5 years (not achieved due to cost)

Note that, in New Zealand, the containment standards for any particular overflow should be based on an assessment of the environmental effects in receiving waters, and, accordingly, it is not normally appropriate to have one standard applying to an entire network.

None of the options discussed above would contain all wastewater flows within the network: quite clearly to do so is impractical and unaffordable.

Conveyance (Option 1) would involve significant disruption during construction that would affect the city from Thorndon through to Moa Point. Conveying wet weather flows to Moa Point would require the augmentation of the Mt Victoria wastewater

## APPENDIX 1

tunnel, augmentation of the interceptor sewer between the tunnel and Moa Point, and augmentation of the Moa Point plant (estimated at up to \$30 million) to cope with the impact of increased flows. The capital cost of conveyance, as illustrated in Figure 2, is significant and would need to be considered by the Council in terms of available budgets and ratepayers' willingness to pay.

This option would only mitigate the effects of overflows to the extent of the level of service selected, and would actually increase the volume and frequency of the bypass overflows to be managed at Moa Point. Beyond the selected level of service, the effects of occasional overflows would remain after mitigation works had been undertaken. While the increased flows could be accommodated in an augmented treatment plant, there would be no guarantee that the biological process would be effective in producing an effluent of acceptable quality.

Similarly, Option 5 involves conveyance of wet weather flows through the Mt. Victoria wastewater tunnel generating increased volumes and frequency of bypass overflows. Again, the cost of partially mitigating effects through implementing this option for even a six month ARI event would be prohibitive.

While conveyance options would minimise the effects of overflows in the inner harbour, the effects on the achievement of Kaitiakitanga and the Mauri would remain both there and on the South Coast, although mitigated, until all overflows ceased. The Cultural Impact Assessment will be useful in establishing the cultural impact of the conveyance approach.

Considering the cost of these options and the extent to which the effects would be mitigated, Council officers recommend that options to convey flows through to Moa Point should be ruled out.

Once the decision not to convey flows to Moa Point has been made, it is possible to consider mitigating environmental effects of the options around a critical point in the network: the wastewater tunnel under Mt Victoria. Increasing the capacity of the tunnel was discounted as part of the conveyance option, which means that consideration should be given to mitigating the effects of the remaining options upstream and downstream of the Mt Victoria wastewater tunnel.

It is recommended that the Moa Point consent application deal with mitigating the effects of the wastewater overflow downstream of the Mt Victoria wastewater tunnel and that the upstream effects are managed as at present, through the consents to discharge stormwater contaminated with wastewater.

The Wellington City Council initiated the Sewage Pollution Elimination (SPE) Project in 1993. The SPE project sought to remove sewage pollution from stormwater drains and, therefore, from the receiving waters of Wellington's harbour, streams and coasts through remedial works as required by resource consent conditions within 15 years.

The Council has budgeted around \$72 million between 1993 and 2008 for remedial works to overcome pollution involve monitoring of water quality, tracing faults,

# APPENDIX 1

inspecting pipes, repairing, replacing or upgrading drains and sewerage pump stations, finding cross connections faults between sewerage and stormwater networks and removing these faults. Works completed as part of the project have been effective in reducing pollution contamination with improved water quality evident at all the consented sites.

Work is continuing in consented and non-consented catchments to monitor water quality and remedy pollution-causing faults. The aim of this work is to ensure that wastewater pollution of stormwater culverts is managed to minimise public health risks and adverse environmental effects.

A number of mitigation options are being pursued that will have the objective of maintaining or reducing the current overflow frequency from Moa Point, and mitigating the effects of the overflows. The effects of these possible mitigation measures are presented in Table 2 below.

**Table 2: Proposed bypass overflow mitigation measures**

<b>Proposed mitigation measure</b>	<b>Cost (\$M)</b>	<b>Effect of mitigation</b>
Implementation of variable speed pump drives at Moa Point Inlet Pump Station	< 1	Will likely eliminate low volume bypass overflows (about 35% of them over the last seven years)
Providing wet weather overflow storage near Moa Point	6 - 20	Reduce frequency (and/or duration) of bypass overflows
Treatment of bypass overflows	Currently being assessed	reduce environmental effects of bypass overflows
Implementing policy changes to address the contribution made by private wastewater laterals to inflow and infiltration. Note: the cost and effectiveness of policy changes will very much depend on the extent of the Council's desire to increase private drain performance testing and compliance	1 - 5	Reduced wet weather and bypass overflows

## 5 Information to be included in the draft AEE

- The information contained in this report will inform the draft AEE being prepared to support the consent application for the Moa Point wastewater treatment plant. The draft AEE will contain information on:
  - The effluent treatment quality standard for effluent discharged during normal operating conditions at the Moa Point plant

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- The environmental effects of effluent discharges from Moa Point
- Alternatives for the management of occasional peak wet weather bypass overflows at Moa Point
- The discharge of effluent to coastal water and emissions to the air
- The results of consultation to date.

A report back to the Strategy and Policy Committee in June will seek approval for the information to be included in the consent application and associated AEE that must be lodged in early July.

## 6. Duration

The Resource Management Act provides for a maximum duration of 35 years for resource consents.

Council officers will consider submissions received on the draft AEE for the resource consent for the Moa Point plant and report back to the Strategy and Policy Committee in June 2007 for approval of the proposed duration of the resource consents to be included in the consent application.

## 7. Consultation

### 7.1 Community views to date

A project description, which provided an overview of the issues related to the Moa Point wastewater treatment plant, was prepared and distributed for consultation, and invited feedback by 29 November 2006.

Nine submissions have been received on the consenting of the Moa Point plant, including the Community Liaison Group, residents from surrounding suburbs, and the Department of Conservation. The main concerns are odour originating from the plant, the frequency of bypass overflows, and the treatment standard for effluent discharged during normal operating conditions.

The submissions generally oppose a term of 35 years for the consent. The Department of Conservation considers measures should be taken to avoid any increase in frequency of bypass overflows and a condition requiring technology reviews should be imposed.

Regional Public Health wishes to ensure the AEE addresses potential health impacts of discharges on recreational use of the coastal waters in the vicinity of the long outfall and proposed mitigation measures and will consider this when available.

### 7.2 Consultation with Tangata Whenua

An important feature of the consultation has been a programme of consultation with iwi. To date, this has included:

- Pre-briefing of iwi prior to Stage 1 consultation

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- Provision of information and presentations
- Two facilitated half-day workshops organised with the assistance of the Council's Manager, Treaty Relations, to assist in clarifying key aspects of the project.

The first workshop identified and addressed issues of concern to Wellington Tenth's Trust and associated organisations; the second was attended by representatives of Ngati Toa.

Each workshop considered the quality standard for treated effluent discharges through the long outfall during "normal operating conditions" from a cultural perspective. Iwi reported a desire to see a continuous improvement in the quality and eventual phasing out of any discharge containing human wastes into the marine environment due to the cultural unacceptability of discharging wastewater to the sea. Any reduction to the quality of discharge would be unacceptable to Tangata Whenua.

The options for mitigating wet weather flows from the Moa Point plant and the wastewater network identified in section 4.5 were detailed in the workshops with Iwi. The two groups developed criteria for evaluating the options in accordance with their perspectives and then ranked their preferred options.

The Tenth's Trust was particularly concerned with addressing the issue of discharges to the inner harbour and central city area as areas of primary settlement and resource use. Their evaluation favoured option 1, conveying wastewater to Moa Point for treatment and increasing the size of interceptor sewers and the Moa Point plant. Their second preference was option 2, storage of peak wet weather flows for later treatment, which was favoured ahead of a focused programme of inflow and infiltration reduction.

Ngati Toa expressed its general concerns in terms of Kaitiakitanga and protection of the Mauri, particularly on the South Coast. Their prioritisation resulted in favouring option 6, overflow storage and downstream overflow treatment, followed by option 2, storage at Murphy Street and at downstream locations, and option 1, conveyance.

Participants at both workshops recognised that the information on which their judgements were being made was incomplete, and further consultation and preparation of Cultural Impact Assessments would enable Tangata Whenua to provide more meaningful input. More design detail would be required for future consultation on any preferred approaches.

Cultural Impact Reports have been commissioned from Wellington Tenth's Trust and Te Runanga O Toa Rangatira Inc and will be completed by the end of March 2007. The findings of the Cultural Impact Reports will be made available to the Strategy and Policy Committee in June 2007.

## 8. Carey's Gully Sludge Dewatering Plant

Sludge is produced as a by-product of treatment of wastewater. The sludge from the Moa Point wastewater treatment plant is pumped through an underground pipeline to the Carey's Gully dewatering plant at the Southern Landfill. Sludge is also trucked from the Western Treatment Plant.

The existing resource consents authorising the operation of the dewatering plant and the discharge of sludge to the landfill and associated discharges to the air at Carey's Gully, expire in mid-2007 and early 2008.

Odour is a key issue with these applications. The applications will seek a continuation of the conditions of consent requiring no objectionable and offensive odour at the boundary of the site.

A draft AEE on Carey's Gully was made available to key stakeholders from 15 December 2006. A Cultural Impact Report by iwi and feedback from other key stakeholders will be completed in March 2007. The AEE and consent application will be finalised in April 2007. The consent application will be lodged by 27 April 2007.

### 8.1 Consultation to date

A project description, which provided an overview of the issues related to the Carey's Gully sludge dewatering plant, was prepared and distributed for consultation, and invited feedback by 29 November 2006.

A total of 20 submissions were received in relation to the re consenting of the sludge dewatering plant and consents for disposal of sludge to the landfill, including Regional Public Health and members of the Community Liaison Group and the Brooklyn Residents Association.

All of the submissions expressed strong opposition to the effects of odour from the area of the Southern Landfill, which appears to be most significant in light southerly winds. Suggestions were made in a number of submissions for operational improvements to address the odour issue.

Given the concerns regarding odour, the general opinion of submitters is that a 35 year term is too long, and that a two- or ten year consent should be granted to ensure that performance at the plant improves. However, because of the need for certainty regarding disposal of sludge, a long-term duration will be sought in the resource consent application.

Regional Public Health has also specifically requested that the AEE address any potential health impacts from disposal of the dewatered sludge at the landfill and proposed mitigation measures.

A draft Cultural Impact Report has been prepared by Raukura Consultants, in association with Wellington Tenth's Trust. While noting that odour is a community

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issue rather than a particular cultural issue, the report states that the plant should include best practice design to minimise offensive odours. The report concludes that the “cultural impacts have been mitigated by maintaining and monitoring the leachate control and management processes, [and] by odour control through the effective management of the bio-filters and other aspects of the overall dewatering plant”.

## 9. Conclusion

The key issues discussed in this paper are addressing bypass overflows at the Moa Point treatment plant and mitigating predicted increases in the frequency and effects of overflows.

A range of options have been developed to mitigate the effects of bypass overflows through hydraulic and hydrologic modelling of the interceptor network. Work on refining the options is progressing. This work will be assisted by feedback from the draft AEE, which will be circulated in March.

A further report back in June will seek approval for an approach to be taken in the consent application.

Contact Officers: *Kevin Robertson, Strategic Projects Manager, Capacity and Nicholas Kildare, Policy Analyst, Capacity*

<b>Supporting Information</b>
<p><b>1) Strategic Fit / Strategic Outcome</b></p> <p><i>The conclusions and recommendations in this report take into account the Council's strategic priorities and outcomes</i></p>
<p><b>2) LTCCP/Annual Plan reference and long term financial impact</b></p> <p><i>The decisions that the Council makes with regard to the options discussed in this report could have a significant impact on the financial position of the Council. Further work would be required to finalise the costs of the options decided on by the Council.</i></p>
<p><b>3) Treaty of Waitangi considerations</b></p> <p><i>Preliminary discussions have been held with iwi representatives on the issues and proposals contained in this report. Further consultation will be undertaken in the lead up to the consent application to enable iwi to consider fully the proposed options.</i></p>
<p><b>4) Decision-Making</b></p> <p><i>This is a key decision for Council. Section 4 sets out the key issues and decisions the Council will need to make before lodging the resource consent applications.</i></p>
<p><b>5) Consultation</b></p> <p><b>a) General Consultation</b></p> <p><i>Consultation on the options contained in this report will occur through the draft AEE.</i></p> <p><b>b) Consultation with Maori</b></p> <p><i>Preliminary discussions have been held with iwi representatives.</i></p>
<p><b>6) Legal Implications</b></p> <p><i>The Council's lawyers have been consulted during the development of this report and commented on a draft of this paper prior to its finalisation.</i></p>

Wellington City Council  
Te Kaunihera O Poneke

EXTRACT OF MINUTES  
STRATEGY AND POLICY COMMITTEE

MEETING OF THURSDAY 7 DECEMBER 2006

267/06P **MOA POINT WASTEWATER TREATMENT PLANT AND CAREY'S GULLY SLUDGE DEWATERING PLANT AND SLUDGE DISPOSAL AT SOUTHERN LANDFILL RESOURCE CONSENT APPLICATIONS**  
Report of Yon Cheong – Manager, Asset Planning, Capacity and Nicholas Kildare – Policy Analyst, Asset Planning, Capacity.  
(1215/52/IM) (REPORT 6)

**Moved Councillor Wade-Brown, seconded Councillor Ahipene-Mercer the substantive motion.**

**The substantive motion was put and declared CARRIED on voices.**

**RESOLVED:**

*THAT the Strategy and Policy Committee:*

1. *Receive the information.*
2. *Agree to the proposed timeline and process for the application for resource consents for the Carey's Gully Sludge Dewatering Plant and sludge disposal to the landfill for terms of 35 years.*
3. *Note that officers will report further to the Strategy and Policy Committee on the key elements of the resource consent applications for the Moa Point Wastewater Treatment Plant including the proposed approach to the management of bypass discharges from the long outfall during extreme wet weather.*

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## **MOA POINT WASTEWATER TREATMENT PLANT AND CAREY'S GULLY SLUDGE DEWATERING PLANT AND SLUDGE DISPOSAL AT THE SOUTHERN LANDFILL – RESOURCE CONSENT APPLICATIONS**

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### **1. Purpose of Report**

The purpose of this report is to set out the background, the process and the timeline for the Strategy and Policy Committee to receive reports regarding the consent renewal applications for the Moa Point Wastewater Treatment Plant and Carey's Gully Sludge Dewatering Plant.

### **2. Recommendations**

It is recommended that the Committee:

- 1. Receive the information.*
- 2. Agree to the proposed timeline and process for the application for resource consents for the Carey's Gully Sludge Dewatering Plant and sludge disposal to the landfill for terms of 35 years.*
- 3. Note that officers will report further to the Strategy and Policy Committee on the key elements of the resource consent applications for the Moa Point Wastewater Treatment Plant including the proposed approach to the management of bypass discharges from the long outfall during extreme wet weather.*

### **3. Background**

#### **3.1 Moa Point Wastewater Treatment Plant**

The Moa Point Plant was commissioned in 1997 and was fully operational in January 1998. The plant currently receives and treats wastewater from a residential population of approximately 136,000. The catchment is approximately 5,500 hectares. Its collection system includes approximately 820km of reticulation and interceptor sewer that convey the flows to the Moa Point Wastewater Treatment Plant.

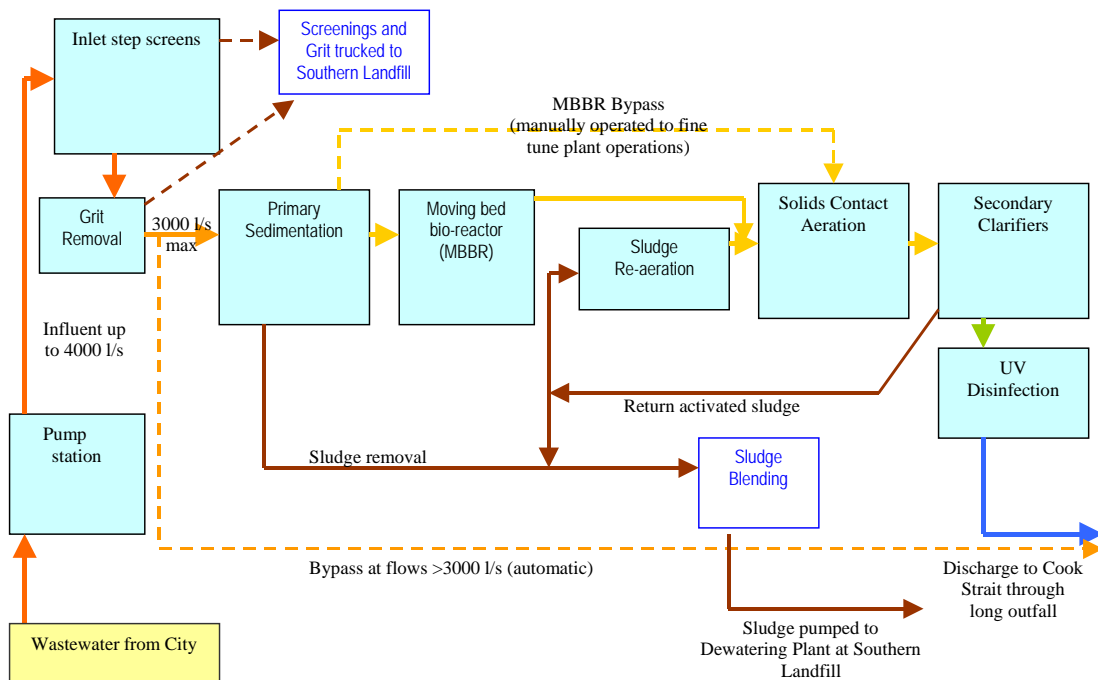
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The essential features of the Moa Point treatment plant and process are:

- A pump station, which is contracted to pump up to 4,000 litres per second (l/s), lifts the wastewater arriving at Moa Point up to the Treatment Plant;
- Buildings and structures, which provide for physical treatment involving screening, grit removal and primary sedimentation, secondary treatment involving biological processes, secondary clarification, and ultra-violet (UV) disinfection; and
- The 1.8km ocean outfall (long outfall) through which effluent is discharged to Cook Strait.

Screened wastewater flows into sedimentation tanks where approximately 60% of the solids are removed as sludge to the Carey's Gully landfill site. The remaining wastewater is then subjected to aeration and biological treatment before passing into clarifiers where residual solids settle out and the clarified effluent flows off the top to the UV disinfection plant. The UV light destroys bacteria that might be harmful to human health or the environment.

**Figure 1: Wastewater Treatment Process**



Following this high quality treatment, the treated wastewater flows through the 1.8km long outfall into Cook Strait and discharges through a multi-port diffuser at a water depth of 21 metres around 2.5km from the Lyall Bay shoreline. Under the current diffuser configuration, 26 ports are open and an initial dilution of at least 100:1 is achieved at all times.

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The primary sedimentation tanks, biological process unit and UV disinfection unit at the Moa Point Plant have a capacity to treat 3,000 l/s, four times the 2006 average dry weather flow (ADWF) of 760 l/s. This ratio is consistent with other treatment plants throughout New Zealand.

Prior to the commissioning of the Moa point wastewater Treatment Plant, sewage from the catchment was milliscreened and discharged through the short outfall at Lavender Bay. While the short outfall has not been used on a continuous basis since the plant was commissioned, the short outfall has been retained as an emergency overflow for unavoidable discharges such as an unforeseen mechanical failure of the pump station. Discharges from the short outfall are not consented and it is not proposed that consents are sought.

### **3.2 *Wet weather overflows at the Moa Point Wastewater Treatment Plant (bypass discharges) and from the wider network***

In 1999 the Council triplicated the Kilbirnie interceptor which increased the flows able to be transferred to Moa Point from a maximum of approximately 3000 l/s to approximately 4000 l/s to reduce overflows from the wastewater network. As a result, during extreme wet weather events, wastewater flows to the Moa Point Plant can exceed the Plant's treatment capacity of 3,000 l/s.

All wastewater arriving under these circumstances still passes through the step screens and grit removal unit. Any flow in excess of 3,000 l/s automatically bypasses the primary and secondary treatment systems and UV disinfection unit and passes directly into the ocean outfall, where it is mixed with the fully treated effluent and discharged to Cook Strait.

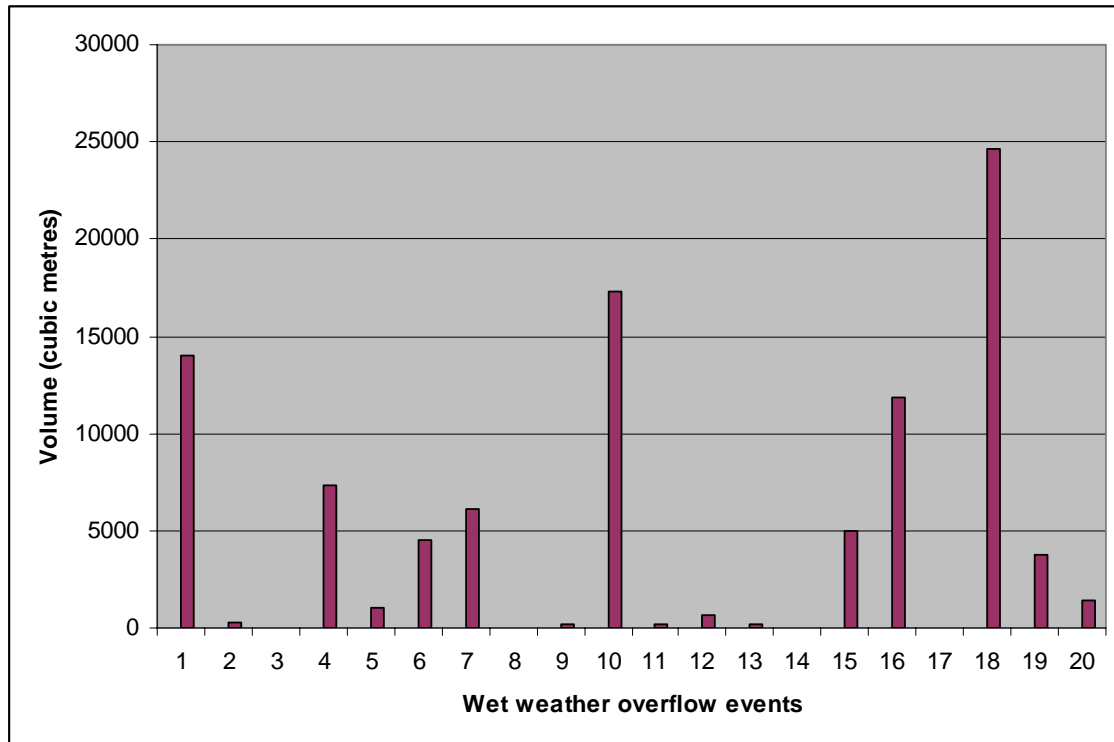
Approximately twenty wet weather events between November 1999 and October 2006 have caused bypass overflows through the long outfall (Table 1). The circumstances that cause a bypass event are influenced by the intensity and duration of a specific rainfall event, the weather conditions preceding the event (e.g. if soils are wet and therefore have limited storage capacity), and the distribution of rainfall within the catchment.

The majority of overflows are small volume discharges and, on the actual day, represent an average of approximately only 2% of the total daily flow discharged at Moa Pt. Considered annually, the Moa Point Wastewater Treatment Plant currently operates within its discharge capacity 99.95% of the time.

Figure 2 shows the relative scale of overflows through the long outfall between November 1999 and October 2006. The data contained in Figure 2 is derived from Table 1, which shows twenty wet weather bypass events at Moa Point over the seven year period.

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**Figure 2: Overflows from the long outfall at the Moa Point Wastewater Treatment Plant since November 1999**



**Table 1: Overflows from the long outfall at the Moa Point Wastewater treatment Plant between November 1999 and October 2006 and the duration of the associated wet weather events**

	Date	Overflow Volume (m <sup>3</sup> )	Duration (Hrs)		Date	Overflow Volume (m <sup>3</sup> )	Duration (Hrs)
<b>1</b>	12 November 1999	14,000	10.3	<b>11</b>	2-3 May 2005	216	3.5
<b>2</b>	4 June 2000	319	4.5	<b>12</b>	21 May 2005	615	3.0
<b>3</b>	7 October 2001	15	0.05	<b>13</b>	23 May 2005	144	2.5
<b>4</b>	22 November 2001	7309	9.6	<b>14</b>	28 July 2005	20	1.0
<b>5</b>	15 January 2002	1005	1.16	<b>15</b>	4 July 2006	4940	11.5
<b>6</b>	17 June 2002	4484	3.16	<b>16</b>	6-7 July 2006	11,836	17.0
<b>7</b>	13 October 2003	6090	7.0	<b>17</b>	20 July 2006	5	1 minute
<b>8</b>	21 January 2004	11	0.6	<b>18</b>	26 Aug 2006	24,674	15.3
<b>9</b>	5-6 January 2005	215	0.5	<b>19</b>	24 Oct 2006	3,747	5.5
<b>10</b>	31 March 2005	17,271	9.5	<b>20</b>	29 Oct 2006	1,392	3.0

Further evaluation is being undertaken on the correlation between overflow events and rainfall return periods.

Heavy rain also results in wastewater overflows from the wider pipe network served by the Moa Point Wastewater Treatment Plant. During extreme wet weather, overflows at localised points can result in some diluted sewage being discharged to stormwater culverts around the City resulting in contaminated stormwater discharges to the Harbour

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and South Coast. Council currently holds resource consents for 11 of these sewage contaminated stormwater discharges, with expiry dates between 2008 and 2013.

The most significant wastewater overflows in the wider network are:

- Murphy Street wastewater overflow on the interceptor in Thorndon, discharging to the Davis St stormwater culvert to the harbour in the port area; and
- Drummond Street wastewater overflow on the interceptor in Newtown, discharging to the Overseas Passenger Terminal stormwater culvert.

The constructed overflow at Murphy Street is currently operating at about an average of four overflows per year. The overflow at Drummond St operates at an average of one overflow every 2-5 years. The existing discharge consents for both these locations expire in 2013.

### **3.3 Resource consents for the Moa Point Wastewater Treatment Plant**

The Moa Point Wastewater Treatment Plant operates under four existing consents that expire in early January 2008. Applications for new consents must be lodged by early July 2007 to allow the plant to continue to operate under the existing resource consents until new consents are obtained.

The most significant of the existing consents with regard to the consent renewal process are the two discharge consents providing for:

- The continuous discharge of disinfected secondary treated effluent to Cook Strait via the long outfall, south of Lyall Bay, during 'normal operating' conditions that requires a effluent standard of 20g/m<sup>3</sup>; 30g/m<sup>3</sup>; 200 per 100ml standard for biochemical oxygen demand, suspended solids and faecal coliform bacteria (20:30:200)
- The discharge of mixed disinfected secondary treated and milliscreened wastewater to Cook Strait via the long outfall to the coastal marine area during and/or immediately after heavy rainfall when the quantity of wastewater arriving at the Moa Point Plant exceeds 3000 l/s (bypass consent)

Unlike the majority of the Clearwater resource consents (which were all obtained in the 1990s), the bypass consent was obtained in September 2004 following the triplication of the Kilbirnie interceptor, which increased the capacity for flows to Moa Point Plant. The bypass consent contained a number of conditions relating to the notification of bypass discharges, signage, monitoring, and reporting. In addition, condition 11 of the consent specified that:

*“11(a) The permit holder shall investigate ways and means of eliminating bypass events and shall provide to the Manager, Consents management, Wellington Regional Council, with annual reports on the findings of these investigations. The investigations shall include, but not necessarily limited to:*

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- a) *Provision of storage of peak sewage flows at various locations within the city, including Murphy Street and Moa Point;*
- b) *The use of Mt Albert Tunnel to store peak flows;*
- c) *The enlargement of the Mt Victoria tunnel to store peak flows;*
- d) *The utilisation of pump station storage to alleviate peak wet weather flows;*
- e) *The amalgamation of sewage pump stations combined with a storage facility;*
- f) *Enhancement of the capacity of the trunk sewer at specific locations, to reduce back-up and overflow potential;*
- g) *Augmentation of the treatment capacity at the Moa Point Wastewater Treatment Plant, including upgrading the UV treatment capacity to treat peak flows;*
- h) *Implementation of a comprehensive inflow and infiltration programme, targeted at specific subcatchments;*

*Note: there are existing consents that have their own reporting requirements and this consent does not intend to duplicate those.*

- i) *Sophisticated screening systems to screen stormwater flows; and*
- j) *Sustainable urban drainage technologies.*

*This report shall be submitted to the Manager, Consents Management, Wellington Regional Council, by 30 May each year and a final report shall be submitted at least three months prior to the expiry of this permit.*

- 11(b) *In the event that the permit holder undertakes significant remedial work as a result of the investigations referred to in condition 11(a), this work shall be described in the annual reports”.*

*Note: there are strong expectations that by the time the expiry date for this permit is reached, the permit holder will have implemented or be in the process of implementing means of eliminating bypass discharges”.*

### **3.4 Resource consents for the Carey’s Gully Dewatering Plant and disposal of sludge to the landfill**

Sewage sludge, which is a mixture of 98% water and 2% solids, is produced as a by-product of treatment of sewage. The solids derive from the settlement of milliscreened sewage (primary solids) and the settlement of the treated effluent (secondary solids).

The sludge from the Moa Point Plant is pumped 9km through an underground pipeline to the dewatering plant at the Southern Landfill at Carey’s Gully. Sludge is also trucked from the Western Treatment Plant.

The Carey’s Gully Dewatering Plant was commissioned in 1997 and dewateres sludge by centrifuge. The dewatered sludge is loaded into skips in the sludge bay and is trucked

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to the adjacent composting plant for further processing or delivered to the landfill. The plant currently produces, on average, 50 tonnes of sludge per day. The effluent from the dewatering process is treated and then returned to the sewer.

The existing resource consents that authorise the operation of the dewatering plant and the discharge of sludge to the landfill and associated discharges to the air at Carey's Gully expire in mid-2007 and early 2008.

It is proposed to apply for new consents on the same basis as the current consents and for a 35 year term. It is noted that odour will be a key issue with these applications. The applications will seek a continuation of the conditions of consent that require that there is no objectionable and offensive odour at the boundary of the site.

Consultation with affected parties has commenced and the project team are endeavouring to resolve any issues raised. The closing date for the receipt of feedback from the consultation is 29 November 2006.

## **4 Key issues arising in the application for resource consents for Moa Point Wastewater Treatment Plant**

The Council's approach to the reconsenting of the Moa Point Treatment Plant will require Council decisions on three key issues:

- the duration of the consents that will be sought at time of application (a maximum duration of 35 years is allowed under the Resource Management Act 1991);
- whether to maintain or alter the effluent quality standard discharged through the long outfall during 'normal operating' conditions; and
- to what degree the wastewater system will contain peak wet weather flows prior to discharge.

### **4.1 Investigation work to date to prepare the consent application**

Existing consent conditions impose high quality effluent standards including a 20g/m<sup>3</sup>; 30g/m<sup>3</sup>; 200 per 100ml standard for biochemical oxygen demand, suspended solids and faecal coliform bacteria. The Plant consistently meets the standards and is normally of a significantly higher quality than required by consent conditions.

While some environmental studies are still being completed, evidence to date is that there have been significant water quality improvements on Wellington's south coast since the commissioning of the Moa Point Plant and the current environmental effects of the discharge of treated effluent from the long outfall into Cook Strait is negligible.

As part of the preparation of the new resource consent applications, it is appropriate that the Council considers the appropriate effluent quality standard, which in practical terms requires Council to consider alternatives, including whether to maintain, relax or tighten

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the present standard of 20:30:200 for effluent treatment. More work is being carried out regarding the effluent standard, and will be presented to Council in a future report. It should be noted that the present effluent standard at Moa Point is higher than the effluent treatment standard (50g/m<sup>3</sup>, 50g/m<sup>3</sup>; 1,000 per 100 ml) required for the Hutt Valley wastewater treatment plant located at Seaview.

With regard to wet weather overflows from Moa Point and the wider network, the Council has developed a hydraulic and hydrologic model of the interceptor sewer and associated pump station catchments to help predict the flows into the future years and the effect of implementing different options for improvement works on the flows arriving at Moa Point and in the network. The usual definition in New Zealand and Australia of catchment rainfall events whereby flows will be directed to storage/treatment before discharge is for wet weather event recurrence periods of between 6 months and 2 years.

The model currently predicts that maintaining the current operating regime towards flows arriving at Moa Point and in the wider network could result in an increase in the number of bypass discharges from the current average of two-three per year to an average of nine times per year by 2043.

Current modelling has derived a number of possible options to reduce wet weather overflows in the wider network as well as at Moa Point (Appendix 2). This work has included initial cost estimates to address these discharges.

Options for the mitigation of the wet weather overflows to the harbour and bypass discharges out the long outfall revolve around concepts of:

- Conveyance of flows:
  - To enhance the capacity of the interceptor sewer to convey flows to Moa Point (this would have a direct impact on increasing bypass discharges unless the Moa Point Plant was augmented to treat the increased flow, and has significant technical and cost implications);
- Attenuation of flows:
  - To reduce the peak flows reaching the Moa Point Treatment Plant and in the wastewater system by storage and/or diversion at one or more locations within the network
- Reduction of flows:
  - To reduce flows within the wastewater system by reducing inflow and infiltration into the network
- Treatment of overflows:
  - The treatment of overflows, such as by screening and settling of excess flows from heavy rain, at one of more locations within the network

The cost estimates for the options derived from the model are very preliminary and at this stage should be viewed only as a means of comparing options. The estimates range

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across a number of containment standards from 6 months to 20 year average recurrence intervals (ARI).

Further study is being carried out to confirm the accuracy of the interceptor sewer model and cost estimates and to ascertain the physical feasibility of the options. As these options relate to significant elements of the City's infrastructure and potentially involve significant capital expenditure, it is prudent for Council and the wider community to consider the benefits and costs of these options in terms of economic, social, cultural and environmental effects, the extent to which community outcomes are promoted or achieved, and the views of interested parties.

In addition, more work will be carried out on the effects of the bypass and the costs associated with the mitigation before any recommendation is made to Council.

## **5 Consultation**

Wellington City Council is currently consulting with the community on the continued operation of the Moa Point Wastewater Treatment Plant and sludge dewatering plant and sludge disposal at Carey's Gully. Meetings were arranged with regard to Moa point and the Landfill consents with the community liaison groups. The public consultation period closes on Wednesday 29 November 2006.

The Western Treatment Plant resource consent hearing provided strong direction for the Council to work with Tangata Whenua to address cultural effects and possible mitigation options. To put this direction into effect, the process outlined below has been established for the Moa Point resource consent application.

An initial workshop was held in late November with representatives of

- the Wellington Tenth's Trust
- Port Nicholson Block Claim Team
- Te Atiawa ki te Upoko o Te Ika a Maui Potiki Trust
- Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui Inc
- the Polhill Gully Trust.

A separate workshop was also held with representatives of Ngati Toa.

Council officers also initiated meetings with other key stakeholders and interested parties in November this year. These meetings and discussions will continue into the New Year.

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## 6 Proposed timeline for resource consent application process

### 6.1 Moa Point Resource Consent Application Process

Timeline	Activity
Ongoing to June 2007	Study of the operation of the Moa Point Treatment Plant and measures to mitigate overflows from the wastewater system, including: <ul style="list-style-type: none"> <li>○ modelling of interceptor sewer</li> <li>○ physical feasibility of preliminary options</li> <li>○ refinement of cost estimates for the preliminary options</li> </ul>
9 October - 29 November 2006	Public Consultation, including: <ul style="list-style-type: none"> <li>○ publication of the Project Descriptions (high-level descriptions of the consent application)</li> <li>○ discussions with key stakeholders and interested parties</li> </ul>
Late November 2006	Further engagement with iwi groups
7 December 2006	Report to Strategy and Policy Committee to provide Council with: <ul style="list-style-type: none"> <li>○ a progress update on the resource consent process;</li> <li>○ information relevant to the resource consent process</li> <li>○ a supplementary paper on feedback received to date</li> </ul>
December 2006 to March 2007	Further engagement with iwi groups, including a possible workshop with Councillors.
March 2007	Report to Strategy and Policy Committee to provide Council with: <ul style="list-style-type: none"> <li>○ a progress update on the resource consent process; and to</li> <li>○ provide an update on the information to be included in the draft Assessment of Environmental Effect (AEE)</li> </ul>
March 2007	Publication of the draft AEE, which includes views of the community gathered to date
March - April 2007	Consultation on the draft AEE, including meetings with key stakeholders, iwi, and interested parties
April 2007	Council receives Cultural Impact Report on draft AEE from iwi
May 2007	Report to Strategy and Policy Committee to provide Council with: <ul style="list-style-type: none"> <li>○ a progress update on the resource consent process</li> <li>○ feedback from consultation on Draft AEE with key stakeholders and interested parties and iwi views expressed in the Cultural Impact Report; and to</li> <li>○ seek approval for the information to be included in the final AEE</li> </ul>
June 2007	Prepare resource consent application documents and finalise AEE
6 July 2007	Lodge resource consent application with Greater Wellington Regional Council

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## 6.2 Carey's Gully Resource Consent Application Process

Timeline	Activity
9 October – 29 November 2006	Public Consultation, including: <ul style="list-style-type: none"><li>○ publication of the Project Description (high-level description of the consent application)</li><li>○ discussions with key stakeholders and interested parties</li></ul>
Early December 2006	Publication of Draft AEE
December 2006 to mid April 2007	Consultation on Draft AEE
Mid April	Finalise AEE
End April	Lodge application with Greater Wellington Regional Council.

## 7. Conclusion

Council has begun to consult on the consent renewal process for the continued operation of the Moa Point Wastewater Treatment Plant and the Sludge Dewatering Plant at Carey's Gully. Further work is required to more fully develop options for the consent renewal applications.

A further report will be prepared to Strategy and Policy Committee in the New Year with a progress update on the resource consent process, and an update on the information to be included in the draft Assessment of Environmental Effect.

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## Appendix 1: Wellington Wastewater Network



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## Appendix 2

	Preliminary Options	Description	Preliminary cost estimates for various overflow containment standard (\$ millions) (+/- 50%)					
			6 months ARI	1 Year ARI	2 Year ARI	5 year ARI	10 year ARI	20 year ARI
1.	Complete Storage	Construction of storage tanks at a number of locations in the wider network.	23	37	62	83	129	305
2.	Complete conveyance	Enhance the capacity of the interceptor sewer, bringing the majority of wet weather flows (except extreme events) to Moa Point for treatment and discharge through the long outfall. <ul style="list-style-type: none"> <li>Would require augmentation of Moa Point Plant</li> </ul>	116	130	143	155	166	199
3.	Complete overflow treatment	Construct combined small storage and treatment facilities at various locations in the network to treat overflows before discharge to receiving waters.	12	15	17	19	21	24
4.	Combined overflow treatment at Murphy St and downstream storage	Construct small storage tank and overflow treatment facility at Murphy St and downstream storage tanks to reduce peak flows reaching Moa Point.	17	22	32	35	45	54
5.	Combined overflow storage at Murphy St and downstream conveyance	Construct a large storage tank at Murphy St and enhance capacity of the interceptor sewer downstream to Moa Point. <ul style="list-style-type: none"> <li>Would require augmentation of Moa Pt Plant</li> </ul>	77	93	110	127	150	252
6.	Combined overflow storage and downstream overflow treatment	Construct a large storage tank at Murphy St and other small storages and overflow treatment facilities at Moa Pt in addition to other locations upstream of Moa Point.	28	39	54	67	87	183
7.	Inflow and Infiltration (I/I) reduction programme	Implement a long term network rehabilitation programme to reduce I/I levels in the wider network.	<ul style="list-style-type: none"> <li>It is not known at this stage what overflow containment standard this option can achieve.</li> <li>Estimate cost - \$100 million over 20 years (\$5 million per annum)</li> </ul>					
8.	Continuing the Status Quo	Proposes no change to the current approach to the operation of Moa Point treatment plant, the bypass events and overflows in the wider network.	<ul style="list-style-type: none"> <li>No additional improvement costs</li> <li>Carry on with annual renewal of the wastewater network of approximately \$6 to \$7 million per annum (replacing 1% of the network per year)</li> </ul>					

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<b>Supporting Information</b>
<p><b>1) Strategic Fit / Strategic Outcome</b></p> <p><i>The conclusions and recommendations in this report take into account the Council's strategic priorities and outcomes</i></p>
<p><b>2) LTCCP/Annual Plan reference and long term financial impact</b></p> <p><i>The decisions that Council makes with regard to the options will have a significant impact on the financial position of the Council. Further information on costs will be provided in subsequent reports to the Committee to assist with a final decision.</i></p>
<p><b>3) Treaty of Waitangi considerations</b></p> <p><i>Preliminary discussions have been held with iwi representatives on the issues and proposals contained in this report. Further consultation will be undertaken in the lead up to the consent application to enable iwi to consider fully the proposed options.</i></p>
<p><b>4) Decision-Making</b></p> <p><i>This is a key decision for Council. Section 4 sets out the key issues and decisions Council will need to make before lodging the resource consent applications.</i></p>
<p><b>5) Consultation</b></p> <p><b>a) General Consultation</b></p> <p><i>Council is undertaking preliminary public consultation on continued operation of the Moa Point Treatment Plant and Carey's Gully.</i></p> <p><b>b) Consultation with Maori</b></p> <p><i>Preliminary discussions have been held with iwi representatives.</i></p>
<p><b>6) Legal Implications</b></p> <p><i>Council's lawyers have been consulted during the development of this report and commented on a draft of this paper prior to its finalisation.</i></p>

## APPENDIX 2

*Cultural Impact Report from Te Runanga o Toa Rangatira.*

## **APPENDIX 3**

*Cultural Impact report from Raukura Consultants.*