

*Ko Maunganui te maunga*

*Ko Taieri te awa*

*Ko Fiona Hoang tōku ingoa*

*formerly a registered architect and currently a teacher.*

*I lived in Strathmore from 1984 to 2001 and have since lived in Kilbirnie. In 1992 I was an appellant in the case over the proposed secondary treatment at Moa Point.*

## **CASE for outfall options to be assessed**

This submission asks for due process to be followed;

- for outfall options to be fully studied
- the merits and deficits assessed for environmental, operational and cost implications
- for the subsequent findings to be included in the Business case options investigations and analysis, before any selection of a sludge treatment option is undertaken for Wellington.

There are 4 points.

### **1 Need to follow due process**

During the sludge pipeline failure in 2020, milliscreening and treated effluent discharge through outfall remedy was discussed, Councillors called on CEO, Barbara McKerrow, for an up to date environmental assessment.<sup>1</sup>The environmental assessment was not done.

This milliscreening outfall option has been omitted in the SMF process options. Public perception, media and Iwi cultural sensitivities have influenced and restricted the Scope of options. To pause, take a step back and examine a more basic option, the accompanying science, thinking, a more natural way to biodegrade without toxic by-products to contend with must surely be worth consideration?

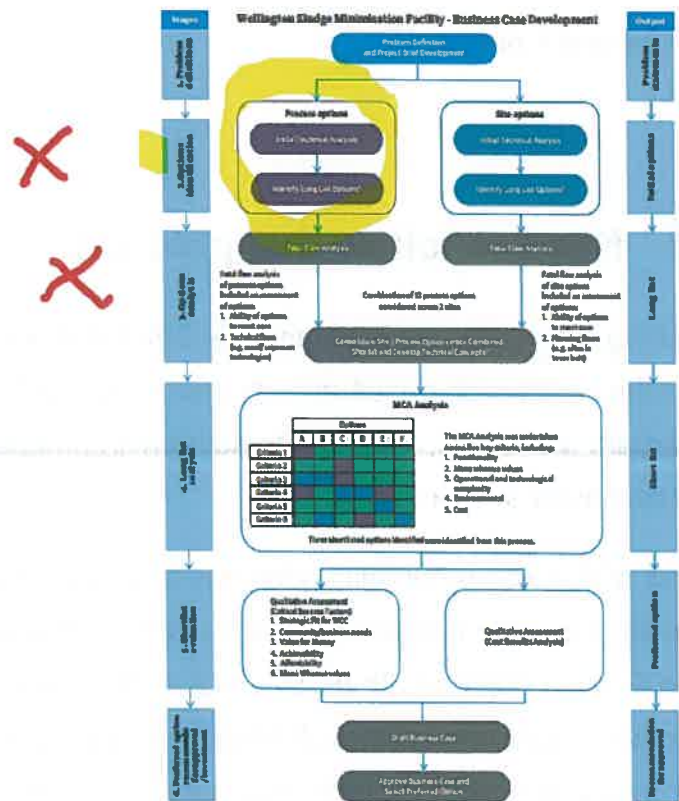
<sup>1</sup>

<https://www.stuff.co.nz/dominion-post/news/120825350/coronavirus-wellington-council-discusses-dumping-wastewater-in-cook-strait>

Only one outfall option (Option 1 Outfall) was considered in the Business case which was discounted at Stage 2 Options Identification <sup>2</sup>. The reasons given - perceived difficulties of gaining consent and getting Iwi acceptability. The SMF Business case stated:-

**” Comment: the likelihood of getting consent for this activity, or iwi acceptance of it, is considered very low to impossible” (P45).**

Subsequently Iwi and specifically Mana Whenua say they have not been consulted at certain stages of the business case. Refer to **Memorandum from Wikaira Consulting - Retrospective Options Assessment** which says, **“Mana Whenua do not appear to have been involved in identifying the long list of technologies for the establishing of the fatal flaw criteria.”** The long list of technologies occurred during Stage 2 and refers to the process options for sludge treatment, when the outfall option was also removed from consideration. See highlighted on *Diagram - Wellington Sludge Minimisation Facility - Business Case Development*



<sup>2</sup> Refer to SMF Business case p. 31,

The Outfall option refers to Option1 Outfall, Table 9 of the Business case, “ Outfall – sludge is discharged with treated effluent from Moa Point WWTP via the long sea outfall into Cook Strait. This would mean sludge would not require any further treatment. Note that this is an activity not currently permitted for which specific resource consents would need to be sought.”<sup>3</sup>

Discharge of sludge mixed with the clean water is unusual and unnecessary, as sludge is the end process of the treated effluent. The sludge and highly treated UV disinfected effluent are discharged having undergone a process intensive, high energy and costly process. This can be described as mixing the dirt with the clean water that the dirt was extracted from, then just disposing of it!

This base case Outfall option is flawed. There are better outfall options that should have been included in the Business case process options.

Table 9: Summary Evaluation of Base Case Options.

	Investment Objective Criteria				Additional Criteria	
	Reduce Operational Impact	Long-term Sustainable Sludge Management	Environmental Impact and Consentability	Mana Whenua Values & Principles	Reduce Long Run Financial Costs	Waste Reduction Policy Objectives
<b>Option 1 Outfall</b>	Excellent	Poor	Not acceptable	Not acceptable	Excellent	Excellent
<i>Comment: the likelihood of getting consent for this activity, or twi acceptance of it, is considered very low to impossible.</i>						
<b>Option 2 Truck to Bonny Glenn</b>	Poor	Average	Average	Poor	Average	Poor
<b>Option 3 Southern Landfill then Bonny Glenn</b>	Poor	Average	Average	Poor	Excellent	Poor

Table 9: Summary Evaluation of Base Case Options<sup>4</sup>

Even though the outfall option was discounted, the Business case found it has excellent outcomes in three of the six assessment criteria (Table 9);

- Reduce operational impact,
- Reduce long run financial costs, and
- Waste reduction policy objectives.

Three compelling reasons for it to warrant investigation.

<sup>3</sup> [Sludge Minimisation Business Case - Wellington City Council](#) p44

<sup>4</sup> Ibid P45

## 2 The case for long outfalls

Research past and present (below) show the significant benefit of long outfall options that include **sustainability and affordability**, providing effective low impact environmental wastewater treatment.

1. Prof. Philip J. W. Roberts, discusses the merits of wastewater disposal with long outfalls in [Treatment Options for Marine Wastewater Discharges](#)<sup>5</sup>

- a. **“Water quality requirements, including those for toxics and bacteria, can be met by an effective outfall, i.e. one that discharges far from shore with high dilution, and preliminary treatment such as millisscreening. Secondary or other advanced treatment is rarely necessary. This is illustrated by the Cartagena, Colombia, outfall. The cost of disposal by an effective outfall and preliminary treatment is of the order of one tenth that of secondary treatment when amortized over 25 years.”**

The Cartagena outfall extends approximately four km into the Caribbean Sea and terminates in a diffuser 520 m long in water depth of 20 m. The preliminary treatment plant was designed to remove floatable material such as oils and plastic bags, as well as sand and grit particles. **No sludge is produced. Just millisscreened effluent is discharged.**<sup>6</sup>

- b. **“According to the WHO, the level of treatment has little bearing on the human health risk of discharge from an effective outfall.** The risk from any effluent discharged through an effective outfall is low, even if only treated to preliminary or primary levels.

**“The costs rise very rapidly as the level of treatment (and contaminant removal) increases.** This is shown by the estimated annual costs to treat 100 mgd (4 m<sup>3</sup> /s) of raw wastewater in Figure 2 where the level of treatment is expressed by the percentage BOD removed. These costs include recovery of investment plus O&M costs. Figure 2: Relative costs of wastewater treatment

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<sup>5</sup> Professor, School of Civil Engineering, Georgia Institute of Technology, Atlanta, [Treatment Options for Marine Wastewater Discharges](#)

<sup>6</sup> For example of millisscreened effluent see P8 showing the effluent from Moa Point WWTP.



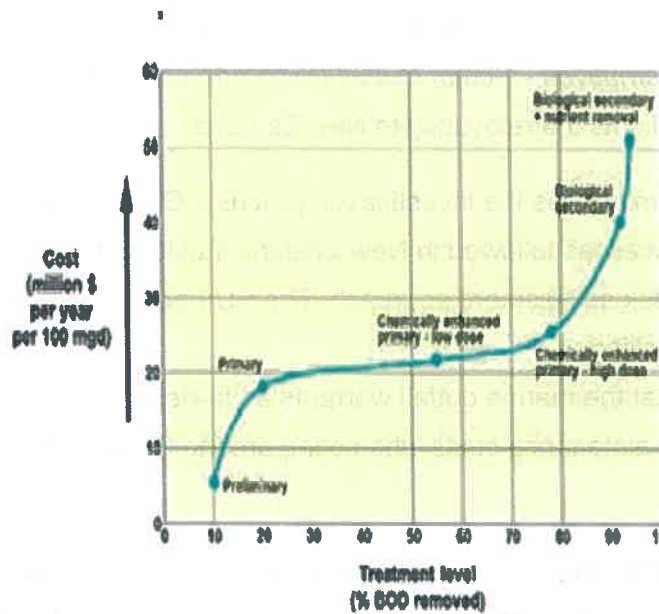


Figure 2: Relative costs of wastewater treatment

2. Prof. Philip J. W. Robert:- “Also Preliminary treatment alone will usually suffice with an effective outfall. For domestic sewage this consists of milliscreens with apertures around one mm. To understand why advanced treatment is usually unnecessary, consider an outfall with a diffuser that effects an initial dilution of 100:1 (which can usually be easily accomplished). This corresponds to a 99% reduction in contaminant concentrations in the receiving water.... Diffuser mixing is therefore usually much more important than treatment in mitigating environmental impacts. This is why the diffuser and near field are included in the “system” in Figure 1. ”<sup>7</sup>

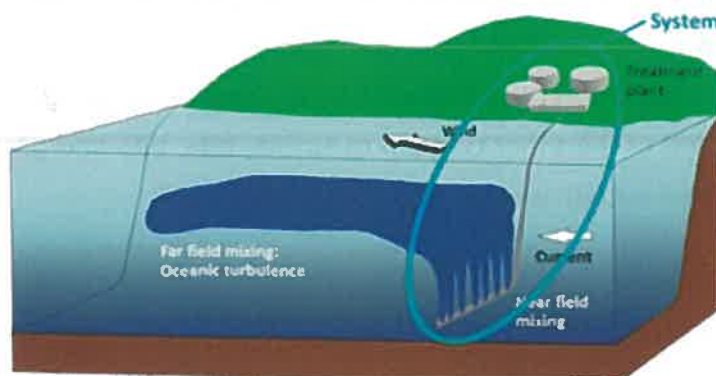


Figure 1: A marine wastewater disposal scheme: Treatment plant, outfall pipe, and diffuser.

<sup>7</sup> [Treatment Options for Marine Wastewater Discharges](#) p25

3. On advances in diffuser technologies, Bradley, reporting on the 2016 symposium, *2.6 Investing Alternatives - Ocean Outfall Discharge and Land Application Alternative*<sup>8</sup> highlights the relevancy to New Zealand.

“The abstract summarises the investigation process. Overall many aspects are similar to the processes followed in New Zealand including the all-important shellfish microbiological risk assessment approach. The EU Faecal Coliform directives were used in this modelling.

“. it was found that the marine outfall warrants an in-depth investigation due to the potential lower maintenance costs when compared to the land-based treatment options.

“.. of the outfall are compared to the land based treatment options. It was found that a marine outfall is preferred due to its ability to accommodate high variations in flow (added storm water flows), a reasonable construction cost and exhibiting very low maintenance and operational costs when compared to land based treatment options.

“In the above report, the advantages of processing through outfalls were identified in both ability to accommodate high variations in water flow, low maintenance, construction cost while meeting the shellfish microbiological risk assessment standards.”

4. Long outfalls discharging in the marine environment allow for natural decomposition, low energy intensive treatment, can be without the need for chemicals and at very low costs.
5. The benefits of low degree of treatment and ocean discharge have been identified by marine scientists and engineers in NZ. Dr R. G. Wear was advocating in 1993;
- “Primary treatment - milliscreeing followed by the removal through sedimentation of most of the other remaining solids, fats, oils and greased - coupled with an ocean outfall, was all that was required.”<sup>9</sup>
6. Dr Wear further did studies<sup>10</sup> of Hutt's milliscreeined wastewater discharge into Wellington's Fitzroy Bay in 1992 and found the effects even in the existing short outfall, “ ..harmed seabed life no more than a southerly storm.

<sup>8</sup> [https://www.waternz.org.nz/Attachment?Action=Download&Attachment\\_id=1777](https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=1777)

<sup>9</sup> Evening Post 15/4/93

<sup>10</sup> **The Effect of Sewage and Natural seasonal Disturbances on Benthic and Macrofaunal Communities in Fitzroy Bay, Wellington, NZ** Victor C Anderlini and Robert G. Wear. Coastal Marine Research Unit, School of Biological Sciences, Victoria University 1992

"Plants and animals near the shoreline Pencarrow outfall showed no effects of pollution beyond 750 meters from the outfall" As early as 1980, a high rate primary and long outfall was proposed by Council's engineers in 1980. This low impact, low cost treatment was backed by engineers and marine scientists.

"I bet my reputation we find in ecological terms secondary and tertiary treatment would be totally unjustified in the high energy, rapid flushing Wellington marine environment - one of the best natural offshore flushing and dispersal systems of the world."<sup>11</sup>

7. The Cook Strait follows the key process at Wellington's treatment plant's second stage of treatment described as: "Aeration basins have air blown into feed the bacteria and keep everything mixed. The aeration process allows environmentally friendly bacteria to feed on the nutrients in the wastewater sludge, such as fats, sugar, and ammonia from body waste. Aeration can take several hours, during which clusters of bacteria form as they break the waste down."<sup>12</sup>
8. Concerning the existing Moa Point outfall itself, the study by Foster and Barton<sup>13</sup> "5.1/p6 - 5.1 The Receiving Environment The Moa Point outfall location was originally chosen as an area experiencing strong tidal and coastal currents that rapidly dilute and disperse any contaminants even during fine weather. Storm conditions further accelerate the dilution and dispersion of contaminants. At the time of the initial investigations for the long outfall a "circulation zone" was identified which conveyed water into Lyall Bay. Consequently the minimum length of the long outfall was set at 1800 metres to avoid the return of discharged effluent into Lyall Bay.
9. "...all wastewater arriving at the treatment plant is milli screened.....the discharge from the long outfall during a bypass event is a mixture of milliscreened and disinfected secondary treated effluent." during peak flows.
10. " These discharges do not meet the water quality standard being discharged, Barter and Foster assert that this discharge would not harm to the foreshore. The long outfall's location has no return discharge, <sup>7114</sup> i.e. no effluent would flowing to the foreshore. Shellfish picking and swimming are protected there. ~~\*\*\*~~ The merits of the current outfall are acknowledged.

<sup>11</sup> Environment Impact Statement Treatment and Disposal of Sewage. March 1988

<sup>12</sup> <https://www.wellingtonwater.co.nz/resources/topic/wastewater/wastewater-treatment-process/>

<sup>13</sup> Summary of Results of Investigations For Moa Point Interim Consent Application 2003

<https://wellington.govt.nz/-/media/rubbish-recycling-and-waste/sewerage-wastewater-and-trade-waste/sewerage-and-wastewater/files/summary-of-investigation.pdf>

<sup>14</sup> Summary of Results of Investigations For Moa Point Interim Consent Application 2003



### 3 Outfall Options for Wellington

- Bradley<sup>15</sup>, “estimates that over 70% of New Zealand’s treated wastewater discharges directly into the marine environment. He states-  
 “Almost without exception the degree of wastewater treatment of New Zealand’s wastewater discharges are of a high to very high standard, compared to many overseas discharges. The New Zealand approach of matching treatment standard to the receiving environment’s assimilative capacity is well developed. In some cases generally for political reasons, discharges have higher levels of treatment than that required from a technical environmental effects assessment viewpoint.” Wellington is one of these.

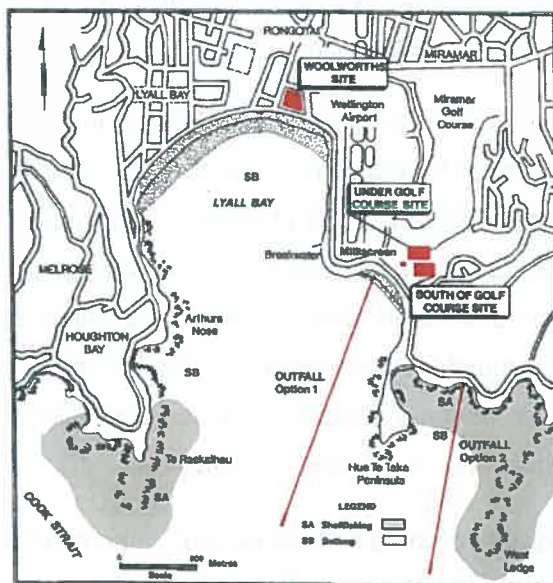


Figure 2 Treatment Plant and Outfall Sites

Water quality standards SB for bathing quality at long outfall, SA around various beaches for shellfish gathering. 1990 Council chose Option 1 as the position outfall.

- Wellington’s treatment level is higher than needed environmentally. Council’s consultants, Beca advised in 1990, “..while Council has adopted a effluent standard of 20:30:200, an effluent standard of 20:30:4,400 would meet the Water Classification Standard, would have the same impact on the marine environment and would save money”<sup>16</sup> 20:30:200 is secondary treatment with UV disinfection. It would be useful to know
  - The level of cost savings of reducing to this level.
  - The treatment level needed at the 1.8km outfall.

<sup>15</sup> WASTEWATER OUTFALLS – INTERNATIONAL PERSPECTIVES RELATIVE TO NEW ZEALAND Jim Bradley, MWH now part of Stantec 2016

<sup>16</sup> Environment Impact Statement Stage 2 1990 p12.



3. The Moa Point treatment Plant mentioned in the report on investigations of Moa Point discharge in 2003<sup>17</sup> talks about the **limited capacity of the current Moa Point WWTP to cope with sewage inflows due to the fluctuations demands in period of heavy rain;**“ there are infrequent events when the peak wet weather flows arriving at the Plant can exceed for short periods the secondary treatment capacity of 3,000 litres per second. ..When this happens all wastewater arriving at the treatment plant is milli screened. However the volume of wastewater in excess of 3000 litres per second bypasses the disinfected secondary treatment process.
4. Wellington’s treatment plant, secondary with UV disinfection has high costs, operational and capacity issues (particularly at peak stormwater demand). There have been multiple unconsented effluent discharges, current status (21/12/ 22) noncompliant.
5. Forecast for wastewater treatment to be \$74million for next year 2023, about 10 % of total annual expenditure. The bulk of that cost is due to the demands of the high level of treatment, using UV lamps, a high energy use. It is near drinkable water quality effluent.
6. **Large volumes of sludge are produced** continuously at the plants, resulting in problematic land based disposal as discussed in the Business Case. Ongoing problems at the southern landfill have been attested to by Greater Brooklyn Association’s submission. Carl Savage, secretary describes the problems, **“Wider Brooklyn and suburbs in southern Wellington, “... have been subjected to minor to major stench and offensive odour issues from the dewatering plant and composting plant.”**
7. Other high level secondary treatment plants in NZ also experience operational problems resulting in discharges below standards and odour. E.g. Wanganui treatment plant built 2007, malfunctioned 2012<sup>18</sup>. Seaview secondary plant built in 2002, , “failure of the sludge dryer which required dewatered sludge to be sent to Silverstream Landfill until repairs were completed.”<sup>19</sup> in 2007.

<sup>17</sup> Summary of Results of Investigations For Moa Point Interim Consent Application 2003 Noreen Barton and Christine Foster Environmental Management Services Ltd

<sup>18</sup> **Wanganui Waste Water Treatment Plant Discharge of Milliscreened Effluent to Ocean Outfall**  
[https://www.horizons.govt.nz/HRC/media/Media/Consent/FINAL-WDC-application-for-discharge-of-milliscreened-wastewater-to-ocean-outfall\\_2.pdf](https://www.horizons.govt.nz/HRC/media/Media/Consent/FINAL-WDC-application-for-discharge-of-milliscreened-wastewater-to-ocean-outfall_2.pdf)

<sup>19</sup><https://www.wellingtonwater.co.nz/resources/topic/wastewater/wastewater-treatment-plants/seaview-wastewater-treatment-plant/>

8. The proposed SMF building uses negative pressure, carbon filtration, and chemical scrubbers to deal with odour emissions; a level of complexity with multiple failure points.
9. The proposed sludge facility requires significant capital to build (estimated \$158-220M) to process the sludge produced from the current treatment plant. Environmental impacts including potential odour have been identified and would need ongoing management and costs (estimated \$5-7M pa).
10. In contrast, there are outfall options that produce no sludge, providing a low impact environmental solution. e.g. Milliscreened effluent discharged involves no sludge. Without sludge the associated problems of odour do not occur and secondary or UV treatment are avoided.



influent [left] (the water that enters the wastewater treatment plant) and effluent [right] (the treated water as it leaves the treatment plant). from Moa Point wastewater treatment plant.

This influent sample was taken once the wastewater went through the milliscreens in the treatment process.<sup>20</sup>

This shows the treatment in Wellington, after milliscreening does not produce sludge.<sup>21</sup>

Outfall options have excellent operations, no capacity limitations and low cost to set up and run.

## 4 The Need to Consult Tangata Whenua

Statutory Drivers - Three key pieces of legislation set out principles to be followed in relation to Maori-tangata whenua considerations on human waste-domestic sewage and wastewater systems.

1. Environment Act 1986
2. Resource Management Act 1991 (RMA)
3. Local Government Act 2002 (LGA)
4. The Treaty of Waitangi (integral in the Resource Management Act 1991(RMA))

<sup>20</sup> <https://www.wellingtonwater.co.nz/your-water/wastewater/collection-and-treatment/the-treatment-process-2/>.

<sup>21</sup> <https://www.wellingtonwater.co.nz/resources/topic/wastewater/wastewater-treatment-process/>

These are the four well beings that for the purposes of this submission essentially deal with management, development and protection of natural and physical resources, whilst ensuring economic, social & cultural well being both now and for future generations.

In March 2012, the central government notified of their intentions to refocus the functions of Local Government and change the purpose as stated above to “cover good quality local infrastructure, public services and regulatory functions at the least possible cost”.<sup>22</sup>

Consultation with Iwi is fundamental at all stages of this project for robust informed decision making and complying with Council’s statutory requirements.

**The value of consultation - A case study of Wellington City Council Biosolids**<sup>23</sup> illustrates the complexity of matters consulted.

*“The sludge treatment systems for wastewater from the main Moa Point and Kaori (western) wastewater treatment plant previously involved production of significant quantities of compost biosolids. Maori concerns about the use of the compost biosolids on land (turf culture, parks, reserves, household gardens, agriculture, revolved around the fact that the waste stream contained blood products (from hospitals, dentist surgeries and similar) and possibly body parts (from morgues, funeral parlours and hospitals). Even though these “materials” might be present in minute, undetectable quantities, nevertheless it was a cultural concern taken very seriously.*

*The matter was largely resolved when it was demonstrated that the “materials” on entry into the waste stream were very quickly broken down so that they were unrecognisable. The compost itself was appropriately labelled warning users of its content. This latter action was to meet Maori concerns that the compost would be used for food production and in Maori traditional thought could mean that Maori, in consuming those food products, they might also be consuming “minute portions of family members.”*

*The solutions were the result of a major consultation effort and the pragmatic acceptance that the traditional Maori way of doing things – arising as they have from a small village hunter-gatherer society - was insufficient to deal with the volumes of waste produced by a modern urban society. Cultural evolution was the only sensible response.”*

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<sup>22</sup> Further reading [https://www.confer.co.nz/tiwf/index\\_htm\\_files/jim%20bradley%20full%20paper.pdf](https://www.confer.co.nz/tiwf/index_htm_files/jim%20bradley%20full%20paper.pdf)

<sup>23</sup> Refer Bradley: *Maori Cultural Considerations in Developing and Operating Wastewater Systems-Case History Experiences*. A case study of Wellington City Council

Iwi and council talking together helps to identify key issues and together enabled a better resolution. With good relations, communication and sound research, this example shows Mana Whenua, as good custodians, may reconsider their position.

SMF business case had concerns “*getting consent for this activity, or iwi acceptance of it,*”<sup>24</sup> The matters of gaining consent and Mana Whenua acceptance would be better addressed by providing an environmental impact study and details of the (long outfall) option, matters yet to be done.

## Summary and Conclusion

The grounds for opposing the SMF have been discussed. An outfall option for sludge discharged with UV treated effluent was identified by the Business case but was discounted at Stage 2 without consultation with Mana Whenua. For full consultation, the outfall options, with their considerable merits, warrant further investigation into engineering options, assessment of environmental effects and costs.

Having a process options review to include the outfall options is an opportunity that may achieve a better environmental outcome. It may eliminate the need for sludge treatment altogether. It is essential the findings are presented to Mana Whenua and other key stakeholders, to inform and support the consultation process.

END

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<sup>24</sup> SMF Business case 2022, P45



## How has discharge of lower treatment on marine life in Wellington?

Moa Point outfall 1993 AEE by Beca Stevens:

“ Since milliscreening took place (1989) the earlier visible evidence of stringy material, sewage derived litter and scum or oil has largely disappeared, although some surface oily film is still evident. Apart from that evidence, more distant marine communities and species around the shore appeared reasonably complete and healthy away from the outfall. P32

“.....A few algal and epifungal species.....(seaweed) and ...(polychaeta) appear to be affected.

“The effects of the outfall on macro-marine life are undetectable beyond a distance of 600-800 m from the outfall. The wide range of species making up the biota in Lavender Bay - ....- which now exist now outside of the contaminated area will ensure rapid recovery to a “normal” stage when the source of effluent is removed from the bay” <sup>1</sup> P33

These findings are consistent with Robert Wear’s study of Fitzroy Bay of Hutt’s milliscreened discharge. All these outfalls are shoreline, yet the effects even with preliminary treatment are short term or limited to around the outfall. How will preliminary treated water discharged through a long outfall perform? This discussed in some way by Foster and Barton on 2003 investigations of milliscreened discharge in the long outfall.<sup>2</sup>

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1

[#https://www.dropbox.com/scl/fo/8uff353davkb7v3np79zw/h?dl=0&preview=AEE+Existing+Sewer+Outfall+Discharges+Moa+Owhiro+Karori+1993.pdf&rkey=qngzba6n3c5tfajn935i4pofv](https://www.dropbox.com/scl/fo/8uff353davkb7v3np79zw/h?dl=0&preview=AEE+Existing+Sewer+Outfall+Discharges+Moa+Owhiro+Karori+1993.pdf&rkey=qngzba6n3c5tfajn935i4pofv)

2

**Summary of Results of Investigations For Moa Point Interim Consent Application 2003**

<https://wellington.govt.nz/-/media/rubbish-recycling-and-waste/sewerage-wastewater-and-trade-waste/sewerage-and-wastewater/files/summary-of-investigation.pdf>

Summary of assessment -

**Table 1. Comparison of Wastewater Treatment Levels**

Treatment		Produce Sludge	SMF needed	Environmental effects on land	Environmental effects on sea	SMF Costs
1	Secondary +UV	Yes	Yes	High	None	V. High
2	Secondary	Yes	Yes	High	None	High
3	Primary	Yes	?	Low	?	Medium
4	Preliminary ((Milliscreening only)	No	No	Low	?	None

The lesser the treatment level the lesser the impact on land and sea.

Secondary treatment produces a lot of sludge.

Milliscreening produces no sludge.

Milliscreening with effective long outfall, removes the milliscreened effluent.

Removes the need of SMF.

1. How long does the outfall need to be?
2. Would we need to replace the existing 1.8 km outfall?

Worthwhile questions to include in research of outfalls. Outfall options have potential to meet the objectives.

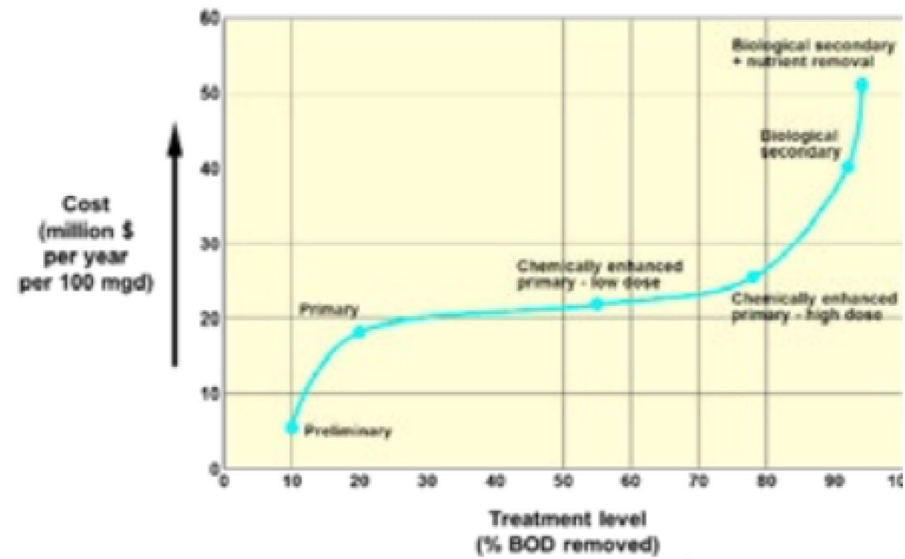


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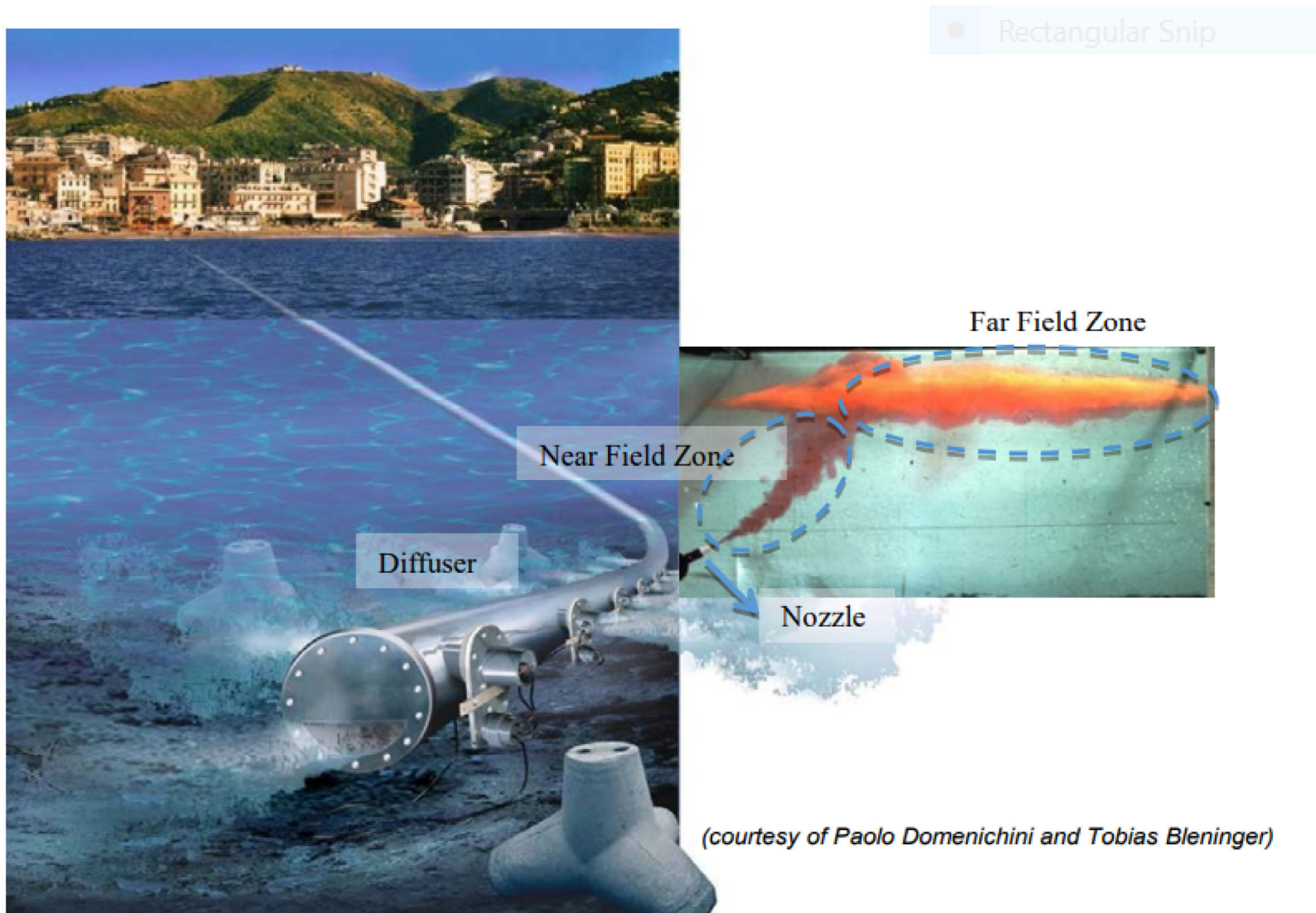
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<b>Option 1 Outfall</b>	Excellent	Poor	Not acceptable	Not acceptable	Excellent	Excellent
<i>Comment: the likelihood of getting consent for this activity, or iwi acceptance of it, is considered very low to impossible.</i>						
<b>Option 2 Truck to Bonny Glenn</b>	Poor	Average	Average	Poor	Average	Poor
<b>Option 3 Southern Landfill then Bonny Glenn</b>	Poor	Average	Average	Poor	Excellent	Poor







**Figure 2:** Relative costs of wastewater treatment



**Figure 2 - Some common terms about submarine outfalls adopted in the text**

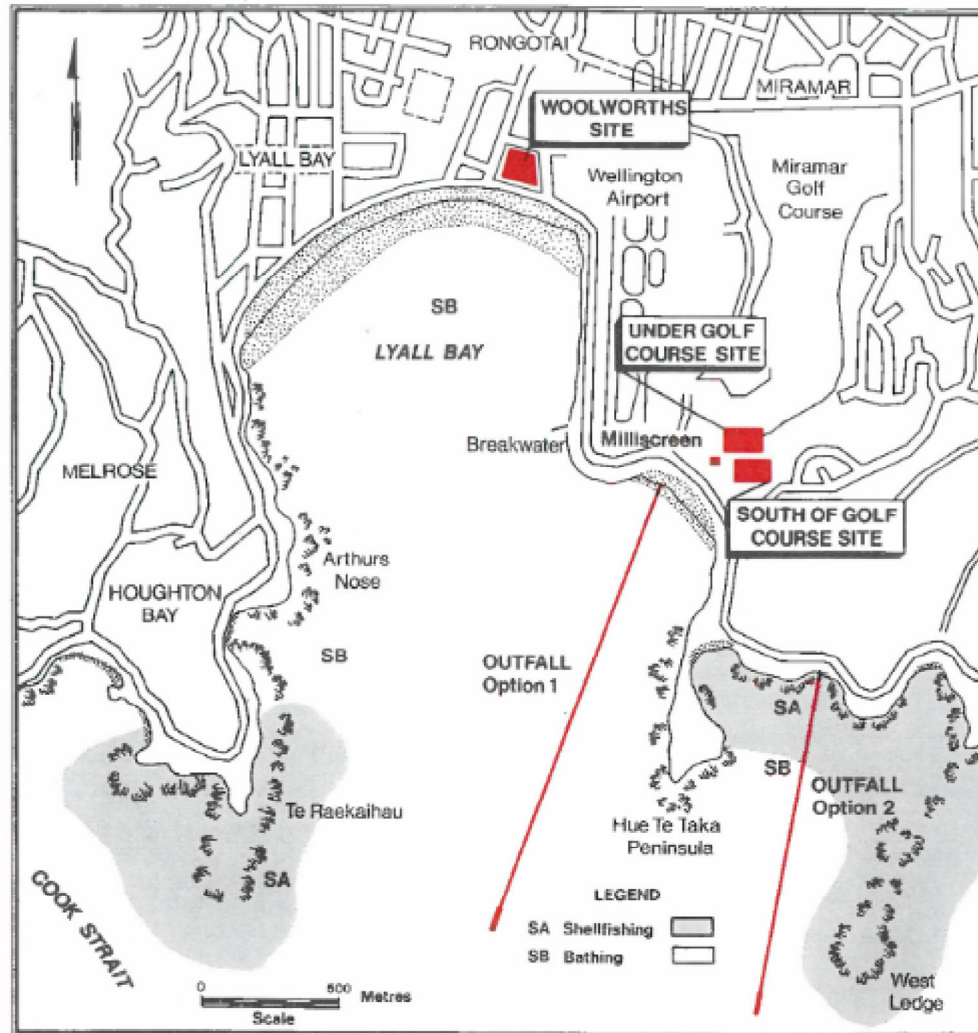


Figure 2 Treatment Plant and Outfall Sites



**Table 1. Comparison of Wastewater Treatment Levels**

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2	Secondary	Yes	Yes	High	None	High
3	Primary	Yes	?	Low	?	Medium
4	Preliminary <u>((Milliscreening only))</u>	No	No	Low	?	None

The lesser the treatment level the lesser the impact on land and sea.

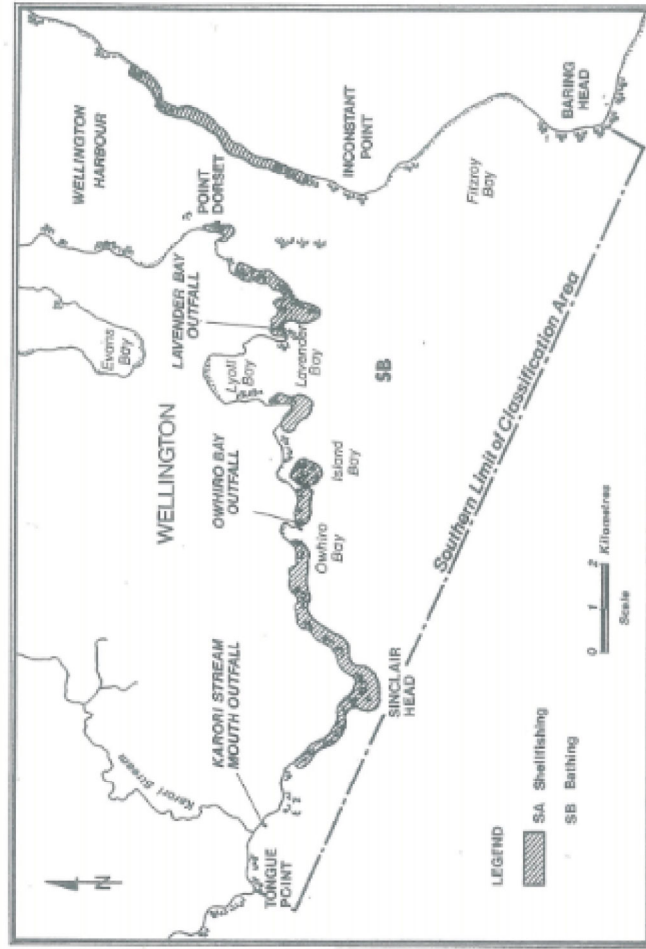


Figure 1: Indicative Water Classification South Coast  
Tribunal Order 23.2.93