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'Pollute the bay and poison the people': A short history of the Green Point marine sewage outfall, 1882–1992

The City of Cape Town in South Africa pumps 40 million litres of untreated sewage into the Atlantic Ocean from the Green Point outfall pipeline every day. This results in microbial and chemical pollution of the sea (including persistent organic pollutants), marine organisms and recreational beaches, breaching the City's constitutional commitment to 'prevent pollution and ecological degradation' and, in doing so, it fails to uphold the constitutional right to an environment for citizens that is not harmful to 'health or well-being'. This article explores how the decision to build this marine outfall was reached in 1895. It illustrates how narrow economic interests from the 1880s until today have driven the City's commitment to the Green Point outfall despite a long history of opposition from citizens and scientists and repeated instances of pollution and ill-health. The findings reveal how, rather than being the cost-saving option that the City has always claimed it to be, its maintenance has cost enormous sums of money. The story of the Green Point outfall is one in which unimaginative, short-term monetary thinking has thwarted the search for an ecologically and hydrologically sustainable alternative means of sewage disposal – a legacy the City's residents and the oceans that surround it live with today.

Significance:

The findings show that the disposal of untreated sewage into the sea at Green Point has always been controversial (scientifically, politically and socially), and has resulted in episodes of illness among Cape Town citizens. It has never been the most economic option as repeatedly asserted by the City Council. The findings also illustrate that the City Council has consistently rejected ecologically and hydrologically sustainable alternative disposal options, and has denied problems associated with the outfall, despite overwhelming evidence to the contrary, a pattern which persists. These findings are important for civic governance, desalination, water quality, environmental humanities, health (human and marine), sanitation and urban planning.

The South African Constitution states that 'everyone has the right to an environment that is not harmful to their health or well-being' and legislative measures must be taken to 'prevent pollution and ecological degradation'.[1] The environmental legislative measures that govern South Africa's oceans are the *National Environmental Management Act (1998)* and the *National Environmental Management: Integrated Coastal Management Act (2004)*, read together with various supporting regulations, and coastal water quality guidelines issued by the South African Department of Water Affairs. This regulatory regime focuses

> *on maintaining or achieving water quality such that the water body remains or becomes fit for all designated uses … aquaculture, recreational use, industrial use, as well as the protection of biodiversity and ecosystem functioning.*[2]

In addition, South Africa is a signatory to various international agreements governing water quality, one of which is the Stockholm Convention on Persistent Organic Pollutants, that aims to protect human health and the environment from chemicals that remain intact in the environment for long periods.[3]

Despite the existence of this regulatory regime, it is clear that the discharge of untreated sewage from the Green Point sewage outfall negatively impacts water quality, damaging the marine environment and threatening human health. Research reveals high levels of microbial pollution, and the existence of persistent organic pollutants (both chemical and pharmacological) in seawater, and bioaccumulated in marine organisms.[4-6]

The Cape Town City Council has denied these findings, insisting that there is no evidence of pollution and thus no risk to either human or marine health.[7,8] This despite its own commissioned research which found evidence to the contrary.[9] What is revealing about this denial is how it replicates Council's response to similar complaints over almost a century concerning pollution and health risks caused by the Green Point outfall. As the following account shows, the Council has ignored or repudiated evidence of the dangers of the outfall from the 1880s, and yet has been forced to take some kind of remedial action time and again, when these dangers have proved genuine.

Giving evidence before a Parliamentary Select Committee on the sanitary state of Cape Town in 1888, H. Saunders, a City medical doctor, declared that sanitary conditions were 'as bad as any town in Christendom'.[10] Indeed, that the colonial government had required a Committee is evidence of its frustration with the City Council's apparent reluctance to do anything substantive about the state of sanitation in Cape Town.

The Council at the time was dominated by property owners and members of the so-called 'Dirty Party' who had resisted previous calls for sanitary reform fearing rates increases.[11] Pressure for reform came not only from the colonial government, however, but also from medical professionals concerned about high death rates (compared to English towns), and from merchants concerned that inadequate sanitation threatened the growth of the city by discouraging visitors and trade.[10,11(p.53-57),12]

However, in the late 1880s, the balance in the City Council fell to the so-called 'Clean Party', and thus ushered in the beginnings of meaningful sanitary reform. The chief objective of the new Council was to introduce a main drainage

system. In April 1888, the Council sought advice from E. Pritchard, a noted civil engineer from Birmingham, who drafted comprehensive main drainage plans. One Council member, T. Anderson, stated that all options should be considered and that sewage should not be simply 'thrown into our beautiful bay'.[13]

Pritchard published his report, 'Cape Town Sewerage' the following year. Describing the current system of sewage management 'as not only sickening in the extreme, but absolutely injurious to health', he proposed two drainage schemes.[14] The first, an outfall at the mouth of the Salt River had an estimated cost of £120 000, while the second, involving 'broad irrigation', would cost £200 000, with 'higher working expenses'. Due to its lower costs, he recommended the outfall.[14(p.8-10)]

The Council chose the outfall and allocated £85 000 to its construction. Because of the lower budget the outfall had to be located closer to the City near Fort Knokke, Woodstock. Numerous Councillors objected vociferously. Councillor J. Combrinck noting:

> *The health of the inhabitants of Cape Town and the purity of the Bay is the object I have in view; and I look confidently for the support and assistance of every man who has like interests at heart in my endeavour to warn the people of the danger of life which must inevitably follow the wholesale deposit of filth in Table Bay.*[15]

Councillor C. Goodspeed noted with regret that the Council had decided 'to carry out a portion of Mr Pritchard's scheme which has been, by amateurs, derailed'. He argued that the outfall should not be at Salt River, but 'in an entirely different direction, say Mouille Point'.[16]

The Council lost the vote even to raise £85 000, and by the end of 1890 the municipality was no closer to resolving its sanitation crisis.[17] In apparent exasperation, the colonial government intervened and contracted another drainage expert to consider the problem. In May 1891, C. Dunscombe, previously City Engineer of Liverpool, published his 'Report on the Sewerage of the City of Cape Town and the Disposal of its Sewage'.[18]

Dunscombe also proposed two schemes, largely similar to Pritchard's. Scheme One was an outfall at the Salt River Mouth, while Scheme Two was 'broad irrigation in combination … with a small amount of intermittent irrigation' on land outside Cape Town. The only difference between Dunscombe's and Pritchard's schemes was that Dunscombe recommended a second smaller outfall at the 'Green Point Lighthouse' to service Green Point and Sea Point.[19] He estimated that both sea outfalls would cost £119 000, while the broad irrigation scheme would cost £143 000.

Dunscombe concluded:

> *the sewage from the city can be safely and most economically disposed of by means of a free sea outfall as proposed in Scheme One … if purification of the sewage was the first consideration then scheme 2 could only be adopted, notwithstanding its extra cost for works and annual charges.*[19(p25)]

The *Cape Argus* campaigned strongly for Scheme 2, noting:

> *The sea outfall would be the cheaper scheme, but we say that even if we had the only assurance which any scientific man could give us, that in all human probability the Bay would never be polluted, we should prefer to feel that the sewage was conveyed to land … The cost will be but a few thousands more … the sentiment, if you will, against the further pollution of the Bay is so strong that we hope the land scheme will be decided upon.*[20]

Early in August 1891 the Council unanimously agreed to pursue Scheme 2 at a cost of £162 000. The mayor, De Villiers Graaff, said that the scheme would result in 'the preservation of the Bay, the purification of the city, and the lengthening of the lives of the citizens'. The *Cape Times* reported that the decision was met with a 'universal shower of congratulations which continued the whole day through', observing that the mayor believed that an outfall was 'a suicidal policy' which would 'pollute the Bay and poison the people'.[21]

However, 2 years after the Council had approved the scheme, it was discovered that land that had been allocated for it was unsuitable and the 'sewage farm' would have to be located further from the City, thus resulting in increased costs. By September, those costs had risen to £280 000 and Dunscombe informed the mayor that he could no longer recommend the 'sewage farm'.[22]

The City's Public Works and General Purposes Committee wanted Dunscombe to be fired because of inflated costs and implementation delays.[23] At the same time, this Committee ordered a survey of the ocean currents in Table Bay. Dunscombe was released from his contract and a newly appointed City Engineer, W. Olive, was 'as a matter of special urgency' given 'the very difficult problem of the disposal of the sewage of the City'.[24]

Olive produced a new drainage report in 1895, stating that 'the result of my deliberations are distinctly averse to any mode of dealing with the sewage other than by a sea outfall', dismissing any irrigation scheme as 'impracticable on account of great expense'.[25] After reviewing the ocean survey, he chose Green Point because 'the probabilities are highly favourable of the sewage being carried Northward' and because 'rough weather, and the churning action of the waves would aerate or oxygenate the sewage tending to render it innocuous'.[25(p.30-31)] Olive estimated the cost of a 182 m Green Point outfall at £235 000.[26] Funds were duly appropriated, and it was completed in 1905.[27]

There are a number of reasons why £235 000 was allocated in 1895, whereas only £85 000 had been rejected just 5 years earlier. Firstly, and perhaps most importantly, Cape Town experienced a severe economic recession in the late 1880s which dramatically reduced municipal revenue. This recession was, however, followed by an economic boom in the early 1890s which resulted in greatly increased municipal revenues. Municipal revenue in 1890 was £73 611, and in 1894 it totalled £498 963.[11(p.60),12(p.497)] Secondly, the 1890 plan was deeply unpopular because it proposed dumping sewage very close to the City centre at Woodstock, whereas the 1895 plan proposed Green Point which was, in 1895, far away enough to not even be considered part of the City of Cape Town. Lastly, the evidence indicates that by 1895 the point had finally been reached when something substantive had to be done about the state of sanitation in the City. It is clear that, by this time, the majority of City leaders, the media and the public had had enough of the delays and obfuscations of the past.

However, within just 6 years, there were numerous grievances from residents complaining that the outfall was a 'vile nuisance' because of a 'stench' that emanated from it so repugnant that they considered taking legal action.[28] On inspection, the City's Sanitary Superintendent agreed, finding that the 'atmosphere was very obnoxious' and that there was 'a quantity of sewage on the rocks and the lower part of the beach' near the outfall.[29]

The Council responded by spending a mere £150 on three 'ventilation shafts'.[30] However, the shafts made the smells even worse, and in late 1913 residents began subscribing to a legal fund.[31] After some procrastination, the shafts were demolished in 1916 as being useless.[32]There were more complaints 4 years later. These complaints followed a similar pattern, but now featured greater concern with sewage that was appearing on the beaches. So bad had the situation become by 1924 that the Cape Publicity Association contacted the City's Medical Officer of Health (MOH) and demanded that something be done about the 'the contamination of the sea with sewage' which is 'on many occasions visibly loaded with faecal matter'.[33]

In response, the MOH completed a report[34] which found evidence of 'drifting of sewage along the foreshore and the deposition of solid matters on to rocks' from both the Green Point and Sea Point outfalls. He argued that this pollution was 'dangerous' and drew attention to the

'exceptional amount' of enteric fever in Mouille Point and, to a lesser extent, Sea Point. The report included a table (Table 1) and observed:

> *… an examination of the foregoing table shows a striking excess of Enteric Fever in Mouille Point, an incidence rate for the five years amongst residents of the district being more than three times the rate for the whole Municipality and more than four times the rate in Cape Town.*[34]

Table 1: Incidence rate of enteric fever (number per 1000 per year) as per Higgins[34] report

Year	Europeans only		All races	
	East of Lighthouse	South West of Lighthouse	East of Lighthouse	South West of Lighthouse
1919–20	8.5	0.0	7.4	0.0
1920–21	21.4	0.0	18.4	0.0
1921–22	4.3	2.4	3.7	2.0
1922–23	14.9	7.1	14.8	6.1
1923–24	8.5	2.4	12.9	2.0
5-year average	11.5	2.4	11.4	2.0
Population	468	421	542	493

The MOH pointed out that the Green Point outfall received sewage from the Infectious Diseases Hospital located in that area. He believed that this probably accounted for the high incidence of enteric fever, especially to the east of the outfall because 'much more stercus is usually found to the east of the outfall, apparently owing to the circumstances that the surf tends to cast in on to that side.'

He concluded that the 'pollution of the foreshore cannot but be regarded as a possible cause of this prevalence of disease'. As a preliminary measure, he recommended treating sewage at the hospital before its release into the sewerage system, but left longer-term solutions to the City Engineer.[34]

The City Engineer, L. Davies, recommended that sewage from the hospital be chlorinated; by December 1925 it was, but complaints did not cease.[35] Two years later, a further MOH report noted that between March 1926 and March 1927 there had been five cases of enteric fever to the east of the outfall (equivalent to an incidence of 9.2 per 1000). It stated:

> *… the danger of enteric fever being caused by the sewage pollution of the foreshore and bathing places would exist even if a hospital for the treatment of typhoid patients did not drain into the sewer, and the chlorination of the hospital sewage will not remove that danger.*[36]

Upon inspecting the sea and foreshore, the MOH found a 'considerable quantity of solid excremental matter and other floating sewage matter' and appealed to the Council to act. On this occasion, the MOH felt compelled to make a forthright recommendation, arguing that the 'surest' way to solve the problem would be to cease discharging sewage into the ocean, or failing that, to treat the sewage before its release.[36]

Nearly 3 years after the MOH's first report, the City finally took action, asking Davies to recommend solutions. In June 1927, his report gave four options[35]:

1. To abandon the outfall, except for stormwater overflow purposes, and to pump the sewage to the Southern Suburbs Sewage Farm on the Cape Flats.
2. To purify the sewage by means of tanks and filters or an activated sludge plant before discharge into the sea through the existing outfall.
3. To sterilise the sewage by chlorination before discharge into the sea through the existing outfall.
4. To extend the outfall sewer and discharge the sewage deeper into the water.

The first option would cost too much: £500 000. The second was dismissed because 'capital costs and annual working expenses would be too high', and the Green Point area was 'not suitable for works of this kind'. Option three was rejected because chlorination had, in his opinion, yet to demonstrate that it eliminated disease-producing bacteria.

Davies's recommendation was to extend the outfall because it was already in a 'favourable position' and if 'extended into deeper water I am of the opinion that there will be very little risk of pollution of the Foreshore'. He recommended closing the Sea Point outfall and redirecting it to Green Point. He offered four different options for extending the pipeline. One option was an extension of either 152 m (£40 000) or 275 m (£53 000) of cast iron pipes on the sea bed, or extensions over the same distances but placed on top of a concrete mole for £71 811 or £117 453, respectively. He suggested the concrete mole because it 'will possess a comparatively long life'.[37]

In 1928, the Council opted for the 152 m concrete mole. However, it was then discovered that the breakwater at the harbour was to be extended by 460 m. This precipitated another report from Davies because 'the Breakwater Extension will have some effect upon the drifts around Green Point'. Davies then recommended an extension of an additional 550 m, giving a total length of 730 m. A mole would no longer be required, but 'non-corrosive nickel-chrome steel' pipes would be attached to the ocean floor and a pumping station would be installed.[38]

The Council reacted also to petitions from residents. One, in late 1927 and signed by 203 residents of Mouille Point and Sea Point, was concerned that since the outfall's construction in 1905 'numerous complaints have been made by the residents to the Council but no steps have been taken to abate the nuisance'. The signatories demanded 'immediate steps to abate and put an end to this nuisance'.[39] Legal action was threatened by J. Yolland, a Mouille Point resident.[40]

The following year the MOH informed the Council that enteric fever at Mouille Point continued to be 'considerably in excess of the rest of the Municipality'.[41] The threatened legal action then came about and the matter was heard by the Cape Supreme Court in March 1929 where Yolland sought interim relief via an interdict to immediately close the outfall. The judge refused to grant an interdict because there was no ready alternative for the disposal of sewage, but he stated that had there been an alternative, it would have been granted. The judge recommended that Yolland seek permanent relief in the High Court and he warned the Council:

> *It seems to me upon these affidavits the applicant has made a stronger case – I think a very much stronger case – than the respondent, and in going to action the respondent Council will very seriously have to consider what the result of that action may be, and they also have to consider their public responsibility in this matter.*[42]

Fearing further legal action (and expense) the mayor pushed for a private settlement with Yolland.[43] In October a secret agreement was signed with Yolland who committed to 'assist the Council in discouraging any other claims so founded in view of the scheme of extension so about to be undertaken' and, in exchange, the Council covered his legal fees and paid £800 in 'damages'.[44]

The city began to take action and there were tenders for the outfall extension to 640 m (not the planned 730 m), because of a 'boulder field'. Two 46-cm 'Gargantua Disintegrators' would be installed as an 'additional safeguard'.[45,46] By July 1931, the new pipes, pumps and disintegrators were in place.[47]

In August 1932, the MOH observed only one case of enteric fever in Mouille Point during the previous year and noted 'this is interesting in view of the fact that throughout the year the new outfall has taken the place of the old'.[48] Clearly the new system was abating the health hazards.

It was only some 25 years later that the Council began receiving complaints again from residents of Mouille Point about sewage on the beaches and in the sea. The City's Principal Chemist found that sewage was leaking 'at about 50 and 100 feet [15 m and 30 m] from the shore' causing 'considerable pollution of the beach'.[49] It is apparent from the archival records that the pipes installed in 1931 had, not surprisingly, reached the end of their useful lives by then. There are records of numerous reports of leaks from the pipeline and associated pollution, so much so that in 1962 the City's Engineer's Department recommended renewing and extending the outfall.[50] Four years later, when nothing had been done, the new City Engineer, S. Morris, reported that the corroded pipeline would need replacement within five years.[51]

Aerial photographs also revealed a 'most unsatisfactory state of affairs' with evidence of a 'sewage bloom' following the shoreline which 'completely envelops Granger Bay'.[52] He told the Council's Works and Planning Committee that:

> *... unless the effluent is discharged under such conditions as are acceptable under the Water Act the Committee may even be faced with an interdict to cease discharge into the sea; this, your Committee may recollect, was precisely what led to the construction of the present outfall.*[52]

He asked that a 'complete oceanographic investigation' be undertaken[52], and this survey, completed in 1970, recommended the outfall be tripled in length to 1800 m[53].

Despite this information, a decade passed before 'Finnish consultants' drew up a new design for the outfall.[54] The City may have been prompted into action because pressure came also from the national Department of Water Affairs which, in early 1981, warned the Council that

> *... levels of copper, iron and zinc emanating from the Green Point sewer discharge are well in excess of acceptable limits and consequently pose a serious pollution hazard ... the construction of a proper pipeline should proceed with the utmost urgency.*[55]

A few months later, the City Engineer said that a new pipe design had been approved, and would cost R6.1 million.[56] The City Council contracted the Council for Scientific and Industrial Research's (CSIR), National Institute for Water Research (NIWR) to assess two other options: the diverting of sewage to the treatment plant on the Cape Flats, or constructing a sewage purification plant in Green Point. The NIWR rejected both these options because pumping sewage to the Cape Flats was 'completely uneconomical' while treatment was rejected because it would 'absorb large areas of the sports fields at Green Point'. Instead, the NIWR favoured merely extending the outfall to 2700 m on the condition that 3-mm macerators were installed.[57]

Construction began in 1985 and was completed the following year. The new City Engineer, J. Brand, reported that R13.3 million had been spent on a high-density flexible polyethylene pipeline, predicting that this would 'render a nuisance-free utility for at least 50 years'.[58]

However, in August 1989, Brand informed the Council that that the pipeline had 'moved' after a storm.[59] In fact, the pipeline was so badly damaged that it had to be severed 280 m from the shoreline. This immediately resulted in extensive sewage pollution from Green Point to Granger Bay, forcing the shoreline to be closed to the public. Remarkably, however, Brand noted that 'surf faecal coliform counts' in the closed area were at 'levels roughly similar to those existing prior to the commissioning of the new outfall sewer at the beginning of 1986'.[60] Quite why closure was deemed necessary in 1989 but not in 1986 is unclear.

The public reacted angrily to the severing of the pipeline and resisted its repair or replacement, demanding that a solution be found that did not result in the dumping of untreated sewage into the sea.[61] Reflecting this public mood, the *Cape Times* reported:

> *The City Council's befouled chickens have come home to roost. In this day and age it should simply not be pumping raw sewage into the sea ... How much longer must Capetonians put up with the Council's casual attitude towards the pollution?*[62]

The Council thus commissioned new research on sewage disposal, budgeting R400 000 for the CSIR to investigate sea disposal, and R100 000 for the engineering consultants Ninham Shand to investigate land disposal.[63] The *Cape Times* questioned how seriously the Council was considering other options, observing that the chair of the Utilities and Works Committee had already publicly stated that the sea outfall was 'the most economically viable alternative'. The newspaper noted:

> *That's what they said before building the one that has just disintegrated. Will the Council ever learn? It has already wasted R13.5 million ... the estimated cost of the new pipeline is R20 million ... Persisting in the belief that the sea is the 'cheapest' alternative for the disposal of sewage is a short-sighted economy.*[64]

Councillors, when presented with research results from the CSIR and Ninham Shand in May 1990, expressed their concern that 'there was an element of bias, in favour of the marine option[65], while the City Engineer warned a public meeting that the outfall would mean a 2.2% increase in property rates, compared to 4.6% for land treatment[66]. It was clear that increasing rates was a concern.

To deflect accusations of bias, the Council contracted other engineering and environmental consultants, Kapp Prestedge Retief, to review the research findings and it also found in favour of the marine outfall on the basis of cost and because it believed that a fully functioning 1700-m outfall posed no danger to human or ocean health. It rejected Ninham Shand's option of a treatment plant at Green Point on the basis that the area was unsuitable for it. Kapp Prestedge Retief averred that the only alternative was land treatment at Paarden Island, at an estimated cost of R68 million. This cost was contrasted with reconstructing the outfall at R30 million:

> *Well-designed marine outfalls have long been considered as an efficient method of reducing sewage through dilution to levels of concentration equal to normal background levels found in the sea. Such systems have low capital and operating costs and involve virtually no terrestrial impacts such as odour or demand on space.*[67]

In August 1990, the Council budgeted the required R30 million for the new outfall, which was completed in 1993 and this is the outfall that currently pumps 40 million litres of untreated sewage into the ocean every day.

This account of the long history of the Green Point outfall reveals the Council's consistent approach to the disposal of sewage over many decades. At no point since its completion in 1905, has the Council seriously considered an alternative approach. The engagement with alternatives that has taken place, has been largely performative, more aimed at shaping public opinion in favour of the outfall, than in asking fundamental questions about how the City might be innovative in disposing of its sewage.

There is little doubt that technological lock-in has featured from the original decision to build the outfall in 1895. As sunk costs in the outfall, the pipe and the pumping station accumulated, it became increasingly difficult to abandon it in favour of alternatives. This situation has been exacerbated by the ever-increasing scarcity and high price of suitable land necessary for potentials like 'sewage farms'. And every time the Council took a decision to invest in renewing the outfall, it became less likely that an alternative scheme would ever be implemented.

This lock-in partly accounts for the Council's decisions always to choose the outfall as the 'cheapest' option. This bureaucratic decision-making is a by-product of the requirements of the political cycle which creates a perverse incentive to minimise costs in the shorter term, often at the expense of increased costs in the future.

The Council has also defended its unwillingness to spend more on alternatives by denying that the outfall is a problem, thus implying that alternatives – particularly on the grounds of public health – are unnecessary. This pattern of denial can be traced back to 1888 when the mayor told the Select Committee investigating the sanitary state of the City that 'matters are not as bad' as the medical evidence had suggested.[10]

The Council had blamed odours emanating from the outfall in the 1910s on putrefying seaweed, until multiple complaints came from lighthouse keepers at Mouille Point. Only then did the Council take action.[68,69] It is revealing that during the period this problem was being publicly denied, the City Engineer was privately writing to his fellow engineers in Durban and Port Elizabeth asking them how they abated their sewage smells.[70]

The situation was unchanged by the 1920s when the MOH reported on the high number of enteric fever cases and drew attention to the sewage regularly seen on the shore as a cause. City Engineer Davies stated then that accounts of visible sewage were 'exaggerated' and its link to enteric fever unproven. However, he also noted that teams of labourers were employed daily to collect stercus in buckets from the very same shore.[71]

This same narrative was to play out again in 1990 when the City Engineer stated, just before another R30 million was to be spent on the outfall:

> *Having taken all matters into account I conclude that a long marine outfall concept for the disposal of sewage has proved to be successful at Green Point for many years. There is no accumulation of pollutants and dispersal is totally effective with a consequent minimal health risk.*[72]

Another feature of this narrative has been ongoing opposition to the outfall not only from residents, but also from sanitation, engineering, and health professionals. Some of these include condemnation from Cape Town's Water Engineer, who argued even before the outfall was constructed that disposing sewage into the sea, while cheap, led to the contamination of 'sea life' and threatened 'public health'.[73]

But almost at the start of this saga, in 1911, A. Snape, then Professor of Civil Engineering at the South African College (later to become the University of Cape Town), believed that it was a 'pity that the whole scheme was not designed for the sewage to go to the Flats'. He thought that if there really was no alternative to sea disposal, there should be 'some form of tank operation for dealing with the raw sewage before it was discharged into the sea'.[27(p.76-77)]

In 1933, writing in *Minutes of the Proceedings of the South African Society of Civil Engineers*, E. Croghan, Cape Town resident and noted analytical chemist and expert on sanitation and sewage disposal, observed that the time had come to chlorinate all sewage entering the sea to protect bathers and those who collected shellfish. He specifically drew attention to Melbourne in Australia, which had a population four times the size of Cape Town but did not drain its sewage into the sea.[74]

A few years later, H. Wilson, the biochemist for Johannesburg, lamented the disposal of raw sewage into the sea, suggesting that towns go through a number of phases before they realise that it is not viable. Wilson contended that it was a shame that 'the same mistakes were going on in South Africa as have already been made in other parts of the world'.[75] In 1961, O. Coetzee, senior bacteriologist of the CSIR's NWIR, writing in the *South African Medical Journal*, observed the 'almost irresistible temptation of seaside municipalities' to dispose of sewage into the sea, despite it being 'bacteriologically objectionable'.[76]

A further feature of the Council's approach to sewage disposal has been that no matter how 'objectionable' sewage might be as a characteristic of urbanisation, disposing of it in the sea appeared to solve the problem by making sewage disappear. Throughout the history of the Green Point outfall, the Council has trusted in the ability of the sea to sanitise sewage. But there was a dilemma, as expressed by Olive in 1895, that while the outfall 'would cause no nuisance', at the same time, 'it is pretty generally accepted that raw sewage cannot be disposed of anywhere without risk of nuisance … it is certain that at some future time it will make its presence felt'.[77]

The very act of always extending the outfall reveals the same dissonance. It is reassuring because it distances citizens yet further from the sewage by disposing of it further out to sea. However, the constant need to extend the outfall because sewage still finds its way to the shore, reveals how futile is the very act of extension. The time has come for the Council to think differently about sewage and the sea. The multiple entanglements of the human, the natural, and the technical need to be acknowledged and faced beyond the binaries of technologists, or the parsimony of the City's financial managers and ratepayers. There is also the recognition today that untreated chemical and pharmacological pollutants produce environmental 'slow violence' as they persist in the ocean and make their way into marine life, and eventually back into humans.[78] Only by facing these manifestations of the Anthropocene with openness and a receptivity to new challenges and ways of overcoming them, will the Council meet its Constitutional commitments to maintain a healthy environment for all living species.

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Competing interests

I declare that there are no competing interests.

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