11 HONOURING CAPE TOWN'S CENTENARIAN: THE ANCESTRY OF STEENBRAS DAM

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ABSTRACT

Just before World War I, all the municipalities in the Cape Peninsula area amalgamated, a process motivated entirely by the need for services reform, with water services the most compelling of all. The ability of the reservoirs on Table Mountain to supply was limited, and those limits had been reached. Parts of the urban area were dependent on mountain streams, boreholes and springs which could not be exploited further. Some municipalities had purchased land in mountain catchments distant from the urban area, but, unless they joined forces, none possessed the resources to embark on development of any of these.

The unified municipality of Cape Town inherited the water problems of each component municipality. Construction work on Steenbras Dam, the first big water scheme, began at the end of 1917 – none too soon, because, before it was completed, water rationing had to be imposed.

INTRODUCTION

The process to unify the eleven municipalities of the Cape Peninsula – a process which ran from the end of the Second South African War[1] (1899-1902) until the outbreak of World War I (1914) – was motivated almost entirely by the need for services reform. The argument was advanced that only in unification was there hope that the backlog of and innovation required for major services could be addressed. The need to ensure adequate water supply was by far the single most compelling reason.

These eleven Cape Peninsula municipalities had during the course of the 19th century grown around a series of nodes, generally at the most significant intersections between the suburban railway line and the road system of the time. Some of these small urban areas were still physically separate from one another, but the likelihood was that they would soon form one contiguous urban area. This clearly had important implications for service provision, not least in that the "open land" outside the urban area into which waste products were invariably dumped would soon find itself adjacent to the growing residential area of the adjacent municipality. Furthermore, levels of service varied widely within municipalities and between municipalities, a situation which not only led to complaints from ratepayers, comparing themselves with the Jones family in the nextdoor municipality and all too ready to criticise their own municipality, but was also inequitable.

Particularly in respect of providing water and waterborne sewerage, it was apparent that substantial economies of scale were there for the taking, and that the smaller urban areas could not afford to improve their services unless they participated in joint ventures.

This paper illustrates that:

- Governmental institutions for service delivery can, depending on the circumstances, benefit by cooperation with other institutions. Indeed, at times, cooperation can be the most rational – or even the only feasible – way forward.
- Major institutional change is generally not brought about by engineers, but engineers provide much of the factual information to motivate change.
- Once the institutional change is made, it is largely up to the engineers to plan and implement infrastructure delivery for the service improvement which has been promised by the politicians.

THE PRE-HISTORY

Ordinance No 1 of 1840 of the Cape Colony determined the revenue-raising powers of municipalities, and established the first municipality in the colony, namely Cape Town. Revenue could from then on be raised through a rate on immovable property, thus laying the foundation of the municipal rating system. In later, evolving, legislation, particularly in 1882, the Cape Parliament granted further powers to municipalities, including control of, inter alia, water supplies, slaughtering, washhouses and sewage disposal.

In 1883 the then existing Village Management Boards of Mowbray, Rondebosch, Claremont and Wynberg combined under the title of the Liesbeek Municipality. In 1886, however, Wynberg seceded, and Claremont shortly after followed its example. In 1890 Mowbray and Rondebosch also parted company. (City of Cape Town 1985, page 21.) It would appear that secessions of this type were usually caused by factors which must have been relatively parochial, bearing in mind that the populations of some of the municipalities were extremely small, e.g. that of Rondebosch was less than 5 000.

Thus at the turn of the century there were no less than eleven local authorities in the Cape Peninsula. They were the municipalities of Cape Town, Green Point and Sea Point, Maitland, Woodstock, Mowbray, Rondebosch, Claremont, Wynberg, Kalk Bay (which included Muizenberg), and Simon's Town, and the Cape Rural Council.

Towards the end of the 1899-1902 War, Cape Town requested the Cape Colonial Government to investigate the future water supply for the Cape Peninsula. The Government appointed "The Cape Peninsula Commission" to assess all aspects of local government in the Peninsula – not just water supply, but also drainage, sewerage, roads, solid waste disposal and electricity supply. After more than a year of work, the Commission's majority report recommended one municipality from Sea Point to Wynberg, inclusive. (Cape Colony, 1902; Van Heyningen, 1981, pages 5-8; Van Heyningen, 2015)

The report met with a generally negative reception. Most of the municipalities expressed the wish to remain independent. Cape Town wanted to be constituted as a kind of water board for the Peninsula. Mowbray, Rondebosch and Claremont had no great objection to amalgamation, but preferred an independent board of works to carry out water and sewerage schemes.

The report was not implemented, and there matters rested for a number of years.

WATER AND SANITATION ADVANCES 1903 TO 1913

But not entirely "rested" – not in respect of water supply, anyway. In the 10 years from 1903[2] through 1913, in a process at times reminiscent of "two steps forward, one back", recognition grew of the unprecedented scope of the work that needed to be done. Indeed, efforts were made to plan for new engineering works, but not much could be realised without the resources and the political will to carry the plans through.

Despite construction of five reservoirs on Table Mountain between 1890 (commencement of work on Woodhead Reservoir, for the Cape Town Corporation (Hodson, 1981; Singels, 2015a) and 1907 (completion of De Villiers Reservoir, for Wynberg Municipality), the need for increased supplies

1 Also known as the Second Anglo-Boer War.

2 Incidentally, the year of foundation of the Cape Society of Civil Engineers – which in later decades developed into the South African Institution of Civil Engineering (SAICE).

of water remained of first importance among municipal services matters.

Water consumption rocketed over the period that these five reservoirs were built. To a substantial but temporary extent this was due to the influx of people (British troops, Boer prisoners) during the War of 1899-1902. More significant were the steadily growing population[3] and, thanks to more households being linked to waterborne sanitation (which in many instances also meant that for the first time they had water piped to their house), greatly increased average consumption per capita. "Rich and poor alike were beginning to enjoy the cheap luxury of pure, readily available -- and increasingly easy to heat -- running water. …. Water supply thus became a priority, [but] … the supplies began to run out almost as quickly as they were made available ". (Murray, 2001, page 20)

Thomas Stewart ("Consulting Waterworks Engineer")[4] reported in 1901 that the only reservoirs then available to Cape Town, those on Table Mountain, could provide 3 million gallons per day at most. Cape Town was soon in trouble, as in 1905 it was discovered that the daily water consumption had risen to between 2,3 and 3 million gallons per day.

The Cape Peninsula Commission considered the problem, and its findings were startling. It recommended that no large additional works should be constructed on Table Mountain. Instead the Peninsula authorities should amalgamate, and embark on a scheme giving at least 10 million gallons per day, for which it would be necessary to go a distance of up to 80 or so kilometres from Cape Town, to a site somewhere in the mountains visible across the Cape Flats. "Such a supply would … cost … about £1 500 000." (Parker, 1911, page18.)

"From 1904 onwards, Cape Town was on short supply during the summer months; the water being stopped off for as long as 15 hours per day. To conserve water, salt water was used for street watering and during 1908 a system of metering was introduced in order to prevent waste." (Cape Town, 1962, page 5.) Wynberg, thanks to its dams on Table Mountain, was somewhat better off, but the other municipalities depended on streams such as the Liesbeek and on wells and springs such as the Albion Spring in Rondebosch (still (2017) being tapped) and the nearby springs owned by Ohlsson's Brewery. (Cape Town, 1986)

During 1904, John Cook (City Engineer of Cape Town), Robert Menmuir (Town Engineer of Woodstock) and R H Charters submitted a report on various water supply schemes, amongst which were: the mountains above Muizenberg;, Twenty-four Rivers (Tulbagh is the closest sizeable town); Steenbras (in the mountains above Gordon's Bay); Palmiet (to the east of Sir Lowry's Pass); Zachariashoek, Oliphantshoek, Wemmershoek (all in the mountains north-west of Franschhoek); and Berg River Hoek (in the vicinity of the Skuifraam Dam built a decade ago). (Cape Town, 1962, page 5). Cape Town expressed preference for the Berg River Hoek scheme, and proceeded to buy the land needed. Then, with the support of Claremont, Mowbray, Rondebosch and Woodstock, it introduced a bill into Parliament. However pressure of parliamentary work led to its postponement to the next session, by which time the smaller municipalities had changed their minds.

As noted earlier, the demand for waterborne sanitation was rising fast. The differences in service levels between municipalities were stark. This is illustrated by the account which follows.

Whereas as early as 1902 the Cape Peninsula Commission was able to report that "nearly all" of the houses in Cape Town Municipality were connected to a waterborne sewerage system, "..... this experience was not matched in the southern suburbs. While by 1915, the suburbs of Woodstock, Maitland, Mowbray, Rondebosch and Claremont were served with a more stable water supply from the Newlands Storage Reservoir, with respect to sewerage [sic] removal, little had changed since 1895. Thus the districts of Woodstock, Maitland, Mowbray, Rondebosch and Claremont continued to be served via a pail system - the stercus being removed on a weekly basis. In Woodstock and Maitland moreover, there being no system of surface drainage, slop water was allowed to pass into the street gutter or on to adjacent land, and ultimately to find its way into neighbouring streams …. It was a most unsatisfactory situation." (Buirski, 1983, p132)

Also, a waterborne scheme was designed by Stewart for Wynberg in 1898. "This consisted of septic tanks, percolating filters and land treatment. The final effluent found its way into Princess Vlei which overflowed to discharge into the sea in False Bay. However, due to the Anglo-Boer War, construction of the scheme only started in 1902 and sewage arrived at the works only in January 1905." (Murray, 1987, page 24)

RE-AWAKENING OF INTEREST

In 1910 the four colonies (Cape Province, Orange Free State, Natal and Transvaal) came together to form the South Africa within the boundaries we know today. This unification had substantial delivery implications, not least in that it led to the unification of the four separate colonial railway systems. (Wall, 2010)

It would seem with hindsight that in the Cape Peninsula this process of unification at national level was perceived to have important parallels, because in the same year there was a significant reawakening of interest in metropolitan unification. This sentiment was undoubtedly reinforced by a realisation on the part of many influential citizens that the long-term interests of efficiency and economy in the provision of municipal services for the Peninsula lay in the unified provision of these services. Indeed, it was realised that in respect of certain services, especially water and sanitation, unification was the only way forward.

In 1910 the advocates for unification formed a "Peninsula Municipal Union Society". Its chairman, Cape Town Councillor John Parker, asked if the following description fitted the area between Sea Point and Diep River. "A group of eight Municipalities, each widely contiguous with, or closely wedged in between its Municipal neighbours, permanently hampered and embarrassed alike by the want of space for the requirements of its position, unable to carry out independently any scheme for water supply, drainage, or sewerage. Indeed, the whole conditions of these eight Municipalities are neither favourable to their progress, nor in the best interests of their ratepayers." (Parker, 1911, page 13.)

"There is no more urgent work required in the Peninsula today than the sewerage of these suburban municipalities. ... [There] should be one sewerage scheme for the five municipalities concerned. No doubt a joint scheme could be carried out even if the municipalities do not unite. But that means the creation of a Drainage Board, another local authority in a district already congested with local authorities. On this question there is only one satisfactory way out, and that is for these five municipalities to unite as one, even if no greater amalgamation is possible." (Ibid, pages 23-24.)

It was perceived that, whereas water supply and sanitation would greatly be facilitated by unification, there would also be significant advantages in the metropolitan planning and supply of street lighting, stormwater drainage, fire protection and public transport, among others.

"Cape Town was the only municipality in the Peninsula that could hope to find the large sums for future capital works which now were an urgent necessity owing to the growth of population, the development of industry and the advent of mechanical transport. The coming of the motor-car and,

3 The 1904 census counted 170 000 of all races in the Peninsula. 78 000 of these were resident within the boundaries of the Municipality of Cape Town

4 Scots-born civil engineer (1857-1942), "the father of consulting engineering in South Africa". https://en.wikipedia.org/wiki/Thomas_Stewart_(civil_engineer)

later, of buses and lorries demanded better road surfaces. ….. The smaller municipalities faced these prospects with dismay, as urban road-building and pavements implied substantial expenditure on stormwater drainage and they just did not have the financial resources to cope with demands of this nature to say nothing of the growing necessity for water-borne sewerage and child welfare clinics ….. Slum clearance and better housing for the poorer sections of the community were problems that also had to be faced." (Slinger, 1968, pages 26-28)

Dr Beck, a medical practitioner and councillor of Claremont Municipality, supported Parker as follows: "If there is one aspect that far outweighs any other aspect of Peninsula Union it is that of public health, which, to my mind, is the most important, and so much so that I regard it as imperative for the benefit of the community that we unify as early as possible." He emphasised: "There is not the slightest doubt that the health work of the community will be very much better done if administered from one centre, with uniform regulations." (Beck, 1910, pages 10-14.)

Finally, Parker and Beck pointed out that a larger municipality would have the financial resources to be able to attract the better qualified personnel able to cope with the fast-increasing more complex engineering and public health challenges.

UNIFICATION COMES

These arguments drew considerable support. In 1912 a "Municipal Union Conference" of delegates from all the municipalities was held, except that Wynberg declined to take part in any way, even to the extent of refusing to furnish data. (Municipal Union Conference, 1912, page 6.)

Following a detailed analysis, including a projection of population increase and of water consumption, the Conference reached the conclusion that the necessary augmentation of water supply "… will be more efficiently and economically carried out by a Unified Municipality than under the existing conditions. In the period which must elapse before implementation of the water supply can be completed, the present water supplies can be utilized more beneficially and economically for the good of the community under Unification." (Ibid, pages 24 and 28.) Also, "Under unification most of the difficulties in the way of carrying out a sewerage scheme would disappear, the necessary money would be raised on better terms, and the reproach of the absence of sewerage in many of the best parts of the Peninsula would be speedily removed. A more complete system of stormwater drainage could be more economically carried out by one authority over the unified area, and this would result in a certain saving in road maintenance." (Ibid, pages 19-20.)

The majority report of the Conference concluded that "the necessity for unification is generally admitted." (Ibid, page 65.)

A cartoon which appeared in the Press in 1912 showing the then Mayor of Cape Town, COUNCILLOR SIR FREDERICK SMITH, *musically espousing the cause of unification to the smaller municipalities*

FIGURE 1: Wynberg, in the background at left, walks away from the unification umbrella

ORDINANCE

The Ordinance to provide for the combination and better government of Municipalities in the Cape Peninsula was promulgated on 28 July 1913 and came into operation 8 September 1913. Not only were the eight municipalities of Cape Town, Green Point and Sea Point, Maitland, Woodstock, Mowbray, Rondebosch, Claremont and Kalk Bay combined, but additional areas were also taken over. These latter consisted principally of "West London" (today's Athlone), the area around Retreat, Steenberg and Zandvlei, and Camps Bay which was then in the hands of a private developer. Furthermore, the Ordinance expressly provided for taking over all assets of the Suburban Municipal Waterworks utility[5]. (Province, 1913.) Appropriately, John Parker was elected the first Mayor of the unified City. (Pryce-Lewis, 1985, page 45)

For a period of not more than twenty years from 1913, a differential rating system was to be followed in that the capital expenditure on the improvement of sewerage and stormwater drainage on each of the areas named below was to be recovered by way of rates levied exclusively on these areas:

- Sea Point and Green Point;
- Cape Town and Kalk Bay;
- Woodstock, Maitland, Mowbray, Rondebosch and Claremont. (Province, 1913, Section 18.)

IMPLEMENTATION

The unified City Council of Cape Town set to work to address the problems which it had inherited from the municipalities.

"This amalgamation ... was a situation which required the utmost efficiency and tact. Most of the credit for its accomplishment goes to Mr D E Lloyd-Davies[6], who succeeded Mr W J Jeffries [as City Engineer] in September 1914[7]. He brought about the streamlining of the hitherto separate departments with the minimum of fuss and without disruption of the essential services they provided." (Shorten, 1963, page 338)

Water supply received priority attention.

"Prior to 1913 the old independent municipalities of Mowbray and Rondebosch had already purchased options on farms in the Steenbras Valley some 70 km from Cape Town with a view to obtaining water. After unification ..... these facilities became available to the city as a whole. In 1915

5 Woodstock, Mowbray, Rondebosch and Claremont had formed this utility in 1898, having taken over the Cape Town and District Waterworks Company established in 1888 by the brewer Anders Ohlsson.

6 The author's career started so long ago that, in the days before computers made stormwater calculations so much easier, he remembers using the Lloyd-Davies Rational Method of calculating stormwater volume, developed by Lloyd-Davies when he worked for the City of Birmingham prior to his arrival in South Africa!

7 He remained as City Engineer until 1931. (For more on Lloyd-Davies (1875-1932), see Murray 2001.)

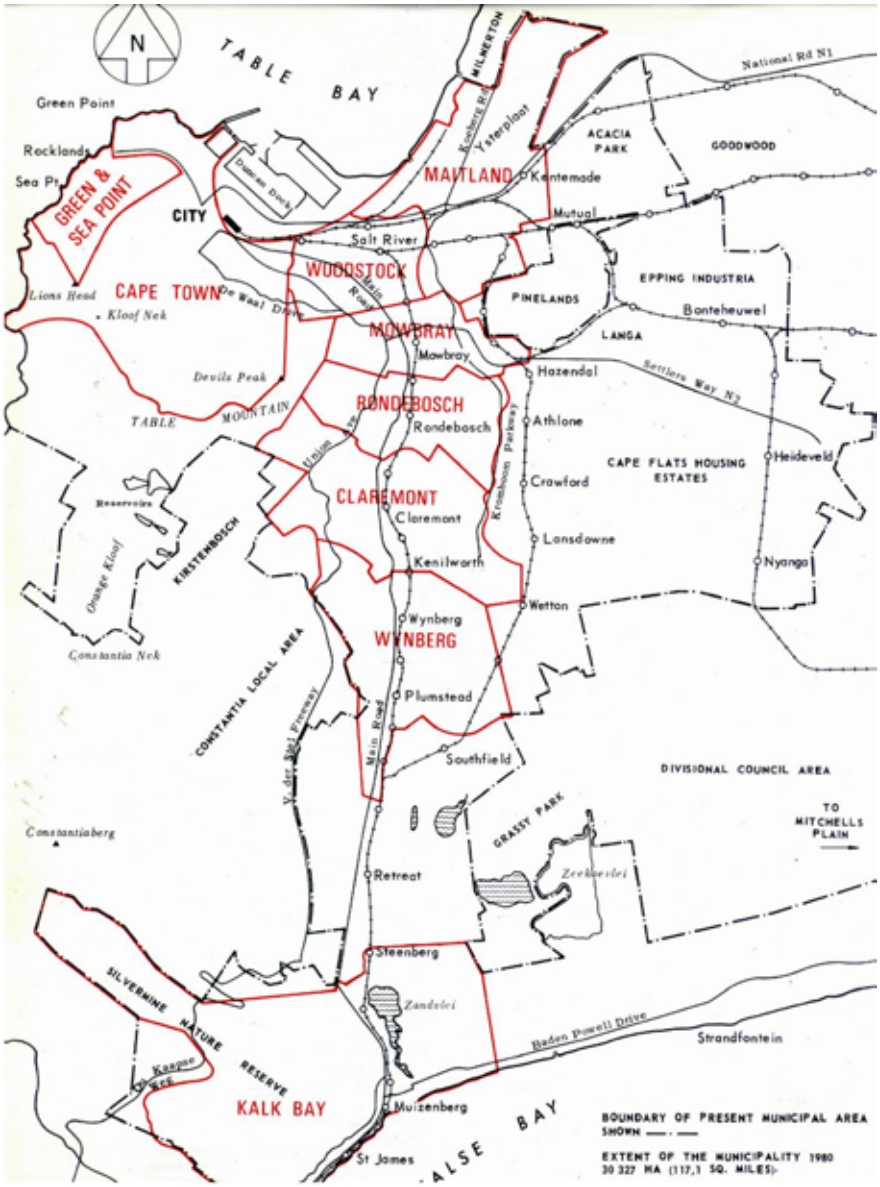

FIGURE 2: Cape Town municipal boundaries, (in red) pre-1913, and (chain-dashed line) post-unification. (City of Cape Town)

the Board of Engineers, consisting of Messrs D E Lloyd-Davies, City Engineer, W A Tait[8] and Thomas Stewart, decided it would be expedient to go outside the Peninsula for adequate water supplies. After investigating both the Wemmershoek Valley on the Berg River and the Steenbras Valley, they recommended in December 1916 that Steenbras should be developed as a water supply for the City." (Robertson, 1976, page 139).

There was considerable discussion in Council as to whether a dam should be built which would suffice for just a few years, to be followed within a decade by a larger dam on the same site for the longer term, or if the larger dam should be commenced immediately. Because of the water shortages already being experienced by the municipality, time of completion was paramount, and thus the decision was taken to build the smaller dam. An additional factor in favour of "smaller dam now, bigger dam later" was the dislocation caused by the World War – dislocation particularly in terms of materials, bearing in mind that most of the equipment would have to be procured from factories overseas whose priorities at the time lay with the needs of battlefields far from the peaceful Cape.

It was decided that a scheme delivering 5.1 million gallons/day[9] would satisfy the increase in demand for the next few years. This would require a storage capacity of about 600 million gallons[10]. "An execution period of 3 years was set. The scheme would consist of a storage dam, a short 800 m tunnel through the Hottentots-Holland Mountain and a 750 mm cast iron pipeline to the existing Molteno Reservoir in Cape Town." To allow for the envisaged second dam, the initial dam was to be constructed "…. slightly higher up the neck than originally selected – leaving the most favourable position free for a future larger wall." (Singels 2015b, pages 1-2)

Contracts were let on 15 December 1917 – just a few weeks removed from exactly 100 years before IMESA 2017 conference. "Mr Arthur L. Reed was awarded the tender for the Masonry Dam for a sum of £ 49 750, with a completion date of 13th Dec. 1919. Messrs G.W. Smith Bros. were awarded the tunnel tender for £ 14 724, with a completion date of 13th July 1919. The City's department would be responsible for the pipeline construction using direct labour. Due to the difficult conditions surrounding World War I and the Influenza epidemic in 1918, both the contractors had made limited progress by mid-1919 and the Council decided by September 1919 to proceed with the construction work departmentally. The contracts were cancelled and settlements were negotiated. At this stage only two-thirds of the dam excavations had been done, but after the take over the dam was completed by April 1921[11] i.e. in another 19 months." (Singels 2015b, pages 2-3)

This was none too soon, because more severe rationing had of necessity been imposed – during the summer of 1919-1920, supply was limited to 4 hours per day. (Murray 2001)

"The project as a whole was severely hampered by numerous problems. The depressed conditions after the War, a large labour strike early 1920, prohibition of cast iron exports from the United Kingdom from Aug 1918 to Jan 1919 and a constant dearth of construction materials (cement from the United Kingdom) made the delivery of water to Cape Town in January 1921 all the more remarkable. Relief from water restrictions was at hand, at least for a limited period." (Singels 2015b, page 3)

One of the requirements of the Unification Ordinance of 1913 was that "... it shall be the duty of the Council with all possible expedition ... to proceed with a sewerage scheme for the municipalities of Woodstock, Maitland, Mowbray, Rondebosch and Claremont." (Province, 1913) On the table at the time was a proposal for a sea outfall near the mouth of the Salt River.

8 A "water supply expert from Glasgow". (Murray 2001)

9 23 Megalitres/day.

10 2.73x106 m^3.

11 The departmental unit was led by Walter Stanley Lunn, who would hold office as City Engineer from 1935 until 1949. (Murray 2001)

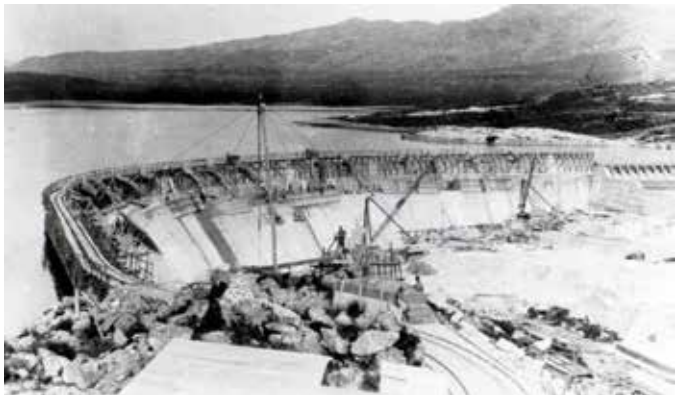

FIGURE 3: Raising Steenbras Dam, 1926 (City of Cape Town)

In his 1915 report to the City Council on the main drainage of the eastern part of the city centre, Maitland, Woodstock and the southern suburbs, Lloyd-Davies rejected this in favour of a land-based works, although with the rider that the western part of the city centre and Green Point and Sea Point be served by an extension[12] of the Green Point outfall which had been built in 1895.

"The central feature of Mr Lloyd-Davies's scheme recommended the construction of the original Athlone sewage treatment plant and the laying of some one hundred and fifty miles of sewers in order to meet the requirements of the suburbs relative to the terms of the Unification Ordinance itself. Work on the Athlone project began in 1921 and its cost, together with that of the sewers, amounted to some £850 000." (Shorten, 1963, pp341-342.)

While these water and drainage matters were understandably the most pressing preoccupations of the new metropolitan-wide government, road improvement, public housing and environmental matters were three others which needed urgent attention. To illustrate:

The predominantly slow-moving horse-drawn traffic compacted the small stones of the waterbound macadam which constituted almost all major road surfacing in 1913. With their faster speeds and rubber tyres, motorised transport[13] kicked these stones out of place, gradually eroding the road surface. For this and other reasons, a programme to tar major roads, starting with Cape Town city centre streets, had begun only a few years before, and had not progressed very far.

The quality of wastewater which could legally be discharged had been steadily raised since the turn of the century. Soon after unification, in terms of the Union Health Act of 1919, the discharge of treated effluent from a sewage purification works into a natural watercourse was prohibited, and the effluent had to be discharged on to land – this practice introduced the era of the so-called "sewage farms". (Cape Town, 1989)

While ratepayers – at the time, this was to all intents and purposes synonymous with "White property owners" – were generally resistant to subsidising any housing of lower income groups, some councillors of the unified municipality perceived that "something must be done", and pushed for change. However it was only in 1917 that Council commenced construction of the first public housing, initially for municipal employees only. This was Maitland Garden Village – 100 years old this year. The 120 cottages are still occupied, testimony to solid original construction and consistent maintenance since then.

12 A much-modified version of this was laid only in 1931.

13 1910 saw first importation of the Model T Ford to South Africa, early evidence that mass production would mean cheaper cars travelling the roads in far greater numbers. Motoring would no longer be a privilege of the wealthy few.

AFTERMATH

As anticipated, the new dam provided but a brief respite in the face of not only a growing population, but also rising consumption per capita – the latter not least because of increasing installation of waterborne sanitation. A new Board of Engineers, constituted in 1923, recommended widening and raising the existing wall, thus increasing the capacity tenfold. Council accepted this recommendation, in terms of which a second delivery pipeline to Cape Town would also be built. Construction commenced in 1926. (More information on the design and construction of this second dam, of the raising of the wall in 1954, and of the "first hydroelectric pumped storage scheme to be constructed in Africa" and the associated doubling of the capacity of Steenbras, can be found in Singels 2015b (pages 3-9) and Murray 2001.)

CONCLUSION

The single most compelling reason for the unification of the small municipalities of Cape Town a century ago was the need for adequate water and sanitation. The need to provide urban engineering services, prominent among them water and sanitation, was also a compelling reason – albeit arguably not as compelling – for:

- the creation, in 1997, of the Cape Metropolitan Council, which was tasked with integrating and managing all "bulk services" in the metropolitan area, and also for
- the further step, in year 2000, of another unification, this time of the now very much larger Cape Town metropolitan area, to form the so-named "unicity" form of municipal government.

However, apart from being a record of an interesting period in local history, and a highlighting of the ancestry of the centenarian Steenbras Dam, does the story told in this paper have any relevance today? No and yes.

"No", because the 1913 unification was unique in the extent to which it was so strongly driven by water and sanitation delivery issues. But "yes", because water and sanitation are just as much of an issue for very many Cape Town citizens as they ever were – as they are indeed for all South Africans.

Water and sanitation have never in South Africa's history ever been higher on national agendas than they have been since 1994. Not just water supply of the right quantity, and to potable standards, but access and management of the supply; also levels of service, and the price of water, and payment (or non-payment). Of concern also are issues of wastewater – its quality, and where it goes to. Water resource limitations, too, are of increasing concern at both national and local level, especially in the light of the very recent severe drought throughout much of the country.

Even Cape Town, a relatively well-managed municipality, has not been free of service delivery protests -- and access to water (and its price) has as often as not been a key focus of such protests. Furthermore, it is sadly ironic that, at the time of writing (April 2017), Cape Town, despite being a leader in water conservation measures such as fixing leaks and demand management, is facing an unprecedented water supply shortage.

POSTSCRIPT

In due course the water supply position in Wynberg Municipality, sufficient in 1913, changed to one of impending shortage, and in 1927 Wynberg joined the union. (Province, 1927)

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