CASE 15040704

ARCON

8 April 2015

NHRA SECTION 34
APPLICATION FOR PROPOSED ALTERATIONS

Glen Dirk Estate Historic Reservoir, Erf 10373 Klaassens Road, Constantia

HERITAGE STATEMENT AND MOTIVATION FOR PROPOSED WORKS (RE: SECTION 8 OF THE PERMIT APPLICATION FORM: ANNEXURE A

This heritage statement and motivation is for proposed alterations to a structure older than 60 years, and therefore subject to Heritage Western Cape's approval in terms of Section 34 of the National Heritage Resources Act (NHRA). This document is to be read in conjunction with the attached submission drawings by Rod Gurzynski Architect as listed in the 'ANNEXURE A' form, as well as **Attachment 01** and **Diagram 01**.

FIGURE 01: Exterior view of the old reservoir structure on Glen Dirk farm. It is located next door to the site of a proposed new residence, which is to be constructed for one of the property owners. The structure in the foreground is the old access hatch. (Image: the Author, 12 December 2014).

1. GENERAL DESCRIPTION AND BACKGROUND

The structure in question is located near the entrance gate to Glen Dirk Estate (Annexure A: Figure A). It is a large brick vaulted concrete structure that was once part of the Wynberg municipal waterworks system, this portion now long abandoned. It is built half into a slope and includes a set of more recently inserted service doors on its downhill-facing side (**Figure 02**). At some stage during the second half of the 20th century, this doorway was created to provide easy access to the interior, the only prior access having been through a service hatch in the roof (**Figure 01**). Given the structure's

isolated position in relation to the other residences on the estate, the reservoir has remained largely unused up to now.

FIGURE 02: The doorway, heavily covered in vegetation, subsequently cut into the downhill side of the structure to provide access for storage in more recent years. (Image: the Author, 12 December 2014).

FIGURE 03: View of the interior looking directly towards the entrance doors. The structure is characterized by impressive brick shallow arch ceiling vaults and arcaded mass concrete longitudinal walls, one of which is visible on the left. (Image: the Author, 12 December 2014).

The purpose of the current proposals is to transform part of this structure into a sunken garden for a new residence to be built alongside. This will involve the removal of

half of the vaulted roof. The remaining vaulted portion is to be used to accommodate infrastructure for a large solar power generation and heat pump installation to serve the new dwelling. For more particulars regarding the future use of the structure, refer to the architect's motivation letter dated 5 November 2014 (**Attachment 02**).

The reservoir is constructed mainly of mass concrete but with brick vaulted ceilings creating impressive interior spaces that have remained largely hidden from view for most of the 20th century (**Figures 3 & 4**).

FIGURE 04: Another interior view of the structure with its arcaded concrete longitudinal walls. The floor is concrete (presumably mass concrete) throughout. The structure has at a later stage been fitted out with electricity. (Image: the Author, 12 December 2014).

2. SIGNIFICANCE OF THE STRUCTURE

The reservoir is a rare example of the early use of modern concrete construction in the Western Cape, if not further afield. Considering that not much is widely known about the early development of modern concrete in the country, and in order to better understand the significance of this structure, a brief historical background of modern concrete construction is provided.

2.1. General Background to the Use of Modern Concrete.

The use of concrete in various forms dates back thousands of years, the oldest surviving major structure being the coffered dome of the Pantheon in Rome, now over 2000 years old. However, the origin of modern concrete construction dates back to the invention of Portland cement (OPC[1]) in England by Joseph Aspdin in 1824. The main

[1] OPC stands for 'ordinary Portland cement', as opposed to less commonly used high alumina cement (HAC), which has greater resistance to sulphates, sugars, vegetable oils and some mild acids.

advantage of OPC over builder's lime is that it hardens through an internal chemical process and consequently does not rely on atmospheric carbon dioxide to set, as do most lime cements. This makes OPC concretes particularly cost-effective for the casting of mass objects because of its vastly quicker hardening properties.

FIGURE 05: The New Jerusalem Church, Norwood, South London, built by WJE Henley, manager of the 'Concrete Building Company'. The 'pisé' mode of construction using 'lifts' similar to the reservoir on the Glen Dirk Estate is clearly evident in the horizontal wall joints. Refer also to FIGURE 6. (Image: the Author, November 1985).

Despite these advantages, the cost of OPC over other cements was considerably higher at that time, and because iron and later steel construction was firmly entrenched at

the vanguard of the (English) Industrial Revolution, there was little scope for the use of OPC in larger projects, other than as fireproof material for walls and patent flooring systems.

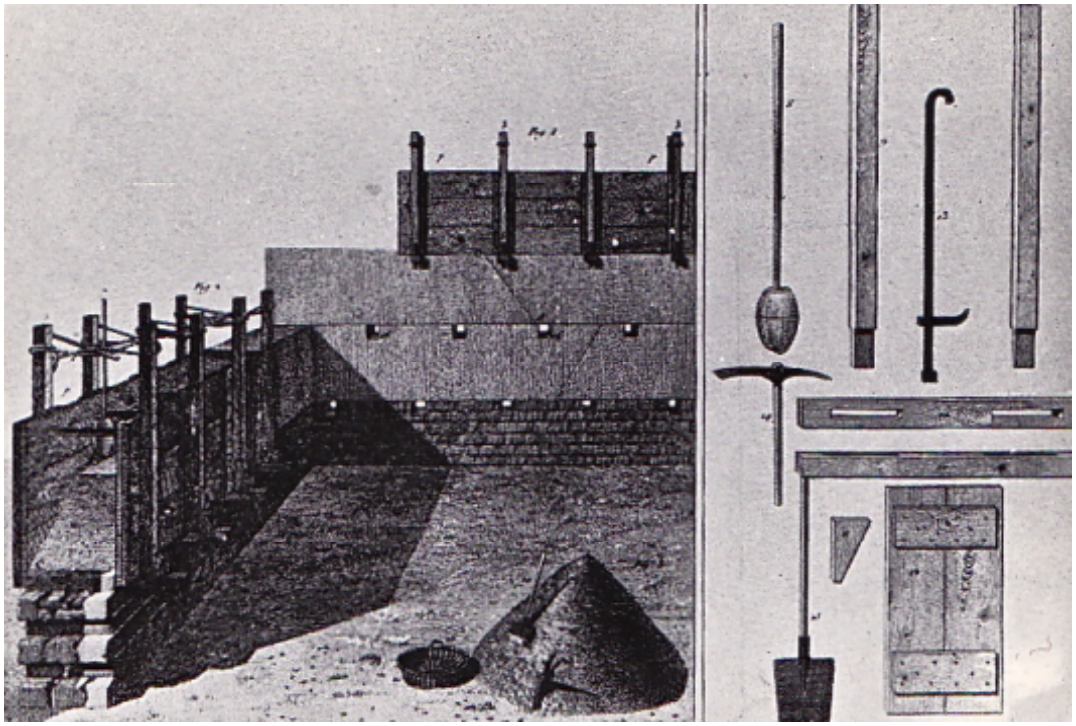

FIGURE 06: An early illustration of the method used for building 'pise' clay and earth structures showing the shuttering of one 'lift' in position. A similar method of construction was used on early concrete structures such as the New Jerusalem Church, FIGURE 05. (Acknowledgements: from Rondelet: 'Traite de l'Art de Batir' (1812) in Collins, P, 1959).

FIGURE 07: Detail of the interior of the reservoir under the old entrance hatch showing similar 'lift' lines to those in Figures 05 and 06. (Image: the Author, 12 December 2015).

It was only during the second half of the 19th century that isolated examples of substantial OPC concrete structures began to be built, the most notable being Aspdin's

own residence, Portland Hall (c1850) in Kent, UK; Down Hall (1873) in Essex, UK; and the New Jerusalem Church (1883), in South London (**Figure 05**). For this reason, OPC concrete structures even in England and other leading nations of the time such as France and the USA, remained a rarity throughout the 19th century. It took until the 1880's for the quality of cements to improve sufficiently for reinforced concrete construction to become practicable, although its widespread use only took off in the early 20th century. This was because of a generally held, but mistaken view that reinforced concrete would become structurally unstable when exposed to fire due to steel reinforcement and concrete expanding at different rates. The more widespread production of OPC was only made possible after the revolutionary invention of rotary kilns from 1900. These kilns made continuous production and more efficient firing possible.

To summarize from the above, concrete construction only started becoming more commonplace during the early 20th century when it would still have been regarded as cutting edge technology.

2.2. Historical Background of the 'Glen Dirk Reservoir'.

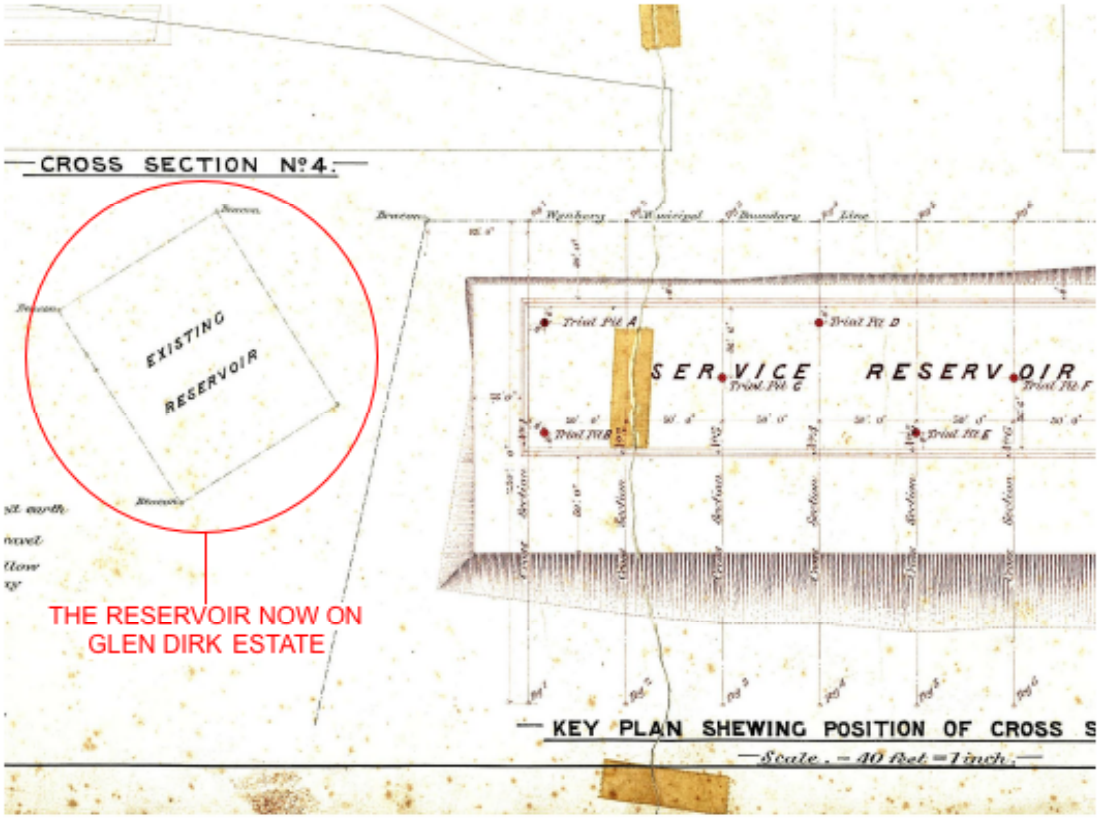

FIGURE 08: Portion of Drawing 36-30 dated March 1897 showing the reservoir on the property circled in red. (Acknowledgements: City of Cape Town Waterwaorks Department).

Records obtained from the City of Cape Town's Waterworks Department reveal that the 'Glen Dirk reservoir' was already in existence by 1897 (**Figure 08**). It was constructed as a service reservoir at the terminal point of the bulk supply mains that ran from the intakes at Diza Gorge, Orange Kloof, via Constantia Nek through the old Witteboom Estate to Wynberg Hill. Distribution mains ran from the 'Glen Dirk reservoir' to the Imperial Army Camp reservoir, Wynberg Village, Kenilworth and

Plumstead. However, this service reservoir was only used when the No 1 reservoir built in 1900 was put out of use for cleaning[2] (Timoney: **Attachment 01A**).

Diagram 01 attached, shows the site of the reservoir on surveys of 1887 (Surveyor General); 1901 (City of Cape Town) and 1931 (City of Cape Town). The structure is clearly visible on the 1901 and 1931 surveys. The reservoir was most probably constructed out of mass concrete[3] using the favoured construction method for concrete at that time, i.e. 'lifts' formed between timber shutterboards (**Figures 05 – 07**). This construction technique most likely evolved from the 18th century method of constructing earth buildings, and was known as pisé construction. This technique employs a semi-dry, stiff mix of earth and clay which is rigorously tamped down between wooden shuttering in progressive layers to build up a wall (**Figure 06**). It is a method that was also used by pioneer settlers at the Cape for building some of its earliest clay-walled farm buildings where clay bricks were not in ready supply.

After being decommissioned upon becoming redundant later in the early 20th century, it remained derelict and unused. The Cape Town City Council finally sold it to Glen Dirk Estates in 1989 for the purpose of redeveloping the old structure, then considered to be "….in poor condition and something of a blot on the landscape". (Southern Suburbs Tatler, 6 July 1989: **Attachment 01B**). It is presumably after its purchase by the Glen Dirk Estate that the side service doors were fitted and the structure electrified.

2.2. The Historical and Technological Significance of the Glen Dirk Reservoir

It is clear from the historical evidence provided by the City viewed in relation to the overall development of concrete construction in England, that the 'Glen Dirk reservoir' is an early, and quite probably rare example of its kind[4]. At the time that it was constructed, OPC of good, reliable quality was not widely available in England, let alone its colonies, despite the founding in Southern Africa of the first Portland cement factory in Pretoria (then still part of the Transvaal Republic) in 1892[5]. It is not known whether the cement was imported from the Transvaal Republic or from further abroad, i.e. England. Nonetheless, the structure must still have exemplified cutting edge construction for that time. It includes two chamber covers (one for the inlet and the other for the outlet) which have the date and name of the Wynberg Waterworks system cast into each of their lids, according to Timoney (**Attachment 01A**).

Even though the reservoir is a simple structure with an exterior that is non-descript, it has an interior that does have local architectural interest. The structure as a whole clearly has historical technological significance while at the same time probably being a

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[2] Undated letter from the late Mr Terence Timoney to a Mr Saunders. Terence Timoney was a former CoCT Waterworks employee who, including after retirement, did much to document the early work of the City's various local municipal waterworks departments. He was responsible for establishing the waterworks museum on Table Mountain and had a thorough general knowledge of the City's historic water networks. This letter is in a file forming part of the City's Waterworks archive.

[3] owing to the widely held suspicions regarding reinforced concrete still prevailing at that time.

[4] It is not known how many other reservoirs forming part of the Wynberg and Cape Town waterworks systems of that time were constructed out of early concrete, although the likelihood is strong that the 'Glen Dirk reservoir' is one of a few, albeit probably one of the earliest.

[5] This was then called *De Eerste Cement Fabrieken Beperkt*, now known as the Pretoria Portland Cement Company.

rare example of its type, although not to a degree that would warrant it being considered of greatest local significance. For this reason, the structure is recommended as Grade IIIB in terms of HWC's 'A Short Guide to Grading' (2007).

3. DESCRIPTION OF THE PROPOSED WORK

The proposals involve the following additions (refer also to the architects motivation: **Attachment 02**):

i) The removal of half of the vaulted brick roof along an existing crack line;

ii) The raising by approximately 2m of the floor in this newly created open section by inserting a new concrete suspended floor supporting a sunken garden accessed via a service ramp to this new interim level;

iii) The construction of new walls within the exposed segments separating the new open section from the remaining roofed section of the structure. The walls are to be constructed from the bricks recycled from the demolished portion of the roof;

iv) The construction of a new outside stairway connecting to the new garden level and thereafter proceeding downwards to connect into the remaining covered portion of the structure through a new doorway.

4. IMPLICATIONS OF THE PROPOSED NEW WORK WITH REGARD TO SIGNIFICANCE

4.1. Motivation & Recommendation

The alterations will effectively remove half of the vaulted roof of the structure and significantly alter its appearance. However, this is not a structure that can be considered of high architectural significance apart from its interior spaces which are of some architectural interest. Its main significance derives from its historical technological significance. Therefore, given that:

i) A sufficiently large representative portion of the structure demonstrating its historic technological characteristics will be retained;

ii) Half lengths of all four vaulted bays will be retained, thereby substantially retaining its interior architectural character; and given that

iii) This intervention will enable an unusual historic structure to be re-cycled and maintained as part of a new viable use with strong green credentials;

It is recommended that the proposed alterations be approved by HWC subject to:

i) A narrow (say minimum 300mm wide) section of the vault with exposed brick edges and mass concrete nibs be retained on the ramp side of the proposed excision, with similarly exposed brick edges and mass concrete nibs retained on the (remaining) covered portion of the structure.

ii) The recovery of historic ironmongery including dated manhole lids either as mounted displays within the new sunken garden, or, alternatively donated to the City of Cape Town Waterworks for as museum pieces to supplement their existing collection of historic waterworks artefacts, should both the property owners and the City be amenable to this arrangement.

iii) The work being monitored by a suitably qualified heritage consultant with experience dealing with historical concrete structures.

5. CONSULTATION WITH INTERESTEED AND AFFECTED PARTIES

Mr Mark Bell of the City of Cape Town: South Peninsula Administration: Heritage Resources Section has been consulted by the architect regarding these proposals from early March 2015. The City's comments are still pending due to delays caused by an apparent difference of opinion concerning jurisdiction between HWC and the City of Cape Town. This relates to authorization of heritage statements prior to the City receiving competency to administer Grade III heritage resources in terms of the NHR Act. It is hoped that this matter will be resolved shortly.

GRAHAM JACOBS
8 April 2015.

REFERENCES

ARCON Architects & Heritage Consultants (Graham Jacobs) *Glen Dirk Farm, Erf 10373 Constantia.* (Unpublished) Heritage Impact Assessment Final Report. June 2009.

City of Cape Town Waterworks Dept. The covers on the old Wynberg Waterworks Service Reservoir, Klassens (sic) Road. Note from Mr Terence Timoney to Mr Saunders. Undated.

Drawing 36-30 showing the Klaassens Road Reservoir. March 1897.

Wynberg Reservoir No: 1. Capacity Chart of Wynberg Reservoir No. 1 recorded as having been constructed prior to 1897 (exact date unknown) at a cost of £ 4 124.

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