

Statement of Dr Per von Scheibner

I, Dr Per von Scheibner, of [address redacted], wish to make the following Statement in opposition to Planning Applications Nos 09/2598/F and 09/2599/L submitted to Greenwich Council by LOCOG for the use of Greenwich Park for the 2012 Equestrian Olympics. I am happy for NOGOE to include this statement in support of their own opposition.

Qualifications and Experience

1. I have studied archaeology in Germany and the UK and I hold a diploma in Archaeology (1985-1988) from the Institute of Archaeology, University College of London. My entire archaeological work in the UK falls into the category of “Industrial Archaeology” and I specialised in “Man-made Subterranean Structures”. Due to ill health I am now living in retirement.
2. Over the last 30 years, whilst still economically active, I discovered – or more accurately, rediscovered – a number of underground features, i.e. the “Greenwich Sand Mine”, the location of the “Eltham Denehole”, an Ice Well and two “lost” chalk mines in Chislehurst, “Turpin’s Cave” in the Bostall Woods, a previously unknown chalk mine in Plumstead – as well as various unfilled remnants of chalk workings in the vicinity – previously deemed to have been made secure in the 1950s. I also excavated a medieval undercroft in Park Vista, a burial vault in Maze Hill and documented the tunnels under Vanbrugh Castle. I also conducted the excavations that rediscovered the remnants of “Ramell’s Pneumatic Railway Tunnel” in Crystal Palace and surveyed the Tudor “Red Conduit” in Richmond, etc.
3. I have lectured at length on “Subterranean Greenwich” at the Blackheath Reminiscence Centre and for the Adult Education Service in Greenwich. I also delivered frequent lectures to the London Fire Brigade on the nature and dangers associated with conduits and other subterranean structures and the necessary precautions to be taken if, for example, a void should open up. My work has been numerously featured in the UK’s printed media, as well as contributions to ITN, Thames News and a mini documentary produced by Sky Television News.
4. Since the early 1980s I have carried out archaeological and historical investigations into the whereabouts of the conduits in Greenwich Park, their history and hydrological principle. I have made innumerable visits to the Park to pursue this study, and have entered the conduits on more than 50 occasions. Together with my associates I have taken many hundreds of photographs, drawings and measurements inside the conduits. A considerable number of my papers on the subject have been published in the Journals of the Chelsea Speleological Society (“CSS Records”).

Types of Subterranean Structures present in Greenwich Park

5.
 - (a) possibly natural chalk caves (there have been several subsidences on the neighbouring “Blackheath” and one in Greenwich Park (1968). Three natural caves were discovered when the main sewer was laid – one was so large that a steam-crane could be operated in it!), see Appendix 1 and the Records of the Chelsea Speleological Society;

- (b) possibly deneholes (medieval chalk-mines, accessed via a deep vertical shaft of anything between 30 to over 100 feet in depth. Originally, “Flamstead’s Well” in the grounds of the Observatory, was in all likelihood a denehole);
- (c) possibly wells (one such well for fresh water is situated under McCartney House – unsurveyed passages from the well-chamber run into the Park);
- (d) ice wells* (at least two such structures, the unmapped “Snow-Well” which supposedly is situated by the “Whipping Ground” in the Park, and another very large ice house which is associated with the Observatory). Ice wells or ice houses are underground storage receptacles for ice. Whilst the size of some of those structures varies, some of them can be substantial, ie some can accommodate thousands of cubic feet of ice. In addition to the actual ice storage chamber, there are often tunnels and underground chambers leading to the actual ice well;
- (e) conduits* (tunnels or tunnel systems designed to collect and channel fresh water. A large number of those are known to exist in the Park);
- (f) reservoirs* (large receptacles for the waters collected by one or more of the conduits. These chambers acted as settling tanks and to increase the hydrological pressure of the waters they piped on to their ultimate destination);
- (g) cesspits or sewers* (one must assume that Flamstead’s House had some means for the disposal of human waste – alas, none has ever been located). Several cesspits are known to exist within the Park;
- (h) air raid shelter* (during WWII the subterranean reservoir by the “Standard Reservoir Building” was rebuilt to serve as a shelter. It is not known if any passages led to this reservoir before it was altered).

Types of Conduit

6. The Greenwich Park conduits fall into two categories –

- (a) the Ancient Conduits – which one has to divide again into two groups, ie
 - the medieval conduits, built in times prior to the erection of “Placentia”, which supplied monastic buildings in the vicinity, and
 - the Tudor conduits which supplied Placentia and other buildings near the river.
- (b) the Hospital Conduits – designed to supply Wren’s successor to Placentia, the Royal Naval College. These were built in the late 1600s and 1700s, mainly by N Hawksmoor and J Vanbrugh.

* There is a simple rule regarding old mine workings: they should be inspected once yearly to ascertain their safety and general state of repairs. It is my considered opinion that the same rule should apply to any underground structure as the same risks and dangers apply.

7. Very little is known of the Ancient Conduits. None of the medieval conduits has ever been found. Yet there is documentary evidence that they existed: ie a repair bill (1268, State Archives at Ghent). It details works to “The Old House” and to the conduits which supply it with water. Further documents held in the UK prove a grant by Henry VI (3.II.1434) to Duke Humphrey which explicitly permits the construction of a subterranean aqueduct. Travers’ map (which accompanied his survey) shows a number of now missing conduits. The Admiralty Report also mentions earlier conduits no longer accessible.

In addition to the above, there is the physical evidence. Two Tudor tunnels were encountered by me during excavations. Another one leading into the Park was exposed by British Gas in Park Vista. Inside the actual conduits there is also evidence of older passages – some have collapsed, others have been bricked off.

8. Of the Hospital Conduits there are at least 12. Five owe their origin to J Vanbrugh (1715), the others are listed in the Travers’ survey (1695) and the Admiralty Report (1780). Several of the described conduits had incorporated or updated the earlier ones – which meant that frequently less productive tunnels were simply bricked up. The whereabouts of the other seven conduits are presently unknown; this being so, they must be considered potentially dangerous.

Design of the conduits

9. The conduits, both older and more recent, were designed to collect subterranean water of all kinds, including that from springs. The design of the more recent conduits is illustrated in the photograph below (*see next page*).



They are built of brick, and are generally about 4 to 6 feet high and about 2 feet to 4 feet wide and generally run between mere inches to some thirty feet or more below ground level. At the top is a rounded or Gothic arch. At the bottom of the conduit walls are gaps in the brickwork to allow water to feed into the conduit (see photograph below).



The water flows into a channel which is generally about one foot wide and about 9 inches deep. The water flows downhill along this channel. At ground level there are entrances/inspection shafts – some round, some square – which would be covered in various ways. These shafts were roughly placed at intervals of about 10 yards down the whole length of the conduit. When in use, the conduits would have been regularly inspected and maintained but the more recent conduits have now been neglected for some 150 years, the older ones for 300 years or more.

Design of older conduits

10. The design of the older conduits was similar. They tended to be lower and frequently (but not always!) have a simple arched roof rather than the pointed Gothic design. The flatter shape of the roof means that it is less able to withstand pressure from above.

The water channel was in the middle of the conduit rather than to one side. It is not known how far below ground they would have been. I have seen two of the older conduits and opened one. The one I opened was only about a foot below ground level, the other one was about 4 feet below the present surface. The one discovered by British Gas was about 3 feet below the street surface.

Major Difficulties

11. Both types of conduit worked satisfactorily so long as they were properly inspected and maintained. Once this ceased, there started to be a build-up of sand inside the tunnels washed in from the outside of the intercept brick walls. This can be seen in the photograph below. As the sand was washed in from alongside the outer wall of

the conduit, voids were created on the outside. This in turn would allow water to put pressure on the affected conduit walls which would start to bulge (see photograph below).



This could – and in several cases did – lead to a collapse of the conduit wall, through which large quantities of water and soil would enter, thereby creating gradually an ever larger void on the outside of the original conduit (see photograph below which shows such a breach in the wall – the actual dimension of the hole is about three feet across).



On the surface this void will be protected for a given time by roots, grass, the actual soil adhesion, etc – but it will be liable to collapse at some point for a variety of reasons, ie exposure to large amounts of water, drought – or simply weight or pressure from above.

12. The other major danger is the way in which the inspection shafts on both types of conduit are capped at ground level. The original methodology was no doubt satisfactory when the conduits were being maintained. However, as time went by the original covers tended to be replaced by less satisfactory alternatives. This is illustrated in the three photographs below, from which it can be seen that all too often shafts are now capped simply by two stones side by side, by roof slates, or by breeze blocks of uncertain strength. (I am also aware of one access shaft which is simply capped by a wooden board.) An additional problem is that many of the access shafts – known and unknown – are well hidden from view and so it is virtually impossible to ascertain if they pose any danger to the public.





Additionally, there are no exact plans or knowledge of all the inspection shafts and their covers of the new conduits – and of the older ones inside and outside the Park there are none at all.

To locate all of the conduits and their inspection shafts it would be necessary to produce a 2 foot grid of boreholes covering the entire Park – naturally, such an exercise would create terrible damage to the archaeological structures such revealed (as already admitted to in the EIS, Appendix 9G, pages 150-151).

The Conduits Outside the Park

13. Looking at Travers' survey maps of the conduits, one might argue that there are more conduits shown outside the Park than inside the actual enclosed area. This assumption is sadly misleading: whilst many of the conduits originate outside the actual Park, they are nevertheless a single unit and more often than not lead from their origins outside the Park directly into it. Whilst this is not always in the shape of an actual tunnel (sometimes they come in guise of a pipe), unless one can say for certain that it is a pipe, one always has to assume it to be a tunnel (ie the Croom's Hill Conduit: it starts on the top of Hyde Vale but ends up in the Park close to the Standard Reservoir).

Documented Evidence of the Dangers Inherent

14. The Gang Lane Conduit gave way quite suddenly in Maidenstone Hill about 20 years ago. Even though the actual site of this collapse is about 10 minutes' walk from the Park, Travers' map shows quite clearly that it is an integral part of the Park's conduit system. The ground opened up all of a sudden and within 5 hours there was a hole about 15 feet wide and 45 feet deep! I witnessed this collapse a short time after it happened. The subsequent articles in the *Mercury* on this event are attached as Appendix 2, which include photographs (at the time I was using my family title, the VIIth Marquis du St Empire).

As stated in the articles, I have no doubt that the reason for the collapse was a void created by the collapse of the Gang Lane Conduit. It is a good example of how a cavity created by a collapsing conduit can lead to catastrophic ground failure without any warning.

It also illustrates another alarming feature of this kind of collapse. Whilst the original collapse produces a shaft-like hole on the surface, the inevitable secondary collapse creates a funnel-like feature. In other words, if someone is caught in it, or investigates such a hole shortly after a collapse, a further collapse is very likely to happen within a very short space of time, making the victim's survival very unlikely (the cause of death is generally asphyxiation) and a rescue extremely difficult and dangerous.

Exactly how and where a future collapse is going to happen is illustrated by the picture taken inside the Croom's Hill Conduit (the section omitted in recent surveys by English Heritage and others) during my survey and the one undertaken by the late Richard Moy. The photograph under paragraph 11 clearly shows the collapsed tunnel wall and the void that got created behind it. The question is not if there will be a surface collapse but only how long it will take for the void to reach the surface.

Are the Conduits of Real Historical Importance?

15. One might argue that it is of little historical importance to preserve each and every one of the conduits and that, from the viewpoint of industrial archaeology, to preserve just one would suffice to demonstrate a given technique.

It might be of little surprise that I strongly disagree with this notion. First of all, the planning proposal refers to those structures as "post medieval". This supposed factual statement is wishful thinking – the documentary evidence shows quite clearly that some of those structures are indeed "medieval"!

In the Environmental Impact Statement there is an admission that those features are of "high importance" – alas, it fails to state why they are of such importance: the reason is that nowhere in the country, perhaps not even anywhere else in Europe, is there such clear evidence of the development of a certain hydraulic science. Each one of the conduits shows an increase in hydraulic knowledge and its application. To destroy just one of those tunnels without at least having undertaken a thorough study of it would create a serious gap in our knowledge in this field of industrial archaeology.

Under “AF42”, pages 52 and 53 in Appendix 9G of the Environment Impact Statement there is a mention of a previously totally unknown conduit system. The emphasis here must be on the word *system*. The sketch “AF42” does not show an area wide enough to support this. But if it is indeed a system, then the mitigation measures proposed would under no circumstances be sufficient, to safeguard either the archaeological evidence, or the public. Why? Because nobody can say for sure what the extent of the system really is. I would regard it as purest vandalism to risk the destruction of this valuable archaeological evidence, without any proper investigation whatsoever. Neither can it be acceptable to risk the safety of the public or the Olympic participants.

Significant Risks

16. The Park will be used for the cross-country in the Equestrian Olympics, with 75 horses and riders taking part, and up to 75,000 spectators. Large areas of the Park will become a building site with substantial structures being erected, and heavy equipment and machinery will be moving around the Park to prepare for the event. In my view there are significant risks in using Greenwich Park for the Equestrian Olympics: the increase of traffic and weight from above might lead to the following emergencies –

(a) Collapse of conduits because of the existence of voids, as described above (paragraph 14);

(b) Giving way of the capping of inspection shafts;

Both (a) and (b) involve considerable risks to life and limb of humans – never mind the risk to the animals ...

(c) Damage to the conduits themselves and the important archaeological structures (plus data) involved.

It is my considered opinion that a calamity as outlined above could occur at any time in any part of the Park. This being so, such an accident should not be provoked. Also once a subterranean structure is weakened, a failure may occur during or after the event.

In light of the available evidence there can be no justifiable excuse for creating new risks to the public or participants in the planned event in Greenwich Park.

Dr Per von Scheibner
27 January 2010

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