



NatSol the
remote toilet
specialists

Case Study: Richmond Park Odourless & Waterless Public Toilets For a Busy Site

About NatSol Ltd

NatSol Ltd was started by Andy Warren and Nick Grant in 2005. Nick and Andy have a combined experience of over 40 years in designing and installing composting toilets.

Contact Us

01686 412653
info@natsol.co.uk
www.natsol.co.uk

NatSol Ltd

Units 5&6
Maesllan Enterprise Park
Llanidloes
Powys
SY18 6DF

Company number 5624596
VAT number 869 9277 43

A new design for high use public toilets

In 2012 NatSol was asked to design a new public toilet facility in the Isabella Plantation, Richmond Park, London. The Plantation is a Site of Special Scientific Interest (SSSI) with high ground water and heavy clay soil where no foul discharge to ground is permitted. The toilets were predicted to be used by over 100,000 people per year. Running costs were to be kept as low as possible whilst maintaining a high standard for users.

The Royal Parks were very clear that there must be no odour within the building or downwind of any vent pipes, especially on still summer evenings.

Inspired by a recent experience we decided to design a no-flush pump-out system with carefully controlled ventilation.

Why not compost toilets?

Our waterless toilets are a proven solution for a wide range of sites from rural churches to large allotments. However we have not recommended composting toilets for very busy places such as large public parks or visitor centres. Such sites with hundreds of daily users present an inherent challenge for the natural mouldering processes that occur in biological toilets and for the handling and disposal of the larger volume of finished compost.



Odourless loos

To guarantee the toilets would be odourless they are vented via the specially designed stainless steel pedestals removing odour at source. The air from the tanks is then drawn through a biological odour filter developed by NatSol. To achieve this we needed to use an energy efficient fan rather than our usual passive chimney vents that have proved so successful on our composting toilets.

The gents' includes AIRFLUSH® Urinals developed by NatSol Technical Director Nick Grant and supplied by the Green Building Store.

The toilets opened to the public in Sept 2014 and are working well. The design fulfils The Royal Park's requirement for a low water use toilet block with excellent odour control, no site discharges, low management requirement and infrequent emptying.

Development of the design: A 'happy accident'

A few years ago we supplied four composting toilets with urine separation for public use in a country park. Usage was higher than expected and for unforeseen reasons the vaults became too wet with urine and functioned as mini cesspits. The park staff responded by simply pumping them out twice a year. At first this seemed like a failure, but pumping out was costing no more than the staff time to manage the intended composting process.

Of particular interest, users were not reporting any odour problems even though the ventilation was purely passive. Even the staff, who were looking out for possible odour problems, reported only a faint musty smell.

Since then we have made adjustments and the staff are experimenting with running the toilets as originally intended. However, the initial failure had given us an idea and the confidence to design and install the system at Richmond Park.

What about the sludge?

The new system at Richmond Park has required about three tanker visits per year and is estimated to save around 95% in sludge removal costs compared with a flush toilet and cesspool system.

Note:

Assumptions: 100,000 users/yr; 50:50 male:female; 60% of males choose to use the urinals. On this basis the additional volume of water for a flushed system with 6.5 litre flushes would be:
 $(50,000 + 0.4 \times 50,000) \times 6.5 \text{ litres/flush} = 455 \text{ m}^3/\text{year}$
 or 50 tanker loads. Hand-wash and cleaning water assumed to be the same and waterless urinals assumed as standard.

The New Toilets in the Isabella Plantation

Richmond Park

Comments from Jo Scrivener Assistant Park Manager May 2016 to the judges of the Loo of the Year Award 2016

Richmond Park is a tricky site - it's a National Nature Reserve, SSSI and Special Area of Conservation. We had no option to connect to a mains sewage system and wanted toilets with a low cost in terms of maintenance, and as environmentally friendly as possible. When funding was secured to improve accessibility we looked into a range of options. These included reed beds, composting toilets and bio-digesters but all of these involved some sort of soak away system and however hard we tried we could not see a soak away of this size in the NNR being accepted by Natural England, the Environment Agency or the planners.

So in the end we settled on the tanked, no flush, low carbon alternative offered by NatSol. This is similar to a composting system but the liquid wastes are also collected in the tanks rather than drained off into a soak away and the waste is taken away by tanker rather than being composted. The building has five pedestals (2 ladies, 1 gents, and 2 disabled - one with baby change, the other on a RADAR lock) with five independent 1000 gallon tanks, one directly under each pedestal. There are also two waterless urinals in the gents toilet that discharge into the disabled toilet as well as taps in both disabled toilets that discharge into the disabled pedestal tanks. Male and female toilets have no taps, only alcohol gel.

Visitor numbers for this garden area are somewhere between 350,000 and 400,000/year. Emptying happens on average 3 times per year with a large 4000 gallon tanker which is far more economical and this results in a lower carbon footprint compared to emptying our small cess pit tanks in the Park, which in peak season can be emptied weekly. The cost last year for the new toilets was just over £2k which included the management fees to our facilities management contractor. I would expect this figure to reduce slightly as emptying should now speed up as a

result of adding more water to the system during the cleaning process. This makes the wastes easier to pump.

The toilets have been up and running now since the end of August 2014 and we've been really pleased with the results. My initial concerns were over smells and insect infestation - this has not happened.

We have now refined a simple method of cleaning which suits the system. The pedestal has a fixed seat so cleaners wipe this and then wash some water around the inside of the pedestal. The system has no flush so it is crucial that the cleaner adds some water to the system every time they clean. Initially we found that the tanks that had no taps or urinals discharging into them were too dry and that waste was just piling up under the pedestal. Adding water to the tank during cleaning and also just after emptying means that the solids disperse better through the tank allowing a more even fill and making them easier to empty via tanker. So it's been a learning curve but we've now got it right and they work well. The cleaners are also okay with the toilets and they can get around them as quickly, if not quicker, than an ordinary toilet where the pedestals take longer to clean.

We have had no complaints from the public with regard to this toilet, the building is lovely and we have had a lot of positive comments. It's a green oak structure with a shelter which is excellent for waiting groups and the facilities are excellent for groups with disability who had to make do with a single disabled Portaloo for the 15 years before the addition of the toilet block. So far I wouldn't change anything on the NatSol system. It's very much a prototype system and I would like to wait a couple more years before I am totally confident but so far it's all looking very positive and it's a fairly simple system with very little that I can see going wrong in the future.