

National Infrastructure Commission – Call for Evidence

London's Transport Infrastructure

- The UK's most valuable infrastructure is our “green and blue” infrastructure — the natural capital that supports communities, nature and economic activity. As such the need to protect and enhance natural infrastructure should underlie all the work of the National Infrastructure Commission.
- Development of new infrastructure can deplete our natural infrastructure, increasing risks like flooding, and damaging ecosystems. However, if designed and managed appropriately new infrastructure can benefit our built and natural environment and help it to be resilient to a changing climate and increasing population.
- This should be facilitated by coordinated action. For example, the Commission should consider linkages between its consideration of the London Transport System and other London strategies and plans, including the London Sustainable Drainage Action Plan and the aims of the London Green Infrastructure Taskforce.
- The Commission should consider how changes to the London Transport System can offer multiple benefits for example flood risk, biodiversity, and health and well-being. This can be done through incorporating well designed sustainable drainage systems.

Introduction

We welcome the formation of the National Infrastructure Commission. This task should not be undertaken in isolation, but considered alongside the wider built and natural environment. Infrastructure needs to be resilient to our changing climate, increasing urbanisation and population and it needs to work with the environment and communities.

The Issues

- The Highways Agency estimates that 70 per cent of earthworks failures are due to deficiencies in the drainage system. Similarly, London Underground considers that drainage-related issues are responsible for the vast majority of significant earthwork failures over the last 20 years.
- Less than a quarter of our water bodies are considered healthy. In order to reach water quality targets established in the Water Framework Directive, it is important that any growth in infrastructure does not lead to the deterioration in our water bodies. Much transport infrastructure such as roads cause a significant amount of water runoff. This runoff not only carries pollutants with it but severely impacts the capacity of our drainage systems resulting in increased combined sewer overflows allowing untreated sewage to flow directly into our rivers and oceans. In addition once our drains reach capacity it can cause surface water flooding carrying pollutants with it.

- 60 per cent of species we know about are in decline; as with all new development there are opportunities to help reverse this decline and help achieve our biodiversity targets. The National Infrastructure Commission should ensure that its recommendations make the most of these opportunities.
- As the climate changes, we are expecting an increase in winter rainfall and also an increase in the number of severe rainfall events. Combined with a reduction in permeable surfaces through the need for increase in housing, this will result in increased risks from surface water flooding.
- In London, the role of managing surface water flood risk lies with Lead Local Flood Authorities which are generally London Borough Councils. Lead Local Flood Authorities have produced Surface Water Management Plans (SWMPs) which gives the roads authorities clear roles where the roads form a key part of the drainage or alleviation of flood risk. Roles include retaining data relating to location and serviceability of existing road drainage; designing road drainage to minimise surface water runoff; and planning exceedance routes using roads surfaces for overland flow. It is important that when looking at growth of the London Transport System that Lead Local Flood Authorities are consulted and areas of high flood risk are avoided.

The London Transport System

Transport infrastructure in London is vital to the city. It is vulnerable to extreme weather events such as flooding, but it can also add to this risk. In considering the development of new infrastructure we need to ensure that it does not increase flood risk.

In the period from 1992 to 2003, over 1,200 flooding incidents and 200 station closures were recorded by London Underground Limited. Of these approximately half were related to flash flooding. Flooding of the London Underground between September 1999 and March 2004 cost approximately £14.6 million in passenger delays. Our current drainage system is struggling to cope and increasing storm events will require significant modification to maintain even current service levels. **The National Infrastructure Commission should ensure that it adequately considers the sustainability of its proposals and recommend appropriate investment in natural infrastructure.**

There are many existing plans and strategies in London, notably the London Infrastructure Plan and the draft London Sustainable Drainage Action Plan. Any consideration of London's Transport System needs to take such plans into account. For example, the draft London Sustainable Drainage Action Plan states *"transport sector buildings can lend themselves to green/brown roofs and also realise the benefits of insulation and reduced long-term maintenance"* and that *"retrofitting sustainable drainage should form part of already planned maintenance, repair and improvement programmes"*. The Government's Manual for Streets (2007) stated that *"the use of SUDS is seen as a primary objective by the Government and should be applied wherever practical and technically feasible"*. These insights should be reinforced by the Commission.

The London Infrastructure Plan places high emphasis on improving the London Transport System but also on delivering a network of green infrastructure to provide flood protection, shade, biodiversity, cleaner air, a greener environment visually, pedestrian and cycling routes and space for recreation. These two should not be seen in isolation. **The National Infrastructure Commission should consider how improving the London Transport System can at the same time improve London's green**

infrastructure network. Sustainable drainage systems if designed and managed appropriately are themselves an important form of green infrastructure.

Walking and cycling are important modes of travel, offering a more sustainable alternative to the car. **Safe routes for walking and cycling should be considered as part of London's Transport System.**

All stages of the development of major projects such as Crossrail 2 should include consideration of ways to enhance natural infrastructure and resilience. This should include the design of projects and the sourcing and disposal of building materials; Crossrail set an important precedent in this regard through its association with the Wallasea Island project, which made good use of spoil and contributed to natural flood defences and biodiversity. This kind of large-scale ambition should be repeated and matched by attention to more local resilient design options in new projects, including sustainable drainage.

Sustainable Drainage Systems (SuDS)

It is important that our transport infrastructure does not negatively impact on other vital infrastructure, including our drainage systems. Yet transport infrastructure can also help alleviate this risk through incorporating sustainable drainage systems into design and management. If these are designed appropriately they can also deliver benefits for wildlife and society.

Sustainable drainage systems seek to manage rainfall in a way similar to natural processes, by using the landscape to control the flow and volume of surface water, prevent or reduce pollution downstream of development and promote recharging of groundwater. Sustainable drainage systems can be vital areas of habitat and stepping stones for wildlife in the urban environment and can also reduce the urban heat island effect and improve the quality of the water passing through it. This also plays a role in making the urban environment more aesthetically pleasing and providing health and well-being benefits.¹

London is also in an area of water scarcity and with climate change we are expecting hotter summers. In considering sustainable drainage systems within the transport system these measures can help with water resource management through rainwater harvesting and reuse. Such SuDS techniques can capture, or harvest, rainwater which can then be used for functions that do not require treated water, such as flushing toilets and irrigation. In addition using methods such as green roofs, recreational roofs, wildflower blankets and green walls can replace some of the evaporative cooling lost through urbanisation.

The National Infrastructure Commission should consider sustainable drainage systems within their plans for the London Transport System so that infrastructure is resilient to climate change, alleviates pressure on drainage infrastructure, and also benefits wildlife and communities.

Case studies

- A green roof was retrofitted onto a tube depot in Ruislip gardens and water runoff rates were compared with a control roof. The green roofs reduced the peak flow to under a

¹ WWT has created guidance on how to design sustainable drainage systems for multiple benefits. It can be downloaded from http://www.wwt.org.uk/uploads/documents/1400927422_SustainableDrainageSystemsGuide.pdf

quarter of that of the control roof and delayed the peak flow time up to 2 hours 45 minutes. The green roofs were additionally designed to encourage pollinating species.

- Nottingham Green Streets project designed to capture runoff from 5500 m² of highway from a total surface area of 7100 m². The scheme was designed to manage surface water runoff from a 1:30 year event and to always intercept and treat the, often polluted highway runoff. Evidence indicates a 33 per cent reduction in the flow reaching the sewer during a 1 in 1 return period storm.
- If designed and managed correctly sustainable drainage systems can be more cost effective than installing traditional drainage systems. For example costings for incorporating SuDS into the development of a rail freight terminal in Telford, Shropshire were compared with traditional sewerage costs. To incorporate SuDS rather than sewer features catering for a 1 in 30 year flood event would result in savings in the order of £253,000 (for basic works costs excluding preliminaries and design and supervision and removes the effects of the disposal of surplus material).

The SuDS have been accommodated within areas that would have been used for landscaping and have enhanced the attractiveness of the Terminal. The SuDS features have also provided enhanced habitats and helped to secure a more continuous green network through the site with positive effects on biodiversity. The slow conveyance and attenuation of flows help to remove pollutants and reduce the diffuse pollution load which would otherwise have been carried by the surface water sewer system into the watercourses. In addition it is believed that the use of SuDS has saved in excess of 100 HGV journeys (probably significantly more) or in excess of 8,000 vehicle miles.

As most of the SuDS features are visible within the site, they are subject to daily oversight by the staff. All aspects of the inspection and maintenance of the SuDS system are capable of being safely undertaken by the staff of the Terminal or outside landscaping contractors. With a piped system, diagnosis and location of the source of pollution in pipe networks can be very time consuming and expensive. A piped system would require at least an annual visit by specialist contractors. This may require several days if pipe jetting is required. Potentially unscheduled, reactive visits may be needed as well e.g. to respond to blocked gullies or choked flow control devices.

Concluding remarks

We recommend that National Infrastructure Commission considers its remit as part of the wider built and natural environment and promotes the development of infrastructure that is resilient to climate change, and contributes to biodiversity and resilience. We recommend the use of sustainable drainage systems wherever possible which are designed to optimise multiple benefits, reducing flood risk, reducing the urban heat island effect, improving water runoff quality, providing biodiversity benefits and providing communities with an enhanced sense of place and wellbeing.

For further information, please contact:

Hannah Freeman, Government Affairs Officer, [email redacted]

Dr Richard Benwell, Head of Government Affairs, [email redacted]

Wildfowl & Wetlands Trust (WWT), Slimbridge, Gloucestershire, GL2 7BT, UK