

## Clean Rivers Trust Issue Outline Paper.

### Thames Tideway Tunnel.

Thames Water, the utility company that supplies the majority of drinking water and all of the sewage treatment services for London is coming to the end of its second round of public consultations in relation to a new sewage collection and movement system. This procedure has been carried out in the run up to placing the scheme in front of the planning authority for approval.

#### Background.

The nineteenth century sewage system and its interceptor sewers designed by, and installed under the direction of Joseph Bazalgette, the Engineer for the City in the 1860s and 70s was a triumph of engineering for its day. The sewage before that time either collected in multiple cess pits or flowed directly to under ground watercourses or drains (sewers) that flowed to the River Thames. In the 1850s the river was in such a condition that the City authorities were encouraged to act; sittings of the House of Commons had had to be suspended due to the noxious odour coming from the river (the Great Stink 1858).



Michael Faraday and Father Thames.

At this same time the city was regularly the site of outbreaks of cholera which were up to and beyond the period of Broad Street pump chaining by Dr Snow considered a disease brought on by miasma or fetid air. The installation of the interceptor sewers and the removal of the foul waters from the central river improved the health of the capital; cholera became a rare disease and the fetid air off the Thames in central London departed. The fact that it did not leave the river totally was that due to the design of the new sewer system that moved all the foul water to the east of the city to Crossness and Beckton.

#### The Present Need.

Today the Thames is a far cleaner river, but it is beginning to revert to what it was. Raw waste water from the combined (surface and foul) sewers is discharging into the river and its tributaries; especially the River

Lee. Every time there is heavy rain the drainage system of the capital become over full and if it were not for storm water discharge points such as at Abbey Mills on the Lee much of London would be flooded with sewage.



Abbey Mills Storm Water Discharge to the River Lee.

These discharges have meant that the River Thames 'has become an environmental and public health hazard' (again). Thames Water goes on to say that their storm discharges amount to 39 million cubic metres of untreated sewage entering the waters of the capital in a year. These discharges are the last significant sources of pollution in the tidal river. The nature and strength of pollution varies due to the changing concentrations of; between 10 to 90 per cent, raw sewage to that of rainwater run off from the city's streets and buildings.

This inundation of the river by such large volumes of pollution kills fish, other wildlife and carries disease. The pathogens that enter the river water include the likes of hepatitis and e-coli. Faecal streptococci and other bugs are making their presence seen in the river environment.

The frequent significant wet weather events, particularly in the summers are adding to the problem. The soils that underlie much of London are heavy clay and do not drain naturally to groundwater. This allied to the urban cover of most of the conurbation that makes up the mass of the greater London area puts the drainage of the area at threat. It appears to need only 2mm of precipitation to see storm waters enter the river.



A River Thames Storm Water Discharge.

Considerations regarding the consequences that global warming will make; including significantly more rain deposition in future years further emphasises the urgency of the issue and the implementation of such a scheme.

The need for action is now plain, due to increasing population density and spread of the urban areas around the capital. The number of people resident in the city is now near 8 million. The Victorian drainage system had been engineered to cope with the waste from 4 million people, when the actual population at that time was 2.5 million. The figures point out further that the capital has been living on borrowed time for some years already and so it is no wonder that actions need to be put in place with some urgency.

The sight of sewage detritus on the Thames foreshore is an unpleasant, but useful reminder that it is not so much what we see coming from the storm water outfalls that are particularly concerning: the microscopic organisms that can be the cause of illness and disease are invisible.



River Thames Polluted by Storm Water Waste.

### **The Thames Tideway Tunnel Scheme.**

The scheme as put forward by Thames Water is a major civil engineering project. As a company and prior to 1989 as an authority the organisation has had success with such schemes before; both in treating foul waters and notably the transportation of drinking water around the capital. The Ring Main project carried out in part before and during privatisation of the utility at the end of the 1980s and is still being extended today.

The main routes for the sewage waters to be transported to treatment works have been designed to a similar standard and will use a similar method of instillation. The planned use of automated boring technology on an immense scale has proved highly successful before.

The tunnel will collect the waste waters from 34 of the combined sewer overflows that discharge to the river and are deemed by the Environment Agency as the most polluting. The route of the pipeline will be from Ealing via Hammersmith and then below the river to Bakesbourne Street, close by Canary Wharf. From whence it will travel north east to Abbey Mills Pumping Station and on to the treatment works at Beckton. The route will be about 26 kilometres in length and the bore of the tunnel will be about 18 metres.



A Tunnel Boring Machine, Front End.

The process to remediate storm water discharges on the River Lee is already underway. This will take pollution event pressure off the second river of London and do much to improve the Thames' water quality up and down stream of the two rivers' confluence.

Another, smaller collection adit of the same sort is planned to run from Greenwich pumping station via Deptford to Chambers Wharf, just down stream of Tower Bridge; here it will join the main system.

To avoid disruption to the city's other infrastructure the tunnel will be located deep underground. The deepest parts of the scheme will lie about 79 metres below the surface.

#### **Cost and Justification.**

The costs of the whole scheme are large, at around £4.1 billion, the cost of which will in large part be borne by the sewage charge payers, the resident public of the metropolis via the annual water and sewage charge to each home and business. The polluter pays principal is the key to understanding this issue.

It is never popular to raise any charges that are unavoidable and payable by all: not even the poorest resident can get relief. The logic for the scheme to go ahead at this time is that it is far better to act now; the future of the city with a corrupted river, flooding drains, insanitary homes: the possible consequences, in the 21<sup>st</sup> century, would be unacceptable but unavoidable.

It is possibly the time to quote the tale of a Margate pleasure boat that foundered in the estuary of the Thames in the 1890s; there were many fatalities, though no one person drowned. The loss of life was caused by disease contracted by the passengers and crew during their immersion in the waters of the Thames.

#### **The Thames River; the Benefits.**

The rivers water quality and its ability to provide a sustainable aquatic flora and fauna that is developing in diversity and richness is undisputed compared to Victorian times. It is better than during the 1950s when the river was biologically dead. The cooling waters of the great power stations, the industries and general pollution saw to that. But over the years; initially in the late 1960s and 1970s as recession and changes in electrical generation came about many of the major pollutions ceased. The great power generation stations at Battersea and Bank ceased operation as did others. Industry that once found it could dispose of any waste to the river had to cease or closed down. The regulations on pollution control and abatement were enacted and the river and its environment benefited greatly.

This state of improvement has carried on; except when it rains; the pollution expunges the oxygen from the river water, fish die, not one or two, but thousands. This mortality is time consuming to catch up with,



some reared fish may be released but the native cadres of piscine stock can take some years to replace themselves.

In mitigation of this problem for several years small craft have travelled up and down the river; when there was rain they would start forcing oxygen into the river. The Thames Bubblers belong to Thames Water; who admit they are a sticking plaster at best. They attempt to limit the damage of the storm overflows. They are good for public relations; the sight of them oxygenating the river outside the terrace of the Houses of Parliament or elsewhere lets it be known that something is being done. Thames Water would admit it is not much but very much better than nothing.



A Thames Bubbler.

Thames Water has, over the years, been innovative in dealing with perceived pollution. The storm overflows leak hundreds if not thousands of sanitary towels, paper and condoms plus other human detritus into the river annually. The visual pollution is unsightly and unnecessary. This is not an exclusive Thames problem, it is national, European, international; from Washington DC to Addis Ababa.

Over the last few years there have been discreet boats moving about the river quietly skimming this sewer borne waste from the surface of the tide. It is sad to witness as all the water companies, environmental groups and other organisations have all supported 'bag it and bin it' campaigns over the last fifteen to twenty years. They, as campaigns, have not failed, the problem would have been far worse if they had not taken place. It does show that there are a lot of people who do not look at the media; or who are bone idle.



A Thames Skimmer.

Each of these craft is able to remove around 14 tons of river borne waste from the surface daily. Even when the storm waters from the 34 sites is removed these boats will not be redundant as is the nature of human kind it will still find away to spoil what should be free of litter or it will come from else where, upstream or on the tide.

Once the tunnelling is complete and the attendant and unavoidable hiatus has died down the river will have the opportunity to develop. In many ways the prospect of a near clean River Thames will be a wonder of the modern world. The river will be clearer of human waste than it has been for over 1000 years. The assurance of less effluent and better quality water gives a chance to see the capital's river to demonstrate to the world community the power of natural rehabilitation having its head. Already there are new and exotic creatures living along the river shores and in the water column. Mitten crabs and sea horses, one a pest the other popular.

As the water improves in reliability of quality there may be other issues and some spectators who will wish that the river was not so clean; it has happened on other rivers such as the Trent. The fact that lack of pollution may be a concern is something I hope to live long enough to see.

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