Written evidence from Flusher EU Limited

Flusher2 is a simple retrofit device that is designed to improve hydraulic efficiency within underperforming drainage and sewerage catchments. These can be used in any pipe system and the use and benefits are wide ranging and considerable.

Conventional high pressure water jetting is designed to be a reactive short-term response to alleviate problems such as sewer blockages or sedimentation, which if unresolved result in consequences such as surface level or property flooding. Also resulting in pollution events when this triggers a premature release of untreated wastewater effluent to our Rivers, Inland Watercourses and Coastal Outfalls.

Flusher2 a proven automated sewer cleansing solution, instead uses purely the effluent passing through the catchment, storing, or attenuating the flow for a short period, typically releasing it to Flush both the upstream and downstream catchment on average, 40 -100 times per day under typical conditions in a normal Combined or Foul Sewer Catchment. The resulting Flushing cycles clean and keep clean the pipework over considerable distances. The cleansing effect used, performs in precisely the opposite way to Sewer Jetting which uses high pressure low volume water to clean only short distances and therefore relies on jetting hoses to be propelled through the pipe repeatedly to achieve anything even remotely like Flusher2.

Flusher2 on the other hand, operates utilising low pressure, high-volume effluent movement. This is precisely how drainage pipelines are designed to function, as they rely primarily on a constant and appropriate flow rate, to deliver a “self-cleansing velocity”. Typically, Flusher enhances the hydraulic velocity both upstream and downstream, achieving hydraulic improvement. This can be witnessed on hydraulic flow models and shown to achieve an enhancement over many hundreds of metres, unlike sewer jetting.

By installing Flusher2 within known problem locations, either continuously, or over predetermined maintenance periods, Flusher2 has the added benefit that it continues to remove sediment and blockages in their entirety, not purely disbursing the immediate problem allowing the sediment to settle and re-establish in future. Silt removal is both costly, and inefficient. Temporary dams or silt boards which are used to stop the sediment at a downstream manhole as part of a standard sewer jetting operation, allow a high percentage of sediment to pass by, leaving it ready to form the next blockage or sediment build-up. Flusher2 however, mobilises sediment over the distance needed to allow it to reach the more efficiently operating part of the catchment. Sediments are mobilised to final Sewage Treatment Plant where adequate facilities are available to deal with the problem within an unencumbered area. This then has no adverse effect on our roads, traffic flow and therefore alleviates the day-to-day problems that affect our nations businesses and the wider public who pay a considerable price to use our roads. Proprietary silt interceptors are now widely available and Flusher2 mobilises sediment to these efficiently allowing silt abstraction to be performed efficiently, within easy to access, minimally disruptive areas.

The effect of even a small amount of sediment and of course of a blockage has a considerable impact on Properties at Risk of Flooding and on the unnecessary and premature discharge of raw sewage via CSO's into our Rivers and Watercourses. An acknowledged study undertaken by sewerage professionals in Germany demonstrate, how just a small build-up of silt can reduce the effective operation of an entire catchment.

"It is acknowledged sediment in quantities as small as 2% of the cross-sectional area of any pipe can result in a 10-20% reduction of the full pipe discharge capacity. Robert Banasiak" ***- Instytut Meteorologii i Gospodarki Wodnej IMGW · Centre for Flood and Drought Modelling***

My personal experience and expertise have been gained over 45 years working as a Drainage Engineer, both directly for Thames Water and subsequently as a Specialist Drainage Consultant and Founder and now Chairman of a longstanding Drain and Sewer Surveying and Inspection Company. I have received numerous industry awards and have pioneered some of the most innovative techniques and solutions now used within the drainage and sewerage sector. I was honoured to receive the National Sewerage Association Coggin Cup for significant Lifetime Achievement.

On several occasions in the past, I have been commissioned to investigate reasons why and where silt builds up and blockages occur, specifically within the central London Trunk Sewerage Catchment. Subsequently, then to investigate the benefits of different types of cleansing solutions and to assess their respective merits and capabilities. Also, to consider alternate methods which could be developed and implemented to improve current capabilities in this area. It was exactly this that led me to design and develop personally Flusher and subsequently the smaller and more widely beneficial Flusher2 solutions. I hope you will appreciate the advantage that this background provides and the added value that I believe I can bring to your deliberation in this instance.

One of the most significant conclusions derived from these investigations was the effect of constant level dry weather flow **(*dwf*)** conditions, and of course any situations where inadequate hydraulic performance denies a self-cleansing velocity. Low *dwf* is responsible for a significant percentage of all blockages, irrespective of sewer size, velocity, or hydraulic load. This relatively consistent flow level allows soluble fats which whilst retained within the effluent remain in a semi liquid state causing no significant problem, it is only when these are exposed to cooler surfaces such as the exposed fabric of the sewer structure or metallic plant and an equipment for example pumps and the metallic pumping mains exposed within pumping stations that this really causes a problem. This process within pipes and sewers promotes the build-up of a fat crust deposit at the *dwf* interface between the effluent and the upper section of the structure. This increases in size progressively and as it does it forces the level of flow to increase, increasing the size of the obstruction within the upper areas of the sewer. Eventually the obstruction either collapses under its own weight and blocks the passage of flow or limits the passage of flow with both conditions resulting in surcharging and upstream flooding.

It is quite simple to rectify this problem, and I am pleased to say that Flusher2 and the former larger original Flusher designs do exactly this by constantly changing the level of *dwf* both

upstream and downstream of each installation. In serious situations Flusher2 when used with the various forms of FOG dosing, increase the effect of these products, by ensure that the active enzymes or microbes are exposed to the entire surface area of any accumulation. As the fat softens, the increased velocity and continuous flushing action disburses any FOG build-up. It is then possible to either reduce dosing and continue using Flusher2 alone to prevent or at the very least, slow the build-up and reformation of these FOG blockages or obstructions. Yes, it is therefore possible to prevent Fatbergs. This we proved many years ago when performing large scale flushing operations during the previously mentioned Sewer Cleansing trials for Thames Water, however it seems that this message was quickly forgotten.

Sewer jetting is now almost universally considered to be the go-to method for dealing with all blockages, and whilst this certainly is effective in the initial disbursement of the obstruction, it does little if anything for the resilience of the infrastructure and is far from being a sustainable solution. The use of mains water in significant quantities considering the finite nature of this valuable resource is just one consideration. Jetting is widely undertaken by some of the largest, heaviest vehicles using UK roads. As a result, both the physical damage and environmental harm caused by vehicles that emit huge quantities of harmful pollutants to our atmosphere by engines used to travel considerable daily distances and for the duration of time spent both jetting and retrieving waste, as the same power unit is used to perform all activities.

Whilst considering the subject of damage caused, it is important to also consider the damage that high pressure water jets cause to our pipes and vital sewer assets. The scouring effect reduces the life expectancy whilst it also reduces the hydraulic efficiency by increasing the frictional resistance and slowing the velocity of effluent passing through the catchment. More significant problems occur where defects are present, for example cracked, broken or deformed pipes, or in larger sewers with missing bricks or open and displaced joints. The jet used frequently forces itself into these defects causing damage directly or destabilises the surrounding subsoil resulting in a loss of structural integrity and a collapse and total failure of the sewer.

Finally, it should also be considered that High Pressure Jetting is in fact quite possibly one of the most underfunded of all regular activities undertaken on behalf of the UK Water Utilities. Typically, the chargeable rate for a blockage is between £40 - £50 per location. It is clear to see that even if the solution was indeed effective, the motivation to do anything other that restore a visible flow condition is clearly inadequate.

So, in response to one of the questions raised for consideration:

"*How could drainage and sewage management plans, introduced by the Environment Bill, play a role in reduced sewer discharges?"*

It is clear I'm sure to all, that a more sustainable preventative solution is needed if the industry is going to effectively address the improvements needed to achieve the enhanced performance and commitments pledged by the Water Utilities over such a short period.

This will only be achieved if low cost, retrofit automated sewer and drainage cleansing solutions are adopted as a vital additional resource, particulalry in situations where recurrent

blockages or flooding incidents occur, or where CSO discharges demonstrate the inadequate design performance of their sewerage catchment. Flusher2 delivers exactly these improvements in a low cost and sustainable way. The alternative of seeking significant capital investment to implement large infrastructure projects, would be slow, exceptionally high in cost and do very little to address the inherent problems of sedimentation and blockages.

The question regarding funding should also be considered.

"What is the required investment level needed to minimise storm overflows vs the scope for sustainable drainage and nature-based solutions?"

Retrofit installation of systems such as Flusher2, would be significantly funded by switching a significant percentage of the money currently spent as part of OPEX budgets from Sewer Jetting to these new sustainable alternative solutions. Additional investment would speed the process but the comparative cost of a Flusher2 solution compared with a nature-based option would be at least 5-10 times less, allowing more catchments to benefit from the same level of investment. Traditional flow control solutions would also be significantly more costly in comparison.

Let's also take a moment to consider one further question raised, namely:

"How could drainage and sewage management plans, introduced by the Environment Bill, play a role in reduced sewer discharges?"

Another important opportunity where Flusher2 could assist Water Utilities in addressing the above objective, relates to the subject of catchment attenuation. Yes, the very process that Flusher2 uses to clean and keep catchments clean permanently can deliver vital additional advantages. During periods of rainfall or indeed of peak flows, effluent passes through the upper extent of a catchment very quickly. It is the overwhelming flow conditions within the lower extents of the catchment or in locations where properties are at risk of flooding or where CSO outfalls exist that these problems are really felt. It therefore prudent to fully utilise all available storage capacity before any opportunity for overspilling occurs. Flusher2 when strategically positioned within the upper extents of the catchment, slows the passage of flow, allowing it to build up more effectively using the currently unused capacity. This can be visualised by considering a series of lock gates. As a result, the catchment becomes capable of storing more effluent for a longer period and benefits from the releasing effluent which subsequently cleanses the catchment further increasing its efficiency in the process.

There is of course considerable commercial resistance from those who perform traditional sewer jetting. These opportunities therefore need to be assessed at the very highest level.

Yours sincerely

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