Risk Assessment – Flow Rates Restricted to 4.2l/s

This assessment considers the technical and operational risks arising from blockages occurring at sustained low flow rates. The usage in this circumstance is based on flow restrictions provided from a Hydrobrake or equivalent approved device to a rate of 4.2l/s. Risks have been reviewed, assessed and mitigation features provided.

Risk Rating Matrix (Likelihood × Severity)

Likelihood ↓ / Severity →	1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

Key: 1–3 Low 4–7 Medium 8–14 High 15–25 Critical

Risk Register

The table below sets out the principal risks identified, scored on the basis of pre-mitigation (inherent) likelihood and severity

Ref	Hazard	Cause	Consequence	L	S	Risk	Mitigation	Post Mitigation Risk
R1	Sedimentation/siltation in foul drainage	Sustained flows below the ~0.75 m/s self-cleansing threshold (due to oversized pipe diameter, flat gradient, or low occupancy, outlet restrictions)	Progressive build-up of solids, increased blockage frequency, potential surcharge/backup into buildings	4	4	16 (Critical)	Design pipe diameter and gradient to BS EN 752 minimum-fall tables for the actual anticipated flow, not a nominal oversized diameter; avoid unnecessary upsizing; specify minimum gradients (e.g. 1:80 or steeper for 100 mm diameter foul pipe, verified by Manning's equation for expected flows); Post construction include a planned CCTV survey and a drainage inspection and maintenance regime.	L:1 S:2 R:2
R2	Blockage and surcharge (foul)	Accumulated silt/grease combined with intermittent low flow insufficient to flush deposits; compounded by back-falls or poor jointing	Internal or external sewage flooding, service disruption, statutory nuisance, potential offence under Water Industry Act 1991 s.111 if it affects a public sewer connection	3	4	12 (High)	Install inspection chambers/rodding eyes at every change of direction, gradient or diameter and at maximum 45 m centres on straight runs (Building Regulations Part H); undertake post-construction as-built survey to confirm falls before commissioning; establish a drainage inspection and maintenance regime.	L:2 S:1 R:2
R3	Septicity and hydrogen sulphide (H2S) generation	Extended retention time of foul effluent at low flow/low velocity promotes anaerobic conditions	Odour nuisance; corrosion of concrete pipework/chambers (biogenic sulphuric acid attack); toxic/asphyxiant gas hazard to operatives entering chambers	3	5	15 (Critical)	Specify corrosion-resistant pipe/chamber materials (e.g. uPVC/HDPE rather than unprotected concrete) in low-flow, long-retention sections; minimise unnecessarily long private runs upstream of the point of discharge; treat all chamber/manhole entry as confined space work under the Confined Spaces Regulations 1997 with atmospheric gas testing, ventilation and rescue arrangements per COSHH.	L:1 S:1 R:1
R4	Surface water pipe/SuDS feature siltation	Pipework or SuDS conveyance oversized relative to the contributing low-intensity/frequent rainfall flows (below the ~0.75 m/s self-cleansing threshold), allowing fine sediment to settle	Reduced hydraulic capacity and attenuation/treatment performance over time; increased risk of local surface flooding in larger events; degraded water quality performance of SuDS treatment train	4	3	12 (High)	Size surface water pipework to the actual design storm rather than worst-case oversizing; incorporate a SuDS treatment train per CIRIA C753 (e.g. filter strips, swales, silt traps/gully pots) upstream of piped conveyance; establish a maintenance schedule for gully pots, silt traps and SuDS inlets.	L:1 S:1 R:1
R5	Blockages from local debris such as litter, vehicular and plant runoff	Restriction of flow to 4.2l/s reduces flow velocity within the system and limits the performance of self-cleansing if it falls below 0.75m/s, this increases the likelihood of debris buildup.	Progressive accumulation will obstruct drainage assets including pipes, chambers and flow control devices which will surcharge the drainage system, causing increased maintenance requirements, localised flooding and asset damage.	3	4	12 (high)	Where practical, design the network in accordance with BS EN 752, Install sumped chamber units immediately upstream of flow control devices and in areas identified as having an elevated risk of sediment accumulation, this will allow sedimentation of solids prior to reaching the flow control device and facilitates maintenance. Undertake a post construction inspection, with adherence to regular asset checks and cleansing measures detailed in the provided maintenance regime.	L:1 S:2 R:2

Conclusion

As this assessment demonstrates, flows below 4.2l/s present a genuine risk of failing to meet self-cleansing velocity (0.75m/s), which threatens sedimentation and blockages to the system that results in localised flooding events. This Risk Assessment is to be read and utilised in conjunction with Civic's Drainage Inspection and Maintenance Schedule: 18704-CIV-XX-XX-T-C-0002 to demonstrate minimal risks involved with a low flow rate that falls below the self-cleansing velocity.