Operation and Maintenance Requirements – Attenuation Storage Tank and Flow Control Chambers

Schedule	Required Action	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually or as required
Remedial actions	Repair / rehabilitate inlets, outlet, overflows and vents	Annually, or as require
Monitoring	Inspect. Check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build up and remove if necessary	Every 5 year or as required
	Neoprene Seal / Rubber Gasket	Annually

Notes:

1. Regular inspection and maintenance is required to ensure the effective long-term operation of below-ground storage systems.

2. The inspection and maintenance of the attenuation tank is the responsibility of the developer or the developer's agent until such a time the tank is fully adopted by the overseeing authority.

Weholite Maintenance

As a structured wall pipe certificated against WIS 4-35-01 Weholite has been tested for its ability to withstand common cleaning practices.

Access to the system for cleaning should be provided by conventional methods.

The system can be rodded easily using flexible drain rods. In common with other standard plastic drainage systems, toothed root cutters and rods with metal ferrules, as used with some mechanical cleaning systems, could damage the pipe and joints and should not be used.

The system can be cleansed using low pressure, high volume flushing in accordance with WIS 4-35-01, 2000 Clause 6.10.

The test requirements of the WIS are based on the recommendations for jetting practice developed by WRc during their writing of the Sewer Jetting Code of Practice in 1997.

WRc Jetting Code of Practice:

- Plastic sewers in Grade 1 and 2 condition can be jetted at pressures up to 2600psi
- All Grade 3 sewers, irrespective of material, should be jetted at a maximum pressure of 1900psi
- All Grade 4 and 5 sewers, irrespective of material, should be jetted at a maximum pressure of 1200psi
- If the pipe material of the blocked sewer is unknown, as is frequently the case in practice, then
    - the maximum pressure to be used is 1900psi
    - EXEPTIONS: for areas known to contain brick, masonry or pitch fibre sewers, a maximum of 1500psi is recommended
- It is likely that sewer obstructions will be removed at pressures of 1900psi

When sewer conditions are known;

In a subsequent report prepared by WRc regarding the risk of high pressure water jetting on the existing sewer network, the following recommendation was given:

"A maximum pressure of 1900psi is used for all jetting work where the condition of the sewer is unknown in order to protect the existing network"

Jetting and WIS 4-35-01

Factors of safety which include:

- The WIS requires pipes to withstand a jetting pressure of 2600psi
    - The WRc COP, however, recommends a standard maximum pressure of 1900psi
    - This represents a factor of safety of almost 40%

- Test pressure is measured behind the nozzle
    - In practice the test pressure would be measured at the pump
    - There is a pressure drop between the jetting pump and nozzle
    - On a 100m hose this pressure drop could be as much as 200psi

- The test nozzle is held rigidly within the pipe 5mm from the thinnest part ofthe inside wall
    - In practice the only time a jetting nozzle is stationary is if it becomes trapped
    - Even a nozzle on a tied hose would not be stationary due to the pulsing action of the pump

- The test is 120 seconds
    - WRc research determined that, if a nozzle were to become stationary or trapped, the average reaction time of a contractor would be 1 minute
    - For test purposes of the WIS, this was doubled

Jetting of Surface Water Sewers and larger diameter Weholite systems

Scope of WIS 4-35-01
The WIS standard only requires pipe up to 300mm to be tested for their ability to withstand water jetting. This is because the industry realises that sewer pipes in sizes above 300mm cannot be effectively cleaned or unblocked with high pressure / low flow jetting equipment.

Recognised procedure: high volume/low pressure jetting
The vast majority of larger diameter sewer pipes being installed at present are for surface water control.

The industry-recognised procedure for jetting of surface water sewers is the use of high volume low pressure jetting rigs. These are capable of delivering a minimum flow of 15 gal/min at pressures up to 2000psi. This procedure is also reflected in the WRc COP.

Low volume/high pressure option: ineffective
The rationale for this recognised procedure is based on the jetters' ability to be able to move large volumes of silt back to the receiving manhole for removal.

Low volume high pressure jetting equipment is ineffective for this purpose, and would simply deposit the silt along the invert of the pipe.

Weholite Jetting Pressure as tested by WRc

Samples	Diameters	Maximum Jetting Pressure
Assett	400	240 Bar (3400 psi)
Weholite	600	260 Bar (3600 psi)
	900	260 Bar (3600 psi)

Note: Jetting pressure will increase with diameter as the thickness of the profile wall increases.

HydroBrake Maintenance

Normally, little maintenance is required as there are no moving parts within the Flow Control. Experience has shown that if blockages occur they do so at the intake, and the cause on such occasions has been due to a lack of attention to engineering detail such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size. The Flow Control (where applicable) is fitted with a pivoting bypass door, which allows the manhole chamber to be drained down should blockage occur. The smaller conical units, below the minimum recommended size, are also supplied with rodding facilities or vortex suppressor pipes as standard.

Following installation of the Flow Control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. If problems are experienced, please do not hesitate to contact the company so that an investigation may be made.

All Flow Control units are typically manufactured from grade 304 Stainless Steel, and if required they can also be manufactured in grade 316 Stainless Steel. Both materials have an estimated life span in excess of the design life of drainage systems.

Neoprene Seal / Rubber Gasket Maintenance

The hydrobrake unit is sealed to the concrete wall of the manhole by the use of a rubber gasket or neoprene seal.

The condition of the seal shall be inspected annually for signs of damage and deterioration and repaired or replaced as required in accordance with the manufacturer's recommendations.

Ham Baker Adams Penstock and Lifting Bar Maintenance

Every 3 Months:

1. It is recommended that all units are operated through a full cycle.

2. Check any operating gear for damage, wear and freedom of movement. Clean the spindle threads by hosing down with clean water. Apply grease to the spindle, and to any grease nipples present in accordance with the recommended lubricant below.

3. Check any lifting beam hooks for freedom of movement. Check the disengagement ropes for wear and tear and replace with the same specification rope as necessary. Moving parts should be lightly oiled/greased. (Note that it is advisable to hose down lifting beams after every time used, especially around the hook pivots and disengagement rope assembly). Note also the requirement in the Health and Safety Recommendations (Section 2), with regard to the requirement for a thorough examination prior to use by a competent person. Customers/end users are reminded that it is their responsibility to ensure that the lifting beams and associated slings are re-tested in accordance with legal requirements at the required frequency.

4. Check that guarding originally supplied with the unit remains in position and is securely fixed, including any fixed guards or protection tubes.

5. All other moving parts should be lightly oiled or greased as appropriate.

Every 12 Months:

1. Clean the unit by hosing down with clean water to remove any grit or debris.

2. Check for any leakage between the unit and concrete wall (or pipe) and the general soundness of the surrounding civil structure. Make good any faults.

3. Check tightness of all fixing bolts/nuts including foundation bolts.

4. Whilst in the fully open/extended position check that there is no damage or excessive wear to the sealing surfaces. Consult Ham Baker Ltd for advice on repair to damaged seals.

5. Normal wear on the seals on penstock units may be overcome by adjustment of the wedges or adjusters. Seek advice from Ham Baker Ltd on the adjustment of the factory set wedges or adjusters.

6. Metal sealing surfaces and metal wedge faces should be greased, (ensuring where necessary for potable water applications that the grease has WRC/DWI approval as required).

7. Check all components for corrosion damage. Painted units should be checked for signs of corrosion or damage to the paint system and repaired in accordance with the repair scheme for the original paint system (in accordance with the paint manufacturer's instructions). Seek advice from Ham Baker Ltd regarding any components which show any signs of excessive corrosion.

8. Remove the door threaded door nut (for non-rising spindles) or threaded yoke sleeve (for rising spindles) and thoroughly check for signs of wear. These components must be replaced if excessive wear is evident (because if threads shear the door may fall/unit may fail without warning).

9. Non-rising spindles require special consideration for maintenance, particularly if the liquid level creates regular grit and debris contamination of the threads and nut.