BIOGEST®
Stormwater Solutions

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Storm Tank Flushing Gates Type KS

Key Features & Benefits:

- Can be installed in new designs or retro-fitted in existing tanks.
- Can be installed in attenuation pipe systems.
- Utilising storm water without taking storage volume.
- Robust construction in 304 or 316L Stainless Steel.
- Hydraulically driven.

How We Create Value:

- Very Low Operational Running Costs
- Long Flushing lengths can be serviced—in excess of 200 m with single flush.
- Minimal Maintenance requirement.
- 25 year design life - stainless steel manufacture.
- Reduced Operator requirement to clean tanks / attenuation sewers.

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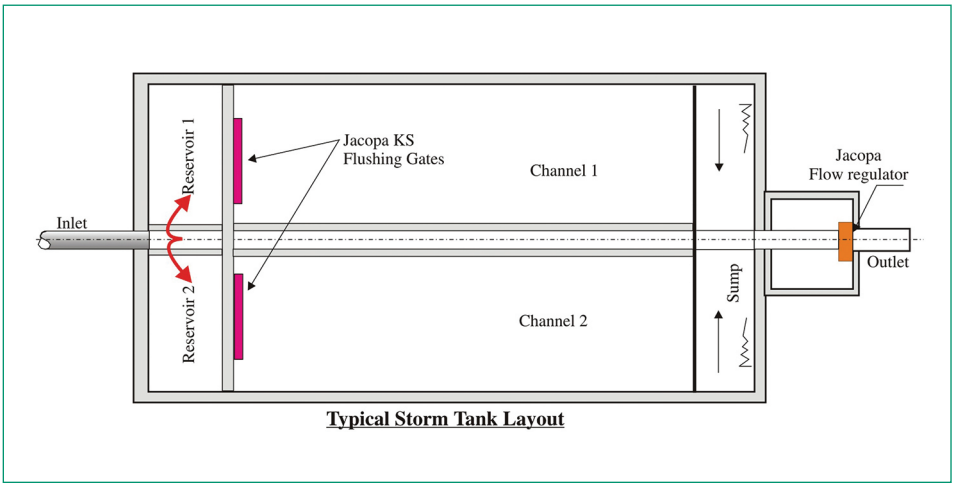
Due to increasing hydraulic loading within the sewerage systems, attenuation sewers and tanks are required to attenuate flows. This leads to the deposition of debris and silts within the construction.

The Jacopa KS Flushing Gate system is a highly efficient cleaning system to maintain the cleanliness of tanks and attenuation sewer constructions. This system is available in two modes:



Typical Storm Tank Layout

1. Electrically powered programmable system.
2. Hydraulic / Float mechanism for use where electrical power is unavailable.

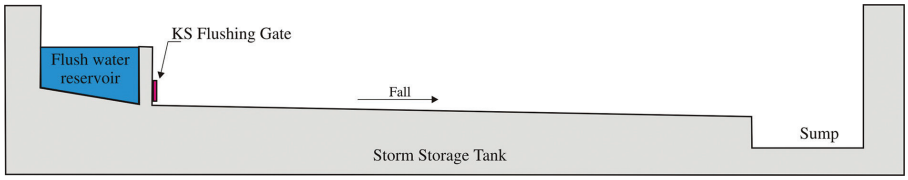
This system utilises the stored storm water to clean the chamber floor, thus not requiring the use of a potable supply.

Storm tanks of up to 200 m have been cleaned using this type of equipment with a single flush sequence. This is due to the volume of water that can be stored behind the gate which enables virtually any length of tank to be cleaned.

The KS flushing system functions on the “Dam Burst Wave” principle. A small section of the storage tank is separated to provide a storage area for the flush water. As the storage tank fills, it also fills the flushing reservoir.

After the main storm tank has been emptied, the flushing reservoir is still full waiting to be released. At a predetermined time after the tank has emptied, the flushing gate opens to release the flush water. The water speeds down the tank with a leading dynamic wave, re-suspending debris and carrying it on to the receiving sump at the lower end of the tank / attenuation sewer.

The receiving sump at the lower end of the tank is designed to prevent “back wash”. This is achieved by sizing the sump to be 120 % of the flush volume (min) to cater for the water and debris.



Gate Control:

The gates are controlled by a Control panel. Multiple gates can be individually configured to open in a defined sequence, triggered from an initial signal usually provided by an ultrasonic level detector.

However, a hydraulic float mechanism can be utilised for small rural tanks where electrical power is not available.

Multiple flushes can be catered for with the provision of a water supply to the flush reservoir if necessary.

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Photographic Sequence:

Once the storm tank / attenuation sewer has emptied, the system is armed and ready.

The flush water reservoir (s) are full and the gates are awaiting the open signal from the control panel.

The first gate is signalled to open.

The hydraulic power-pack releases the gate and the water pressure opens the gate.

Allowing the stored water to flow out rapidly.

The dynamic wave passes down the flushing lane, cleaning the tank.

The flushing water re-suspends and carries the debris down the tank and deposits in to a suitably sized sump at the bottom end of the tank.

This sump is allowed to empty through the outlet pipe prior to signalling the next gate to open.

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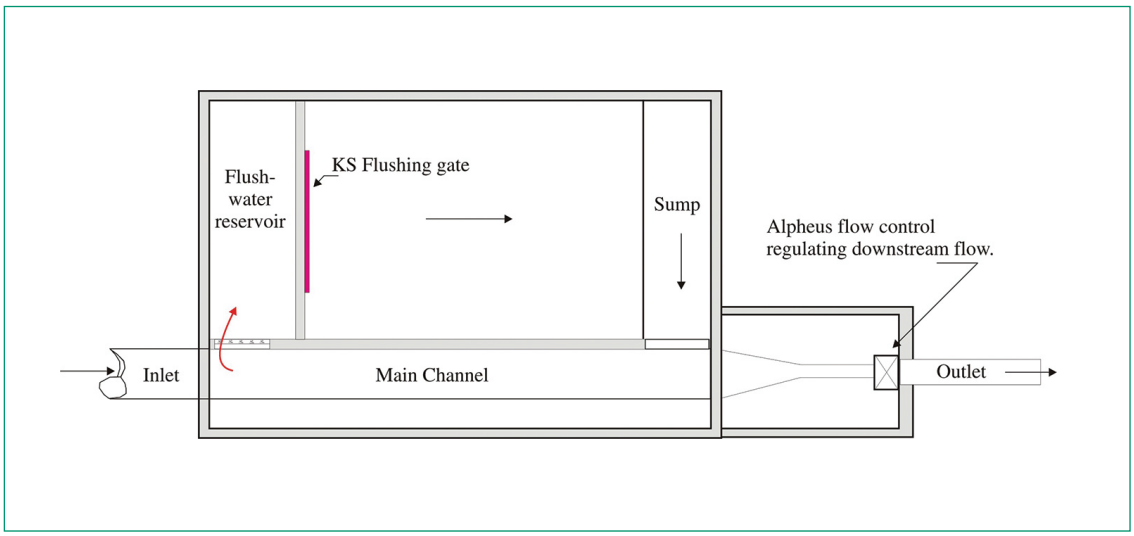
Storm Tank Layout Suggestions:

Here are a few suggestions for tank layout, which may be useful for the design of new tank systems. Please note that there will be other options available, and that these suggestions are not exhaustive.

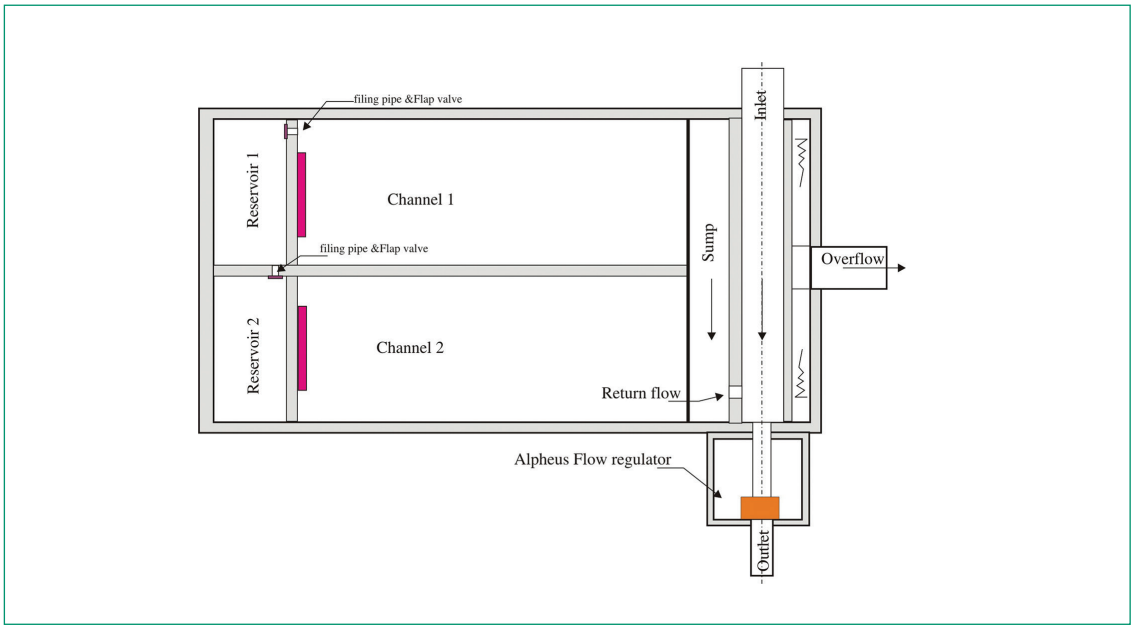
Example 1:

Main channel has the downstream flow regulated by a flow control device. Storm flow builds up and first overflows into the flush-water reservoir, charging the system. The main storage tank fills as required. Following the tank emptying, the KS Flushing gate opens. The sump drains back into the main channel.



Example 2:

Storm-water tank in secondary enclosure; double channel with gravity flow back to main channel.



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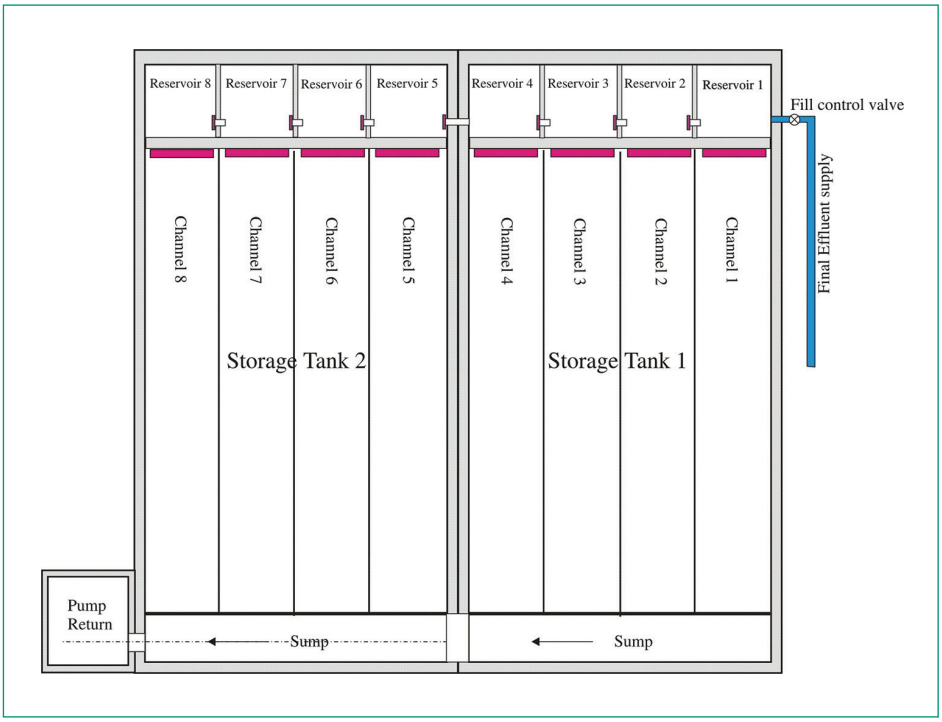
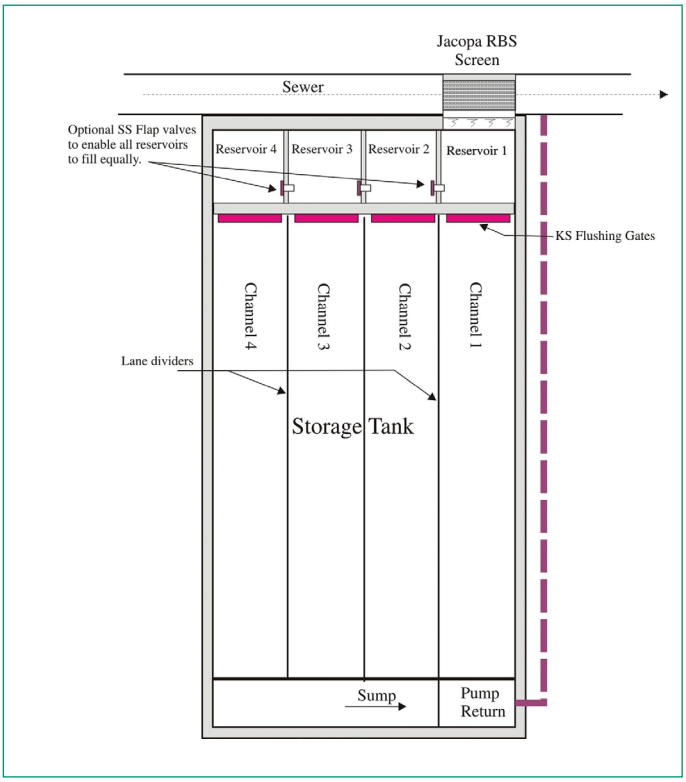
Example 3:

This shows multiple storm tanks with 4 No gates in each tank. Lane dividers are utilised to produce individual flushing lanes. Steel lane dividers can be seen in the photographs on page 2.



The reservoirs can be filled as the first tank fills. In addition, this example shows the provision of a water feed. The KS Gate Control panel can also control an actuated 'fill control valve', so that multiple flushes can be made available to Operational Staff.

The Jacopa Control Panel can allow for any combination and order of gate release, this can be programmed on site during the commissioning process. If an Ultrasonic level detector is used, it would be positioned over the sump area, to detect when the sump is empty. In the example above, each gate could be released individually in turn, allowing for the sump to empty between releases, if the sump capacity was limited. Alternatively gates could be opened in pairs (Gates 1 & 5 : Gates 2& 6 etc). This is decided on a site by site basis to suit Operational needs.



Example 4:

The screened flow entering a storm tank into the flushing reservoir No 1 and filling all flushing chambers prior to filling the main tank. This shows the option of providing stainless steel flap valves between each reservoir to enable all storage units to fill equally.

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As the water is stored within the tank, and does not have to be supported in a bucket or other structure, large volumes can be retained for cleaning purposes. Flushing lanes in excess of 250 m have been successfully flushed.

In addition, tanks with poor floor gradients can be catered for.

Adjacent photo shows low level concrete lane dividing walls, which form the ***'Flushing Lanes'***

The KS flushing gates can also be used within attenuation sewer systems, where by design, solids are encouraged to settle. Very often the flow rate exiting attenuation sewers can be low, not permitting solids to be re-suspended, therefore, cleaning methods should be considered at design stage.

Gate sizes and weights:

If a wider flushing lane is required, two gates can be linked and opened in unison. The adjacent photo shows this type of liked gate arrangement. However, care is to be taken to avoid the reduction in cleaning power by allowing the wave to meander.

Gate Model	Width mm	Weight Kg	Width of flushing lanes From m	To m
KS500	500	56	-	1.75
KS750	750	68	1.75	2.00
KS1000	1000	85	2.00	2.50
KS1500	1500	120	2.50	3.00
KS2000	2000	148	3.00	3.50
KS2500	2500	200	3.50	4.00
KS2800	2800	230	4.00	5.00
KS3500	3500	240	5.00	5.50
KS4000	4000	270	5.50	6.00

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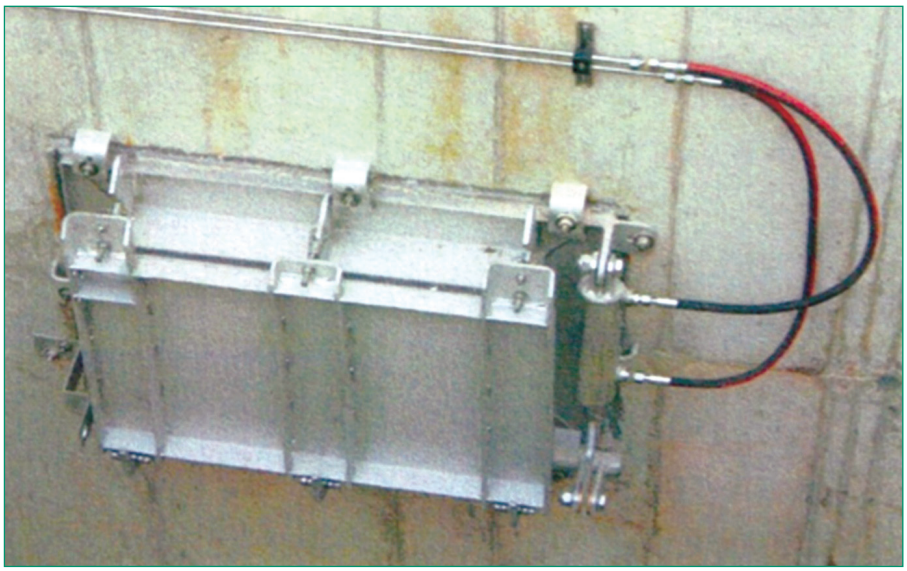
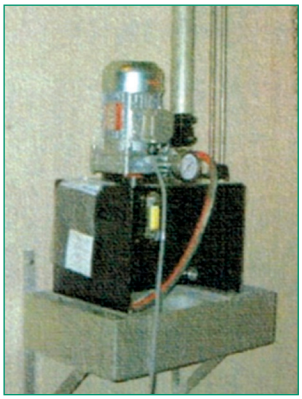
Control Sequence

There is an ultrasonic transducer located at the lower end of the storm tank / attenuation sewer, which monitors the sump level.

When the water level in the sump rises, and reaches the first set-point, the system 'armed to flush'. Dependent upon the tank layout, a second transducer can be located over the flushing reservoir to check that there is sufficient water to enable a successful flush. This could be linked to an exterior water supply to 'top up' the reservoir if required.





Once the storm tank has filled and emptied, the level in the sump drops below a specified set-point, the flushing sequence is initiated. The first gate is released by the driving of the locking mechanism by the hydraulic power-pack. The water released travels down the flushing lane confined by dwarf walls defining the lane. The water and debris are transported to the sum and allowed to drain down before the system releases the next gate. Once all the gates in the system have been operated, the system is re-set and waits for the next tank fill.

Photo of Power-pack

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