



Canal Intakes

CODY VOLT

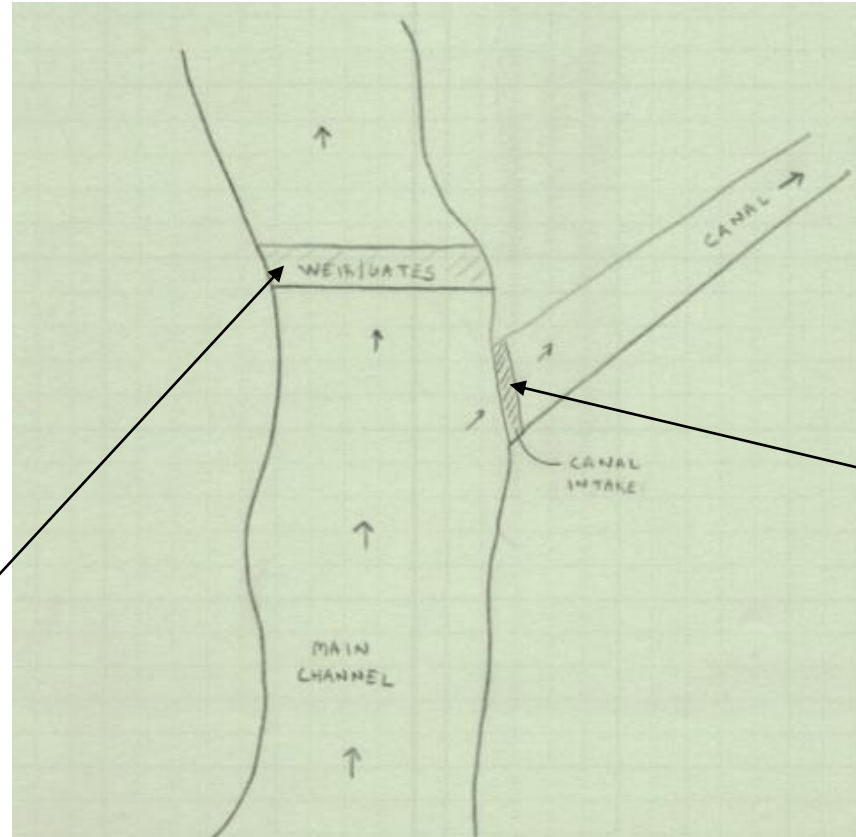
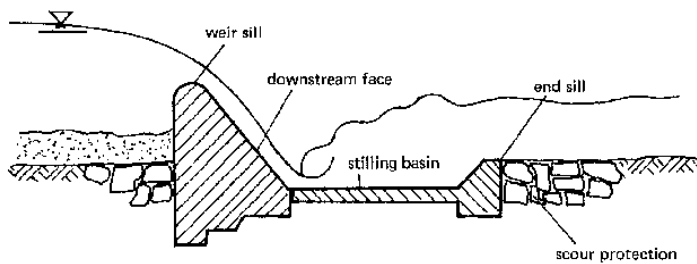
What is a Canal Intake?

A purpose of a canal intake is to withdraw water from a source (the river) and direct it into a separate channel (the canal)

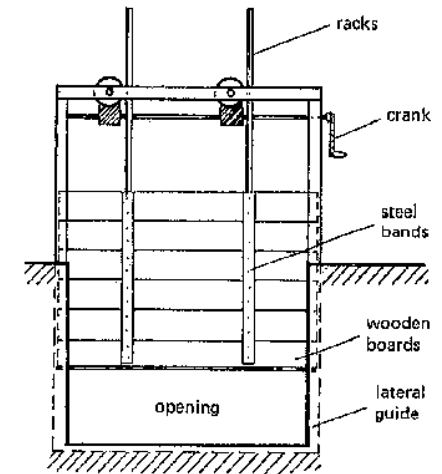


Components

Flow regulation (weir, sluice gates, etc.) to raise water surface elevation to a desired level



Canal intake structure (sluice gate, weir, etc.)



Issues with canal intakes

This presentation will mostly cover the topic of issues associated with canal intakes

Issues can be broken down into two categories

- Issues related to flow characteristics
- Issues related to sedimentation



Canal filled with sediment

Issues with Flow Characteristics

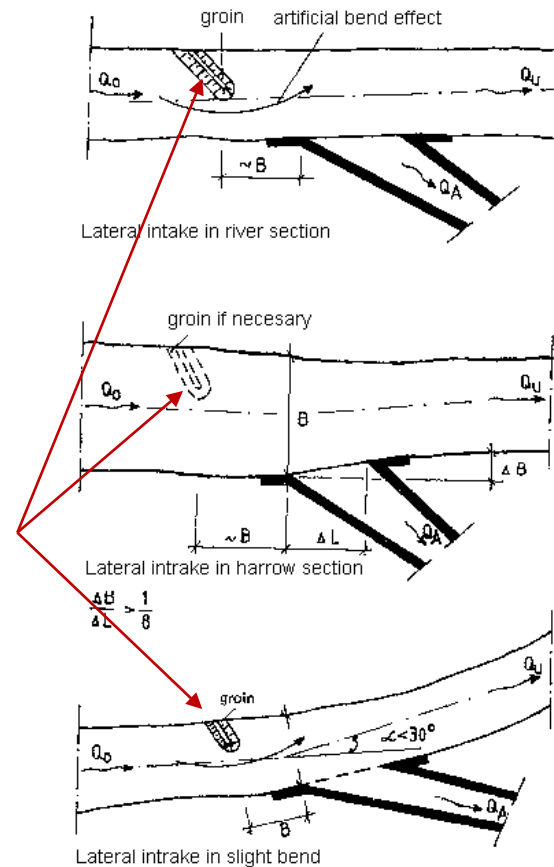
Flow should be directed in a manner that:

- Prevents significant bank erosion
- Prevents unwanted head loss

Methods to re-direct flow

- Guide vanes
- Groins/spurs
- Guide banks

Devices such as groins can be used to direct flow



Issues with Sedimentation

If the water source (the river) has a high concentration of sediment, additional measures may be needed to remove sediment from entering the canal

Methods to remove sediment from water entering the canal:

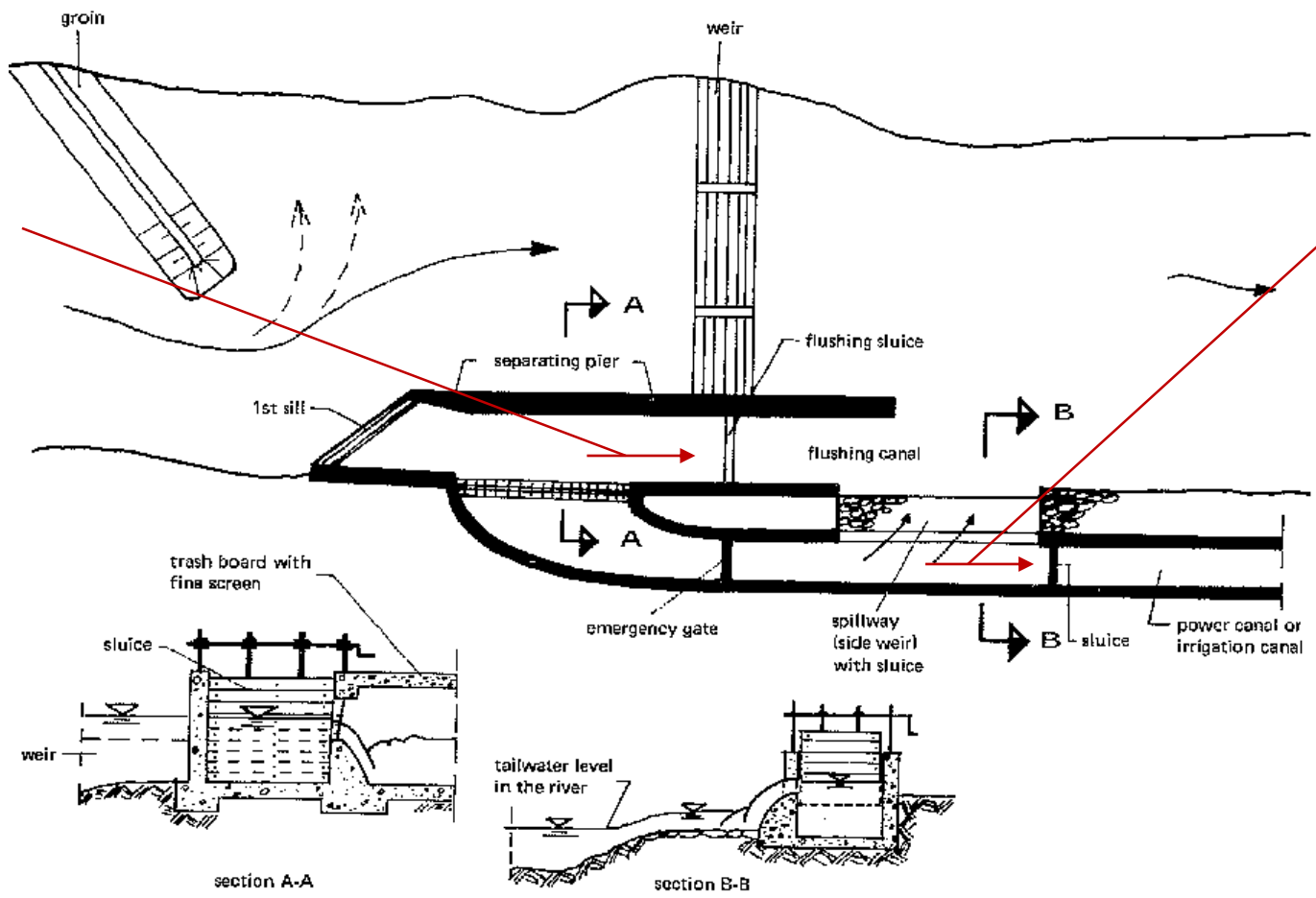
- Flushing sluice
- Settling basin
- Bottom guide vanes
- Vortex tube

Ideally, sediment should be returned to the main channel. The nature in which it is returned to the main channel could cause issues as well, large amounts of deposition in a localized area for example.

Flushing Sluice

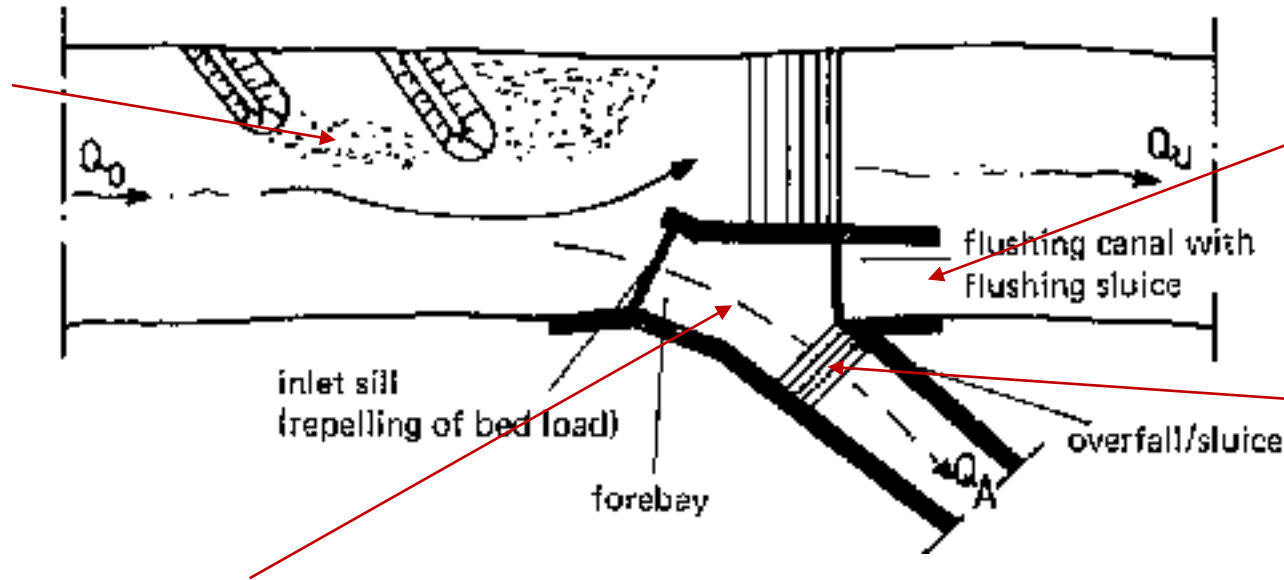
Water with high sediment concentrations will go down the sluice and return to the primary channel

Water with very low sediment concentrations will go down the canal



Settling Basin

Also note that some sediment is being trapped here

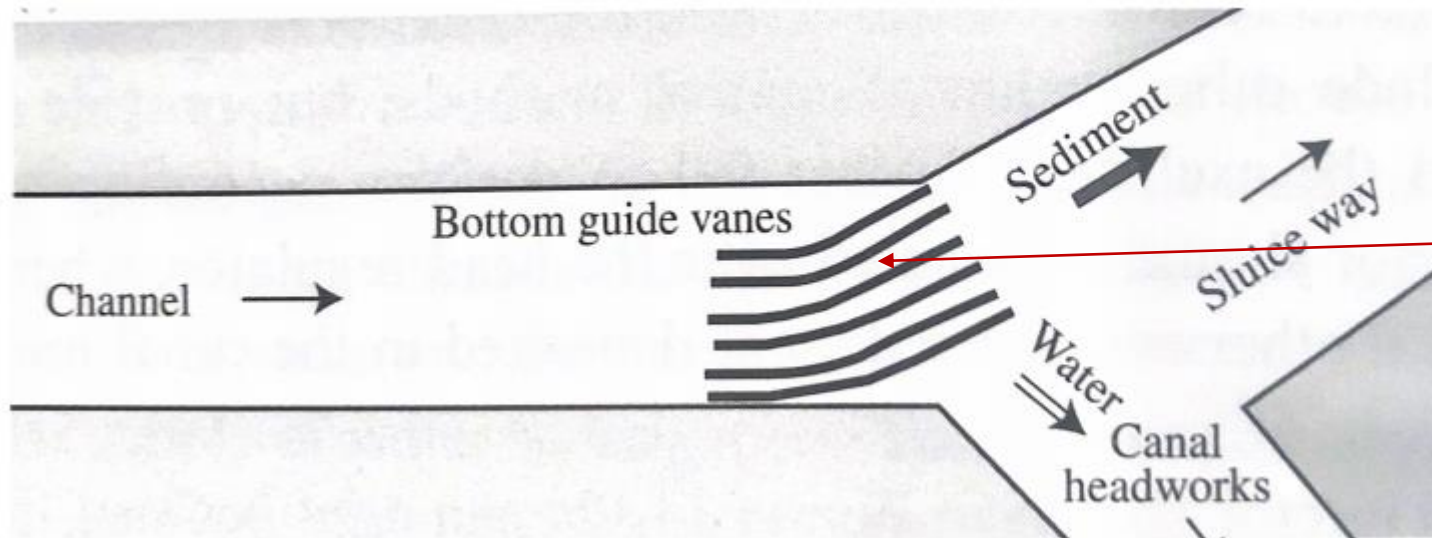


Sediment will return to channel here

“Clean” water will travel over the weir and down the canal

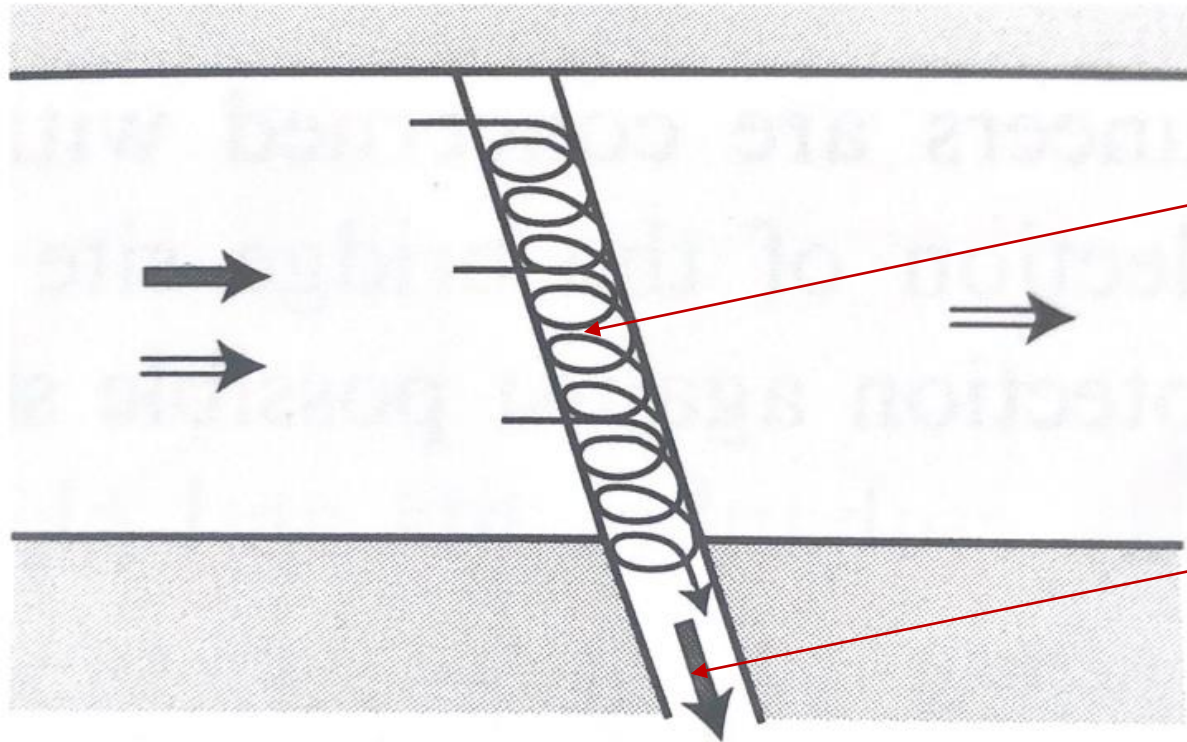
Sediment is trapped here before entering canal. If trap efficiency is high enough, this could work well for suspended load situations too.

Bottom Guide Vanes



Guide vanes on the channel bottom will force **bedload** to stay in the main channel. May not work well with high suspended load situations.

Vortex Tube



Sediment will be removed from the main current and fall into the vortex tube

The vortex will force sediment out of the tube, and back into the main channel

Sources

<https://i.ytimg.com/vi/s1yUxNVJvrs/maxresdefault.jpg>

<http://www.nzdl.org/gsdImod?e=d-00000-00---off-0hdl--00-0---0-10-0---0---0direct-10---4-----0-1l--11-en-50---20-about---00-0-1-00-0--4----0-0-11-10-0utfZz-8-00&cl=CL1.14&d=HASH10e6c50b76a9b6493d7247.4.3>=1>

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