



US Army Corps  
of Engineers®  
St. Louis District

# PIPE INSPECTIONS

## WHY ARE THEY IMPORTANT?



Pipe inspections help assess and communicate risk associated with levees.

**700**

More than 700 pipes impact levees in the St. Louis District portfolio

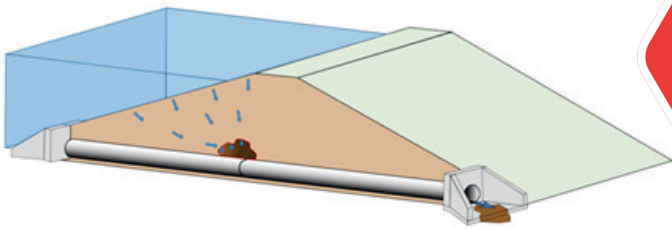
Internal Pipe inspections help inform the inspector of issues, like this one, that may be hidden under the foundation.

**#1**

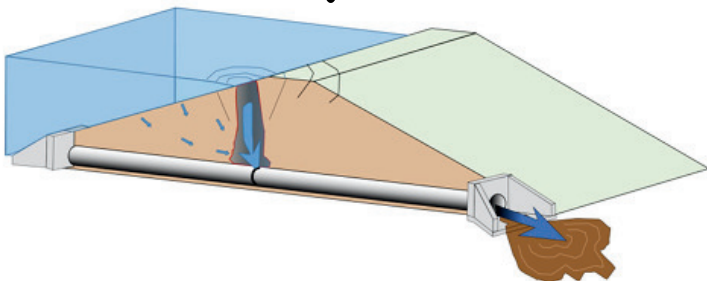
Culverts are the #1 contributing factor to internal erosion breaches

Gravity drains aren't the only type of pipe that increase risk of failure...

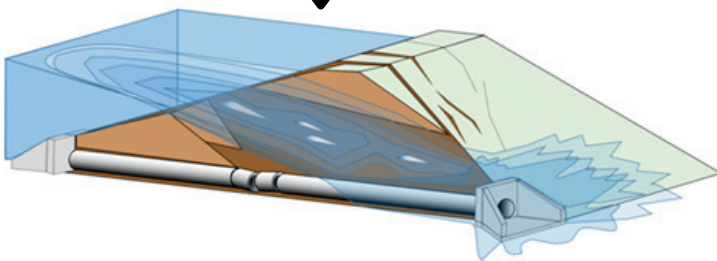
### COMMON LEVEE FAILURE MODE



A void forms in the embankment as soil flows into a joint, crack, or hole.



The void reaches the water source and starts uncontrolled flow.



Increased soil removal causes embankment failures and eventual breach.



Photo: Discharge pipes over levee crown

...failure of discharge pipes, utility pipes, toe drains, and relief well collector pipes can all negatively affect levee performance.



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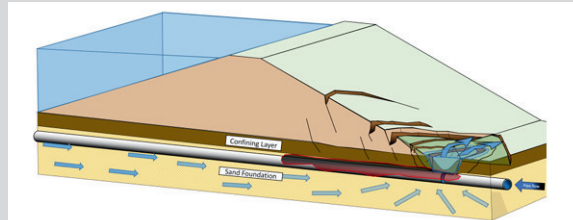
### DEFECT

### PROGRESSION

### RESULT



Broken joint in relief well collector system pipe



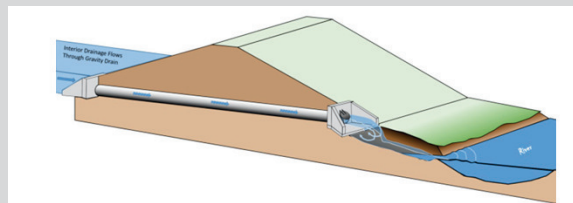
Seepage fills joint and damages the embankment



Collector system is compromised



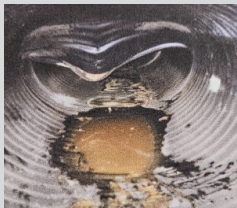
Erosion at outlet



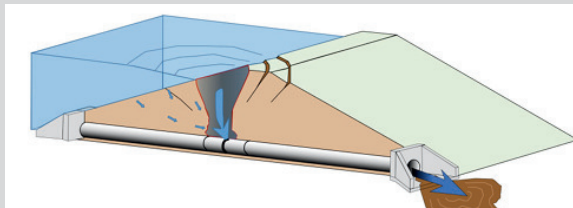
Erosion under the outlet increases



Outlet and embankment collapse



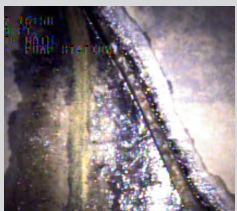
Collapsed pipe



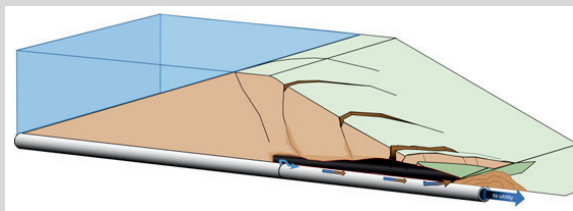
Uncontrolled flow reaches the collapsed pipe



Sinkhole develops



Crack in pressure pipe

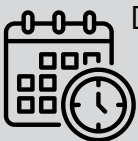


Leak from pressure pipe crack erodes embankment

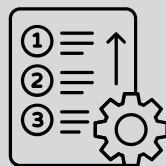


Interior flooding occurs

### Actions to consider...



Develop a schedule for recurring inspections to monitor conditions



Prioritize levee maintenance activities to account for pipe maintenance



Budget for pipe inspections, repairs, and replacements

Questions or concerns? Contact the Dam and Levee Safety Section Chief, Jeremy Eck, at 618-319-5328 or [jeremy.l.eck@usace.army.mil](mailto:jeremy.l.eck@usace.army.mil).