



Interior Drainage



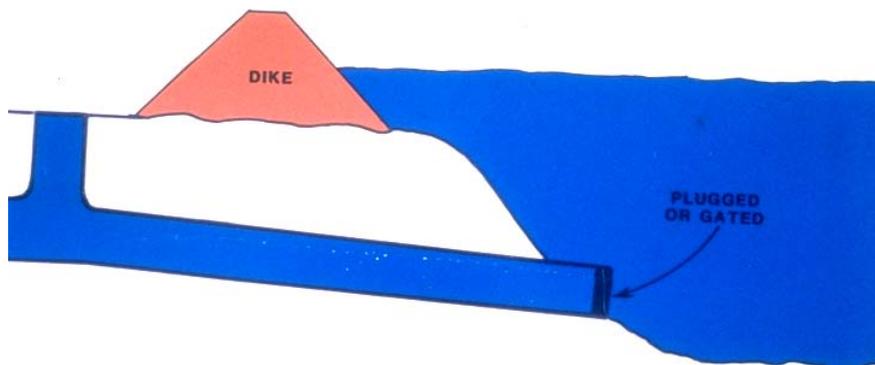
Interior Drainage

- High river stages and presence of flood barriers (levees) can result in blockage of normal drainage to the river
- Unblocked storm sewer outlets can cause backup of floodwaters into protected areas



Interior Drainage

- Evaluate drainage area
 - How much runoff is anticipated?
- Are ponding areas available to store runoff?
- Will pumping be required?
- Are all pipe outlets to river adequately blocked?
- What power sources are available if pumping to the river is required? Remember that power outages often occur during floods. Need to have a backup plan for power
 - Emergency generators?
 - Tractors?



Storm sewer plugged or gated at outlet



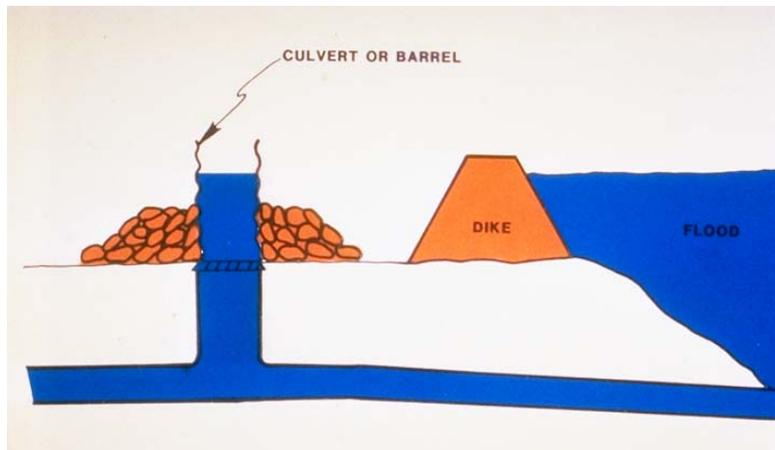
Flap gates at outlets of corrugated metal pipes



Inflatable plug in pipe outlet



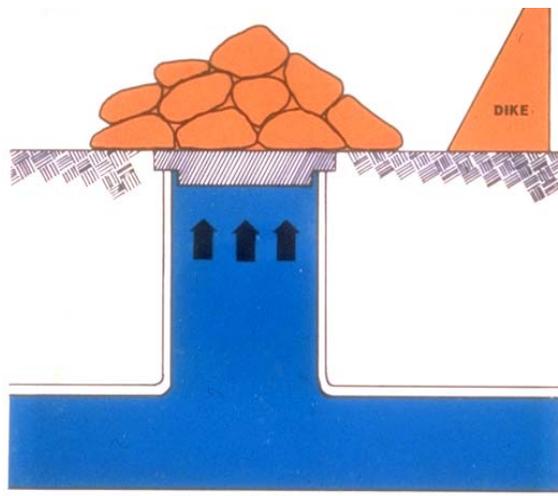
Inflatable plug in PVC pipe outlet



Chimney manhole using culvert or manhole barrel to prevent backup of floodwater into protected area through sewer system



Chimney storm sewer manholes using manhole barrels



You need enough weight on the manhole cover to counteract the pressure of the water on the wet side of the levee.

A 10' difference in elevation from river surface to manhole cover would exert 1,960 pounds of pressure on the manhole cover and require something that heavy to counteract it.

WEIGHTED MANHOLE – NOT PREFERRED



Interior drainage trapped behind levee



Interior Drainage Pumps

- COE
 - Crissafulli
 - PTO-drive
 - Flygt
 - Electric submersibles
 - Hydraulic
- Rental
 - Self powered
 - PTO drive
 - Electrical





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Community can pick up pump/s or delivery can be coordinated through State or USACE EOC



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Diesel pump supporting pump station operations



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Pumping out storm sewer



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Diesel pumping from ponding area over levee



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Pumping at Afton 4/13



Crisafulli backed into ponding area pumping over levee



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Demo showing how to secure the discharge hose. The levee bank must be protected too; the discharge is powerful



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KEEP THE DISCHARGE HOSE OFF THE LEVEE



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Multiple pumps in use – make sure all are monitored!