

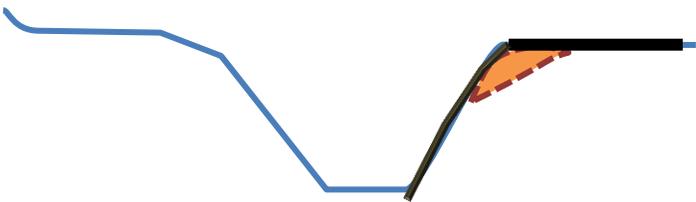
Avoid Excavating the Stream Channel too Deep



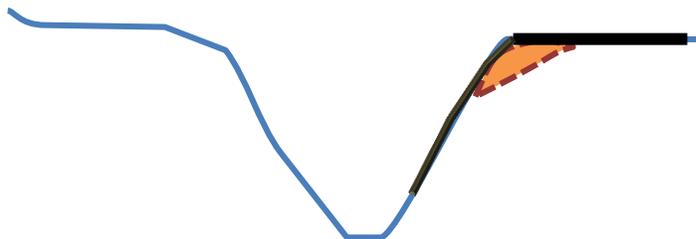
Pre-flood stream channel / floodplain cross-section; with road surface to the right and a more erosion resistant valley side wall depicted on the left.



Channel and road shoulder eroded during peak flood flow, then, during flood recession, the new wider channel completely fills with sediment.



Channel is excavated (too deep) and flood generated sediment is used to shore up road shoulder, road is remade and stream bank is armored.



Another flood event occurs, and flood flows are contained between the resistant left bank and the armored right bank; the increased power erodes the stream bed further, below the armoring, and flows are further impinged against road embankment.



Almost immediately, and often during the same event, the impinging flows of the incised stream channel erode the embankment and the bank armoring and road with it.

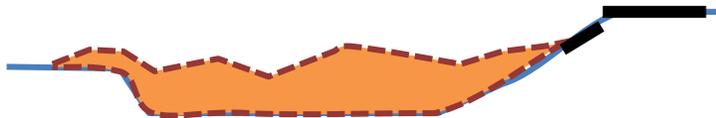
When excavating an aggraded stream bed -- establish the equilibrium channel width and depth to avoid bed incision and road failure.

Vermont Rivers Program - <http://www.vtwaterquality.org/rivers.htm>

Avoid Over-widening the Stream Channel



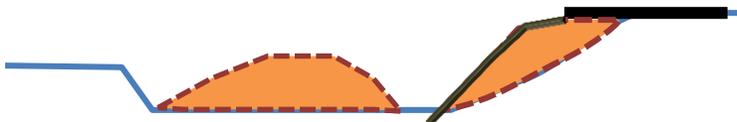
Pre-flood stream channel / floodplain cross-section with road surface depicted on an upper terrace to the right.



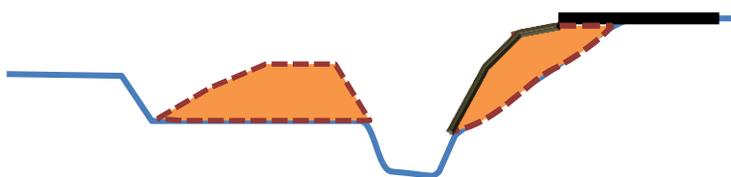
Channel and road shoulder eroded during peak flood flow, then, during flood recession, the new wider channel completely fills with sediment.



Channel is excavated (too wide) and flood generated sediment is used to shore up road shoulder, road is remade and stream bank is armored.



Another flood event mobilizes sediment from upstream and the over-widened channel does not have the depth and power during the flood recession to transport the sediment volume. This sediment forms a large mid-channel bar impinging flows against road embankment.



Almost immediately, and often during the same event, the impinged flows erode the stream bed below the bank armoring.



The bed incision causes the bank armoring to fail and the road along with it.

When excavating an aggraded stream bed -- establish the equilibrium channel width and depth to achieve sediment transport and avoid more aggradation, bed incision, and road failure.