

Martinez flood plain : a groundwater recharge site

I conducted a study to determine the amount of groundwater held in a cubic yard of stream sediments in the Martinez flood plain. Three samples of sediments from different sites were analyzed to determine porosity. In each case, half a gallon of wet sediment was evaporated to dryness on a stove. The sample was then placed in a calibrated container and compacted. The sample was then re-hydrated by adding water from a measuring cup.

Samples:

- 1] Twenty oz. of water was added to re-hydrate the 1/2 gallon sample.
A cubic yard would hold 63 gallons of water.
- 2] Twenty-three oz. of water was added to rehydrate the 1/2 gallon sample.
A cubic yard would hold 72.6 gallons of water.
- 3] Twenty-four oz. of water was added to rehydrate the 1/2 gallon sample.
A cubic yard would hold 75.7 gallons of water.

The average cubic yard of stream sediment holds 70.4 gallons of water. The average porosity is 35%.

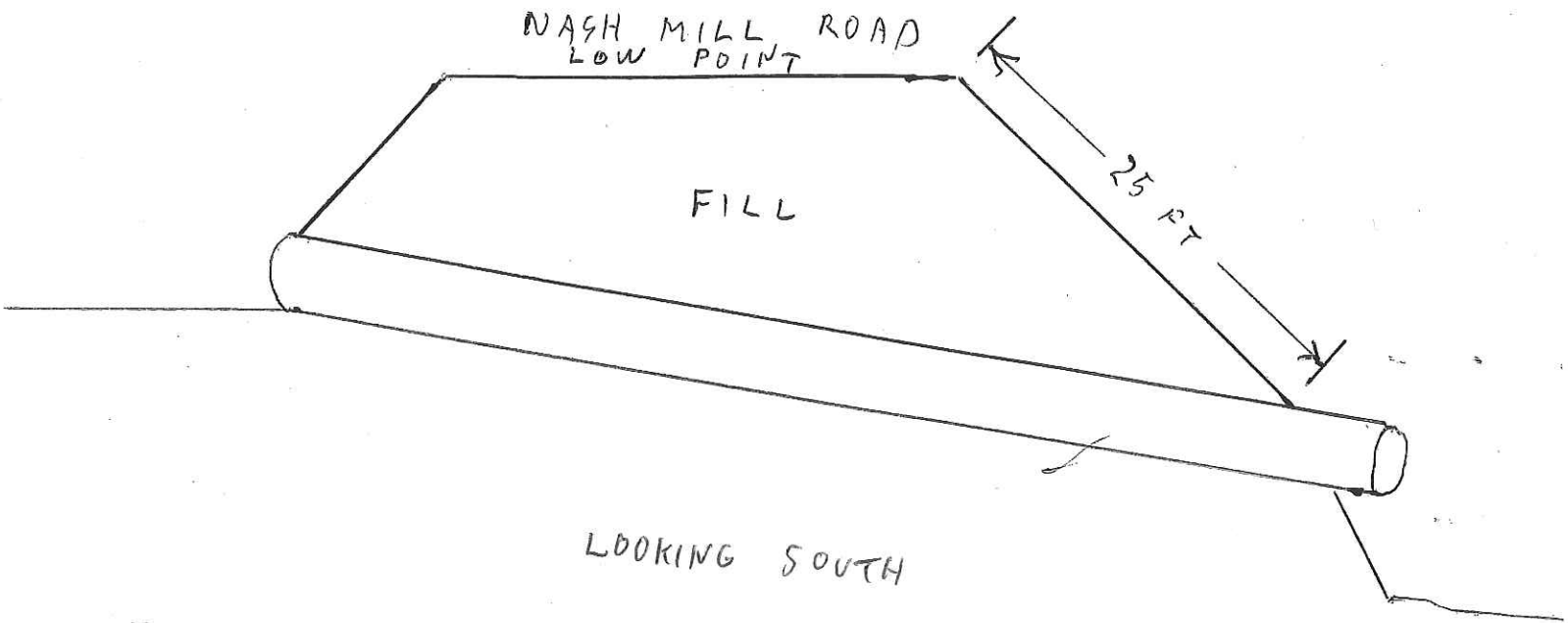
The Martinez flood plain is some 670 feet long and the width varies from 20 feet to 60 feet. The area is roughly 29,000 square feet or 3,222 square yards. The floodplain was created in 1947 when Nash Mill Road was constructed on a dirt fill which was cribbed with redwood logs. According to Gary Nash, the current 4 foot culvert was installed in 1970. The groundwater stored in the top 3 feet of sediments [below stream level], is estimated to be 226,800 gallons. In the lower end of the floodplain, the sediments are over 10 feet thick, so the total floodplain water storage is probably over half a million gallons.

This stored groundwater contributes to the springs which flow through the road fill below the lower end of the culvert. Flows of over a gallon per minute, of 56 degree F. water were observed in late July, 2014. This is a valuable source of water for the fish and for the Martinez household.

I believe that any plans to replace the existing pipe should include preserving this flood plain as well.

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MARTINEZ CULVERT



1 INCH = 10 FEET

↑
TO 128

PARKING AREA

[PROPOSED ROAD LOW POINT] → FLOOD FLOW

FLOOD FLOW →

FENCE

○
↑
REDWOOD
TREES

MARTINEZ
DRIVE WAY

NASH MILL RD

↓
NORTH

[EXISTING ROAD
LOW POINT]

CULVERT

