

HYDROLOGY MAP
GRANT BARNETT PROPERTIES
2000 Grant Street, Cambridge, CA
Phone: 925.499.8212 & 925.499.8213

X

5/28/08 Red [Signature]

Cross Section for Garnett Creek at Grant Street, 100-Year Storm

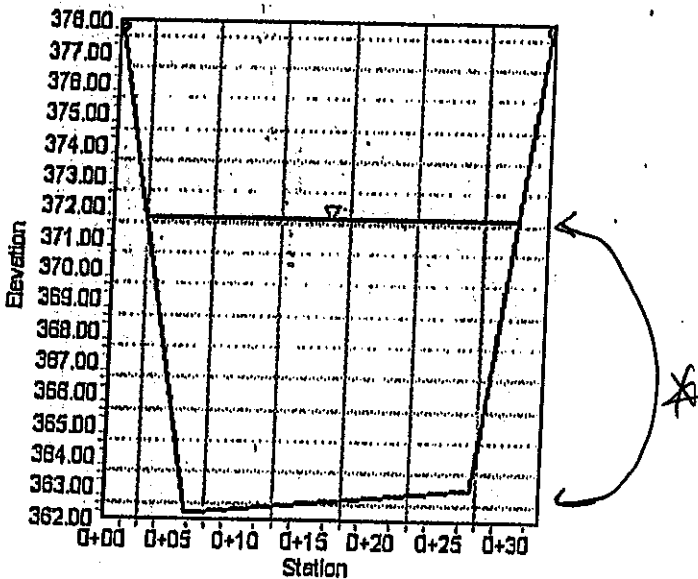
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.01000	ft/ft
Normal Depth	9.46	ft
Discharge	2900.00	ft ³ /s

Cross Section Image



Worksheet for Garnett Creek at Grant Street, 100-Year Storm

Project Description

Friction Method: Manning Formula
 Solve For: Normal Depth

Input Data

Channel Slope: 0.01000 ft/ft
 Discharge: 2900.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	377.80
0+08	382.20
0+27	383.00
0+32	377.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 377.80)	(0+32, 377.80)	0.035

Results

Normal Depth	9.46 ft
Elevation Range	382.20 to 377.80 ft
Flow Area	220.18 ft ²
Wetted Perimeter	40.30 ft
Top Width	27.57 ft
Normal Depth	9.46 ft
Critical Depth	8.40 ft
Critical Slope	0.01479 ft/ft
Velocity	13.17 ft/s
Velocity Head	2.70 ft
Specific Energy	12.16 ft
Froude Number	0.82
Flow Type	Subcritical

Cross Section for Garnett Creek Downstream of Grant Street, 100-Year

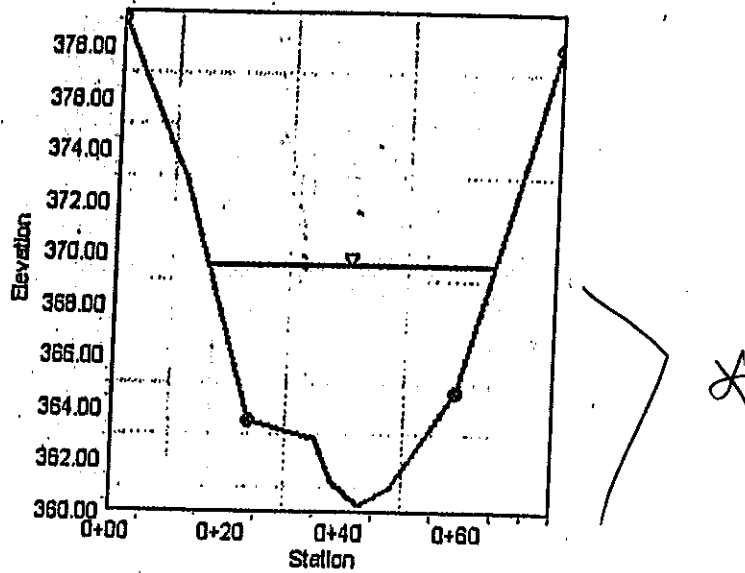
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01000 ft/R
Normal Depth 9.27 ft
Discharge 2920.00 ft³/s

Cross Section Image



Area/ Degree of Roughness	Description	Manning's Roughness Coefficient
Banks		
Low	Earthen bank under canopy with upright trees having few branches within 10 feet of channel bed or sparse vegetation on bank	0.050
Medium	Earthen bank with moderate blackberry or woody growth	0.070 *
High	Thicket of blackberry or willow; dense willow trees with horizontal stems or branches	0.090+ *
Channel Bed		
Low	Gravel bed with non-native rock fragments with few or no willow stems or branches	0.030
Medium	Gravel bed with non-native rock fragments with moderate amounts of thin woody branches/saplings intruding into channel or few downed trees in channel	0.040
High	Gravel bed with non-native rock fragments with downed stems, branches, and debris in channel	0.050
Extreme	Gravel bed with non-native rock fragments with dense obstructions of downed stems, branches, and debris in channel	0.060

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PROJECT
SHOWS
11/30/2007
REPORT

Roughness Coefficients

Manning's roughness coefficient is a coefficient of Manning's equation, the primary hydraulic formula used to estimate flow depth in open channels. Roughness coefficients are a measure of the channel's hydraulic resistance to flow. High roughness coefficients indicate high obstructive values such as dense stands of willows. Low roughness coefficients represent more open channel areas. Each cross section is described with a roughness coefficient for the left bank, channel bed, and right bank (looking downstream). The roughness coefficient is a composite value that represents the channel upstream and downstream, halfway to the next cross section.

Manning's roughness values were estimated for the channel and overbank areas using the Cowan equation recommended by USGS (1989) with guidance from Chow (1959). The Manning's roughness values summarized below were used as guidance for the actual Manning's roughness values in the model. See Appendix D for the calculations using the Cowan equation.

* CURRENT STANDARDS
APPLIED BY KURT LARSEN