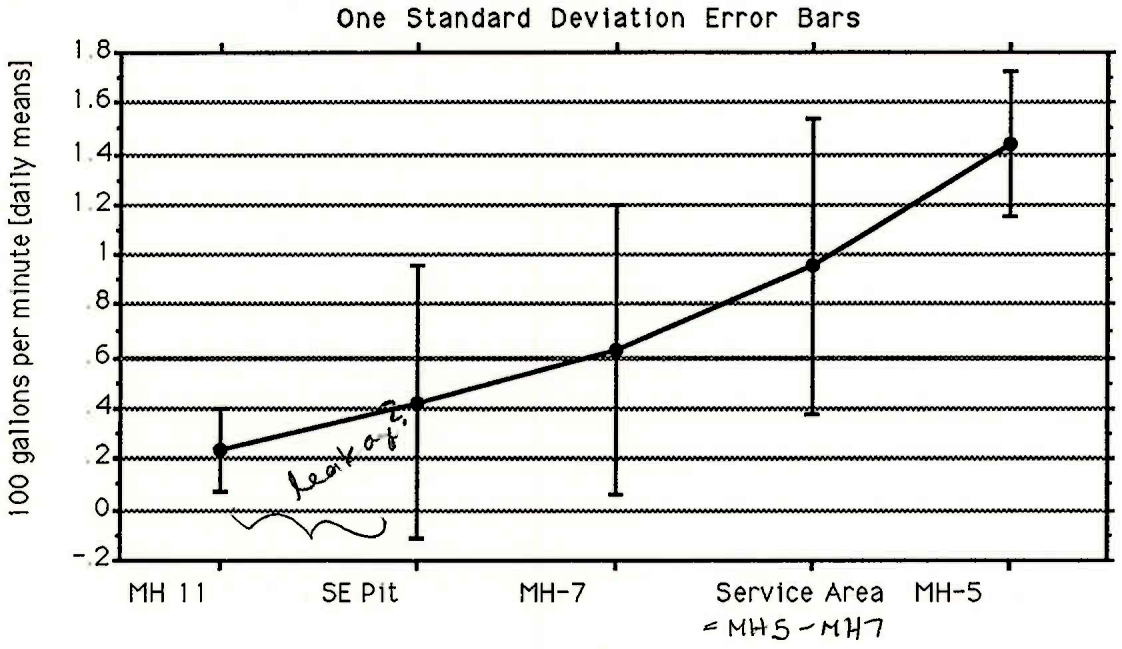
CEDAR HILLS Hydrology

Flows Do Increase as one proceeds downstream



Based on data from Feb 4, 1988 to March 24, 1988.

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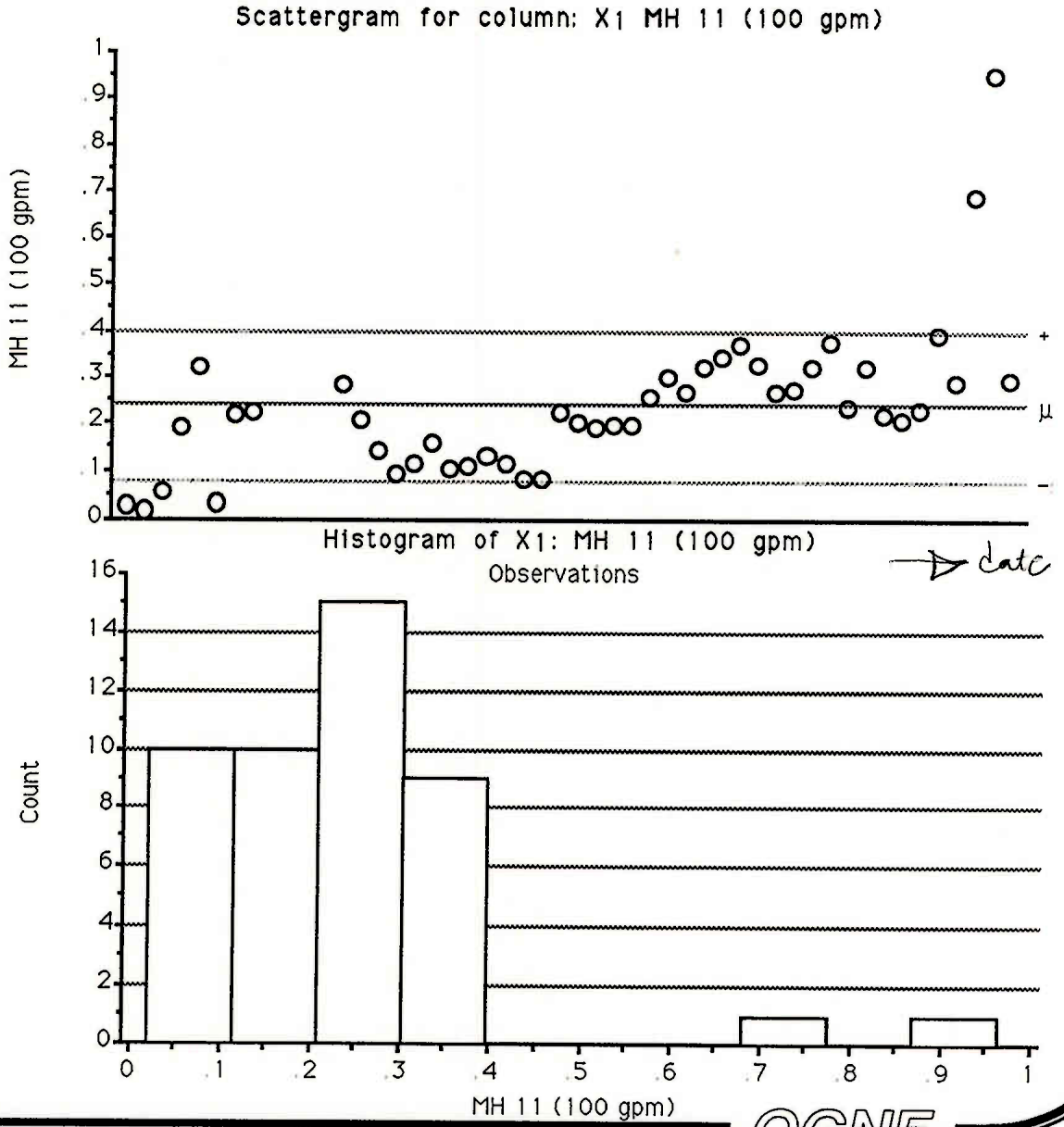
CEDAR HILLS Hydrology

Man Hole 11 (ATC)



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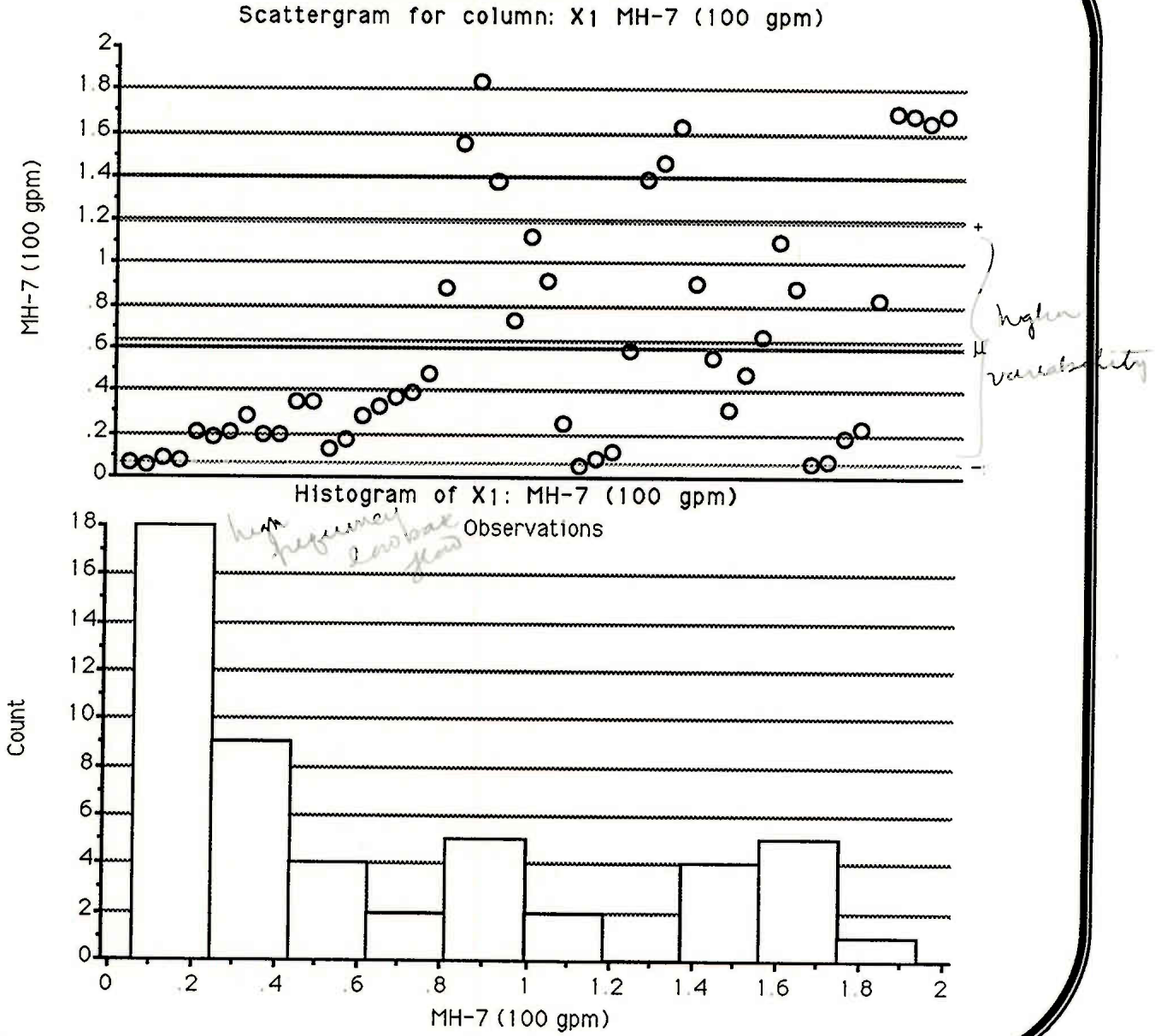
CEDAR HILLS Hydrology

Man Hole 7 (PS3 - SE Mt addition)



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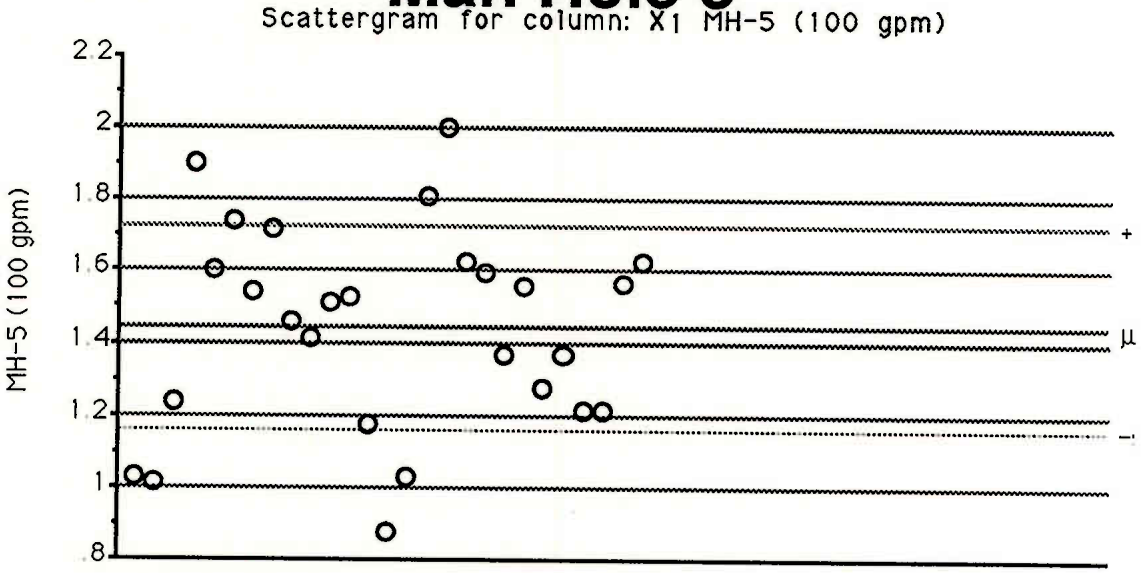
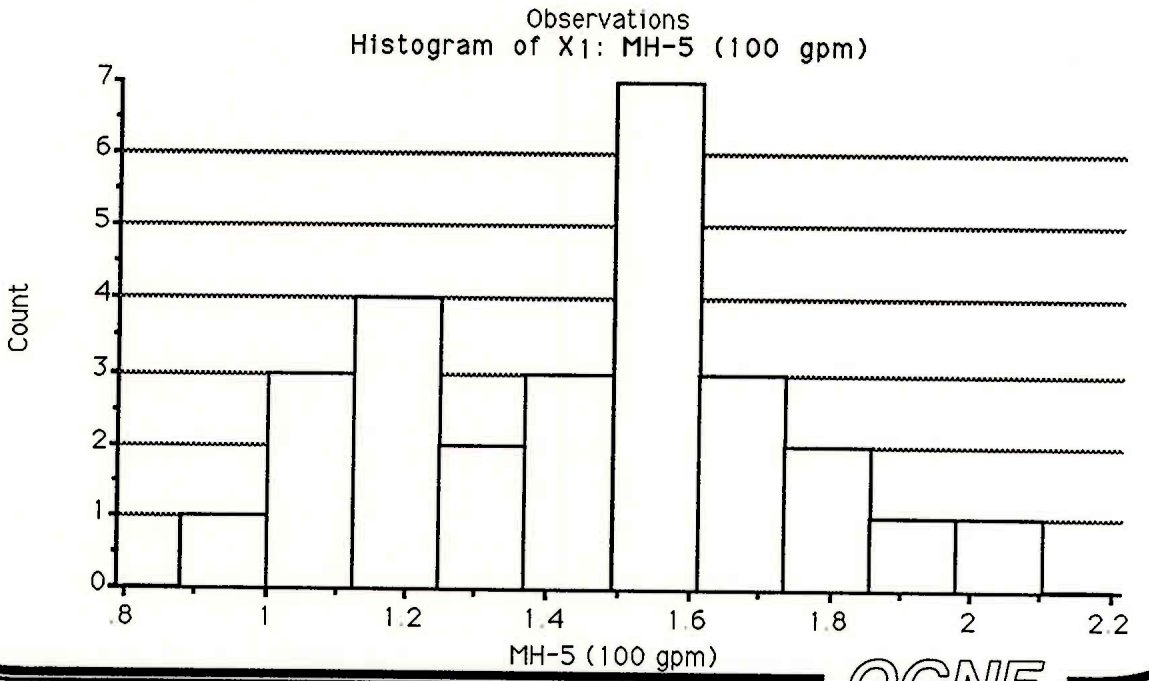
Man Hole 5





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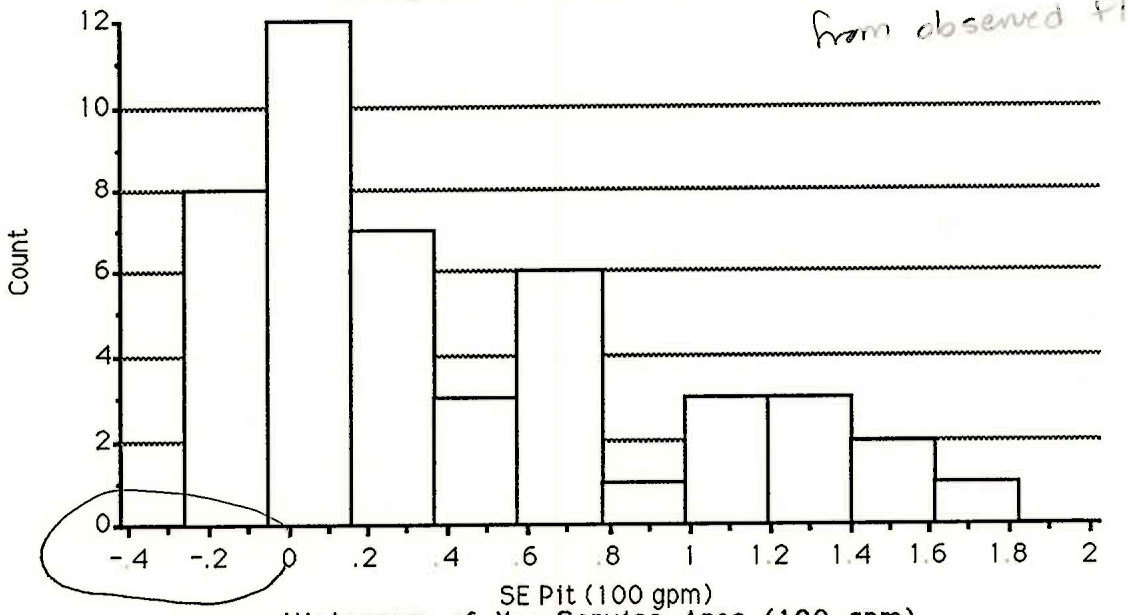
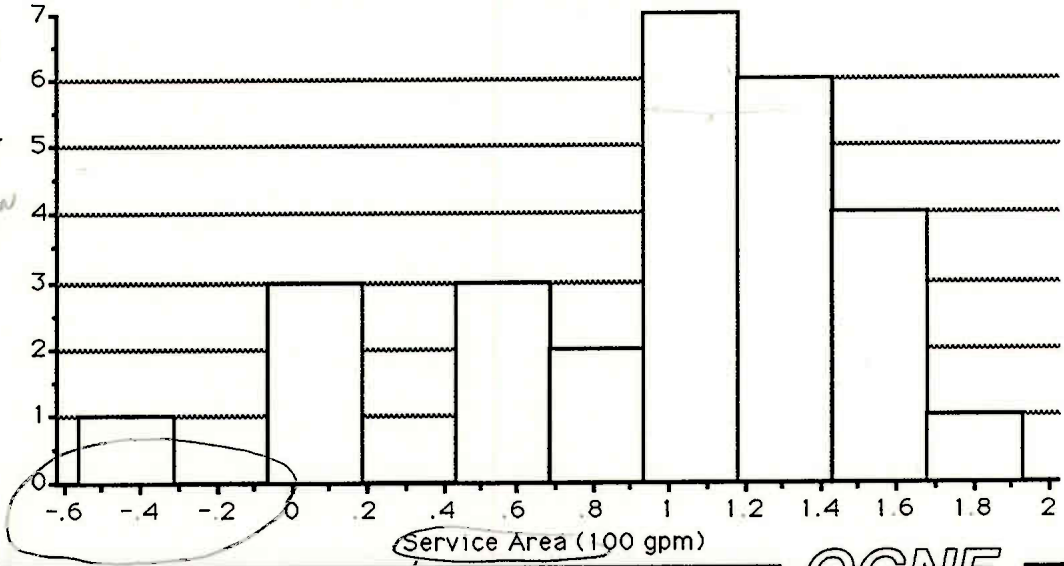
for entire data set after bubbler change

CEDAR HILLS Hydrology

Calculated Flows



by backing out from observed flows



probably not losing this much flow — problems with data

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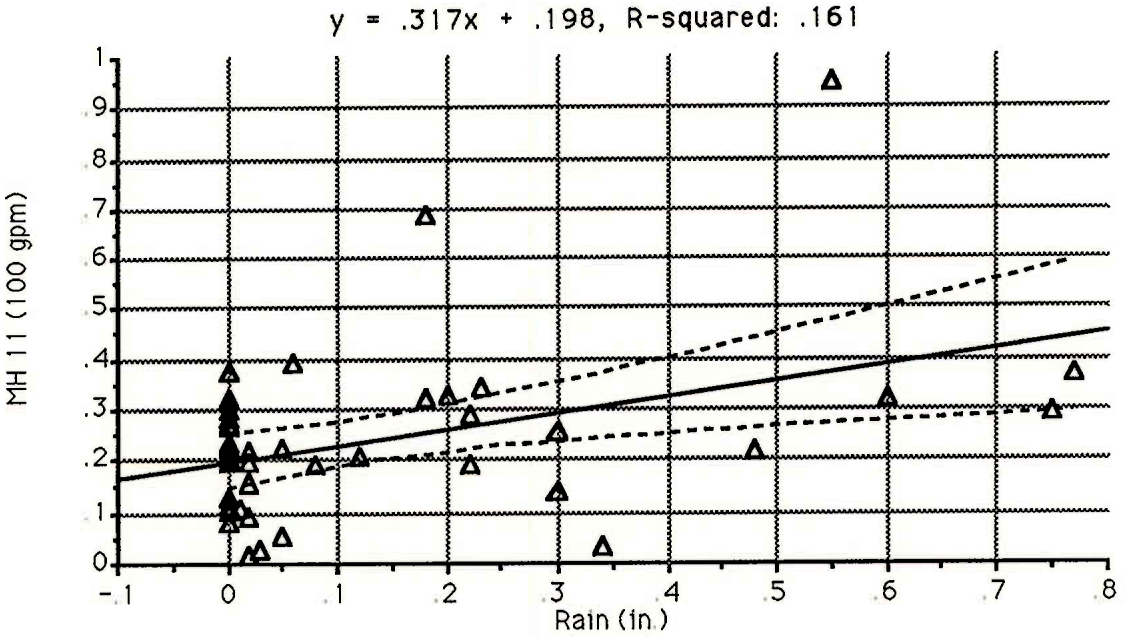
lunch room, administrative offices, etc. - NOT truck wash

CEDAR HILLS Hydrology

MH11 Flow as a Function of Rain



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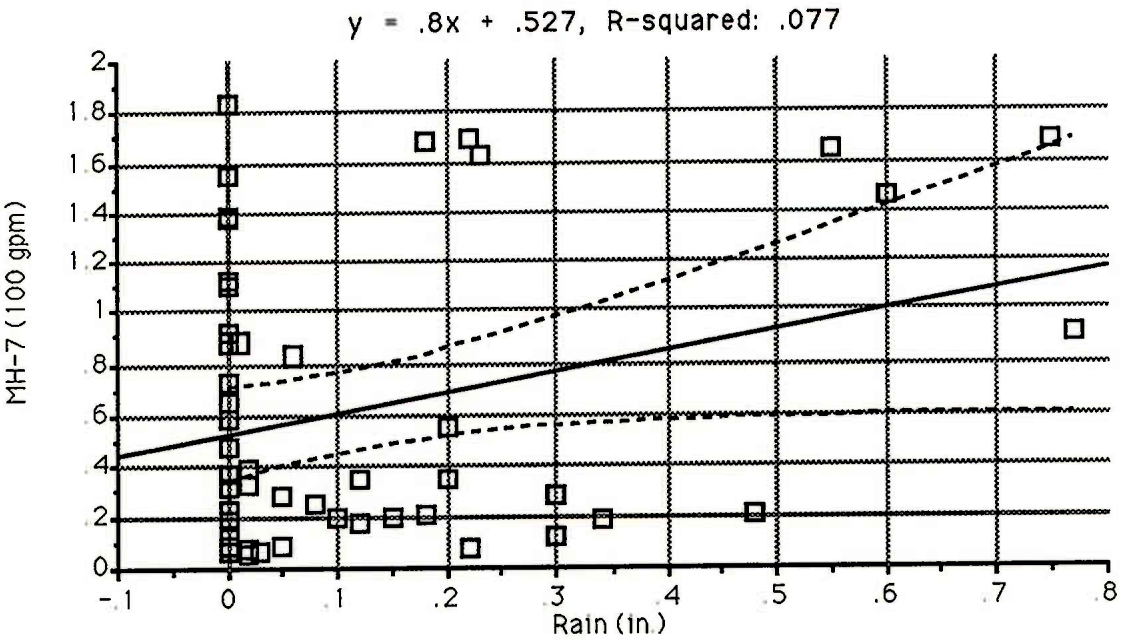
CEDAR HILLS Hydrology

MH-7 Flows from Pump Station 3 may be a function of rain.



NOTE: Figure 6-4 *Site Development Plan*, "Leachate System Schematic" shows *future* Pump Station 3 flows from Southeast Pit Collector going to Pump Station 4. <u>Presently</u>, it actually flows in the ATC sewer to the Metro Pump Station.

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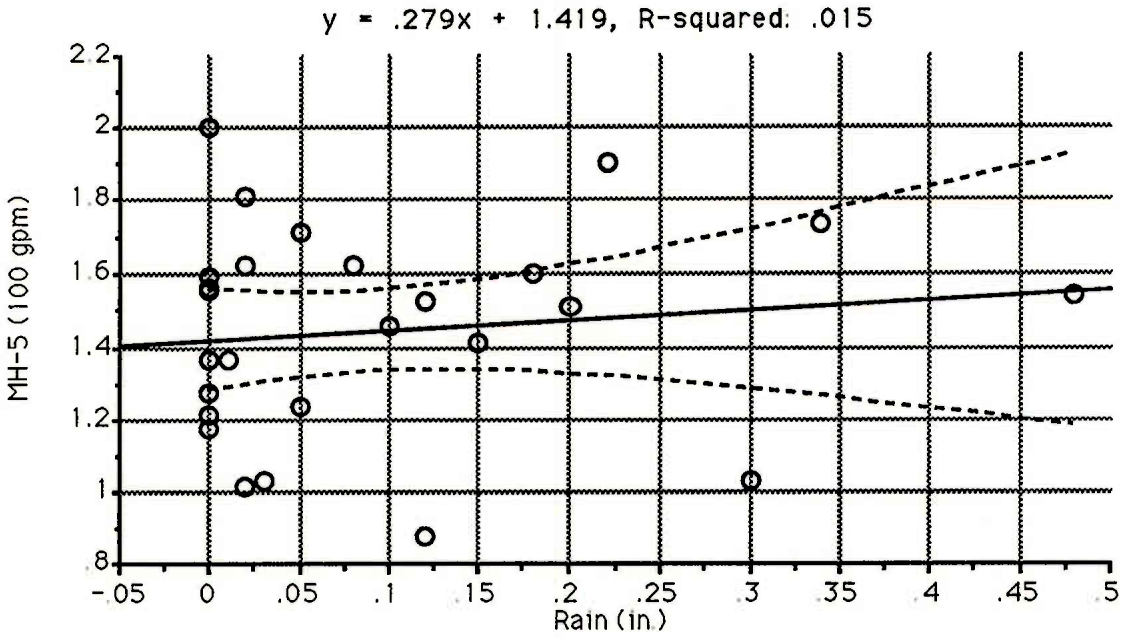
CEDAR HILLS Hydrology

MH-5 flows influenced by Facility Area Sewer Flows are relatively insensitive to Rain.



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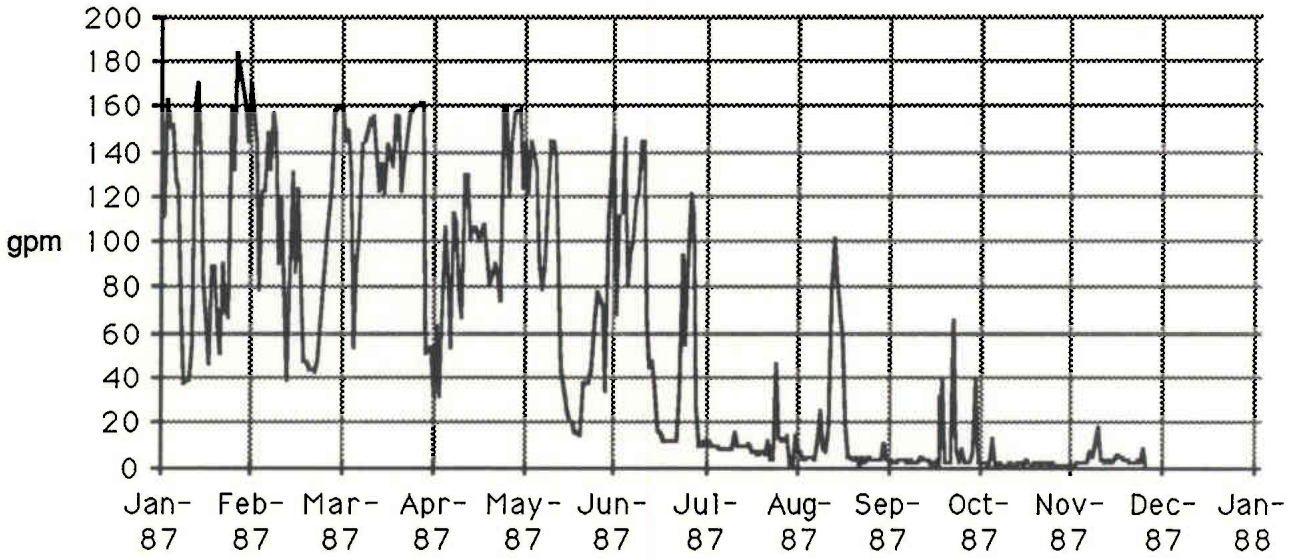
CEDAR HILLS Hydrology

Pump Station 4 Collects Flows from South Main Hill and South Solid Waste Area

Daily Mean Flow Through Pump Station 4
1987



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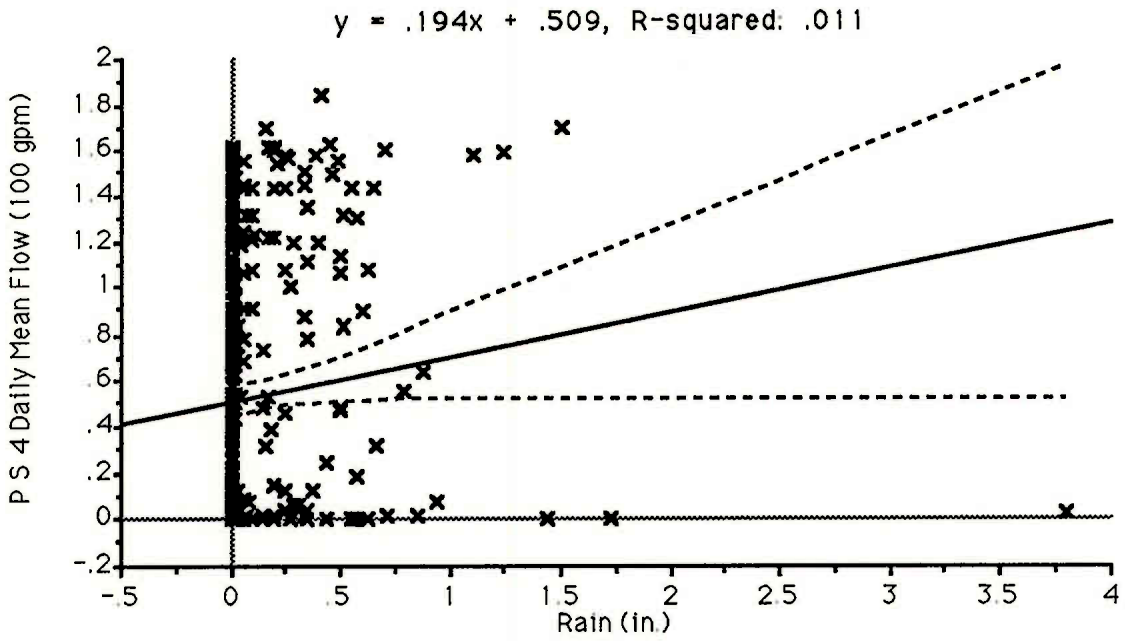
CEDAR HILLS Hydrology

Poor Correlation between Pump Station 4 Flows and Rain



Lagging by one day the PS 4 flows relative to rain correlates even less----> r squared = 0.0046

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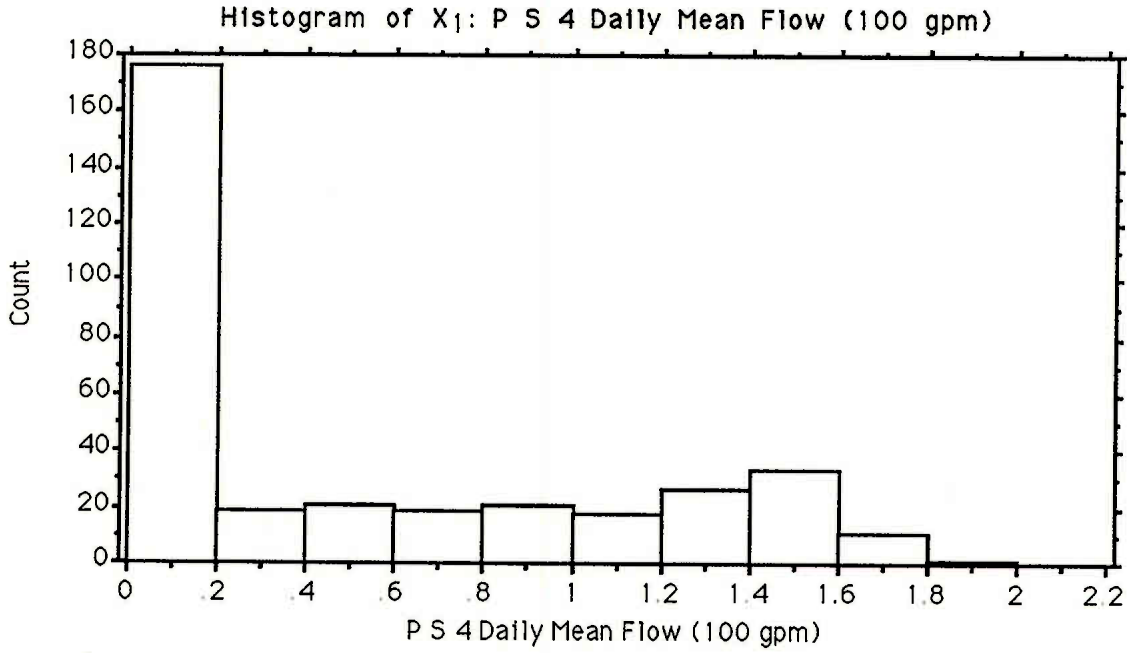
CEDAR HILLS Hydrology

Low Flows Predominated at Pump Station 4 in 1987



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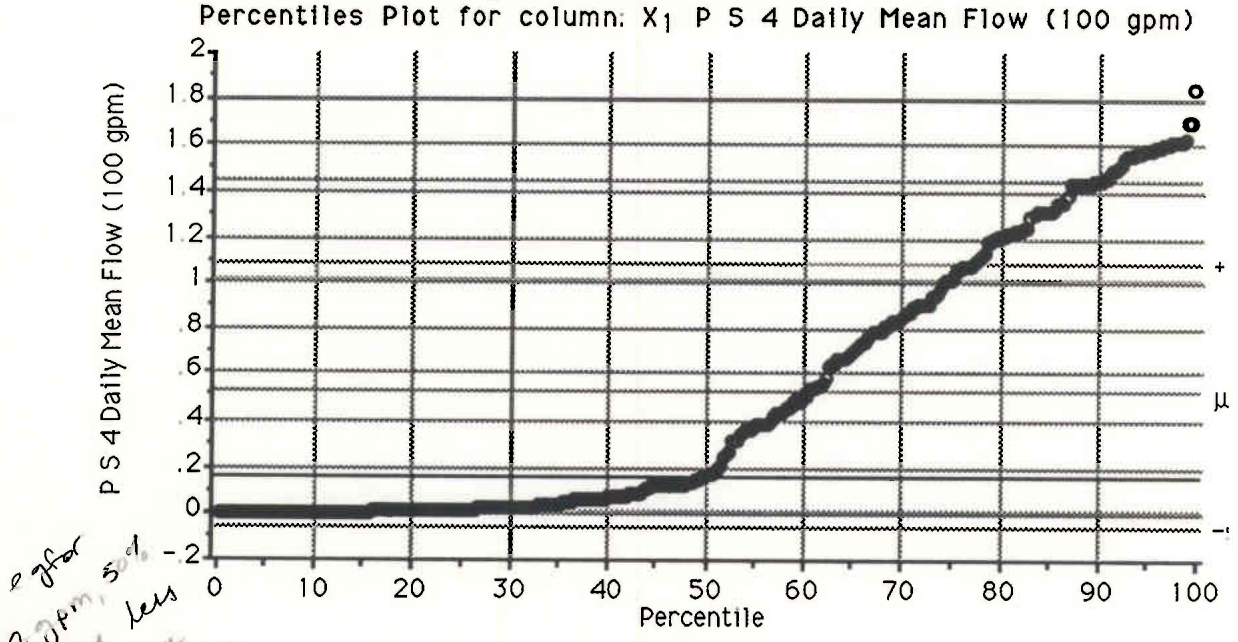
CEDAR HILLS Hydrology

can correlate one year to return occurrence & skew for other return occurrences

Low Flows Predominated at Pump Station 4 in 1987



e.g. for .2 gpm, std. flows less than .2 gpm

X_1: P S 4 Daily Mean Flow (100 gpm)

Mean	Std. Dev.	Std. Error	Variance	Coef. Var.	Count
.518	.574	.031	.329	110.828	346
Minimum	**Maximum**	**Range**	**Sum**	**Sum Squared**	**# Missing**
0	1.84	1.84	179.18	206.434	0
Mode					
.02					

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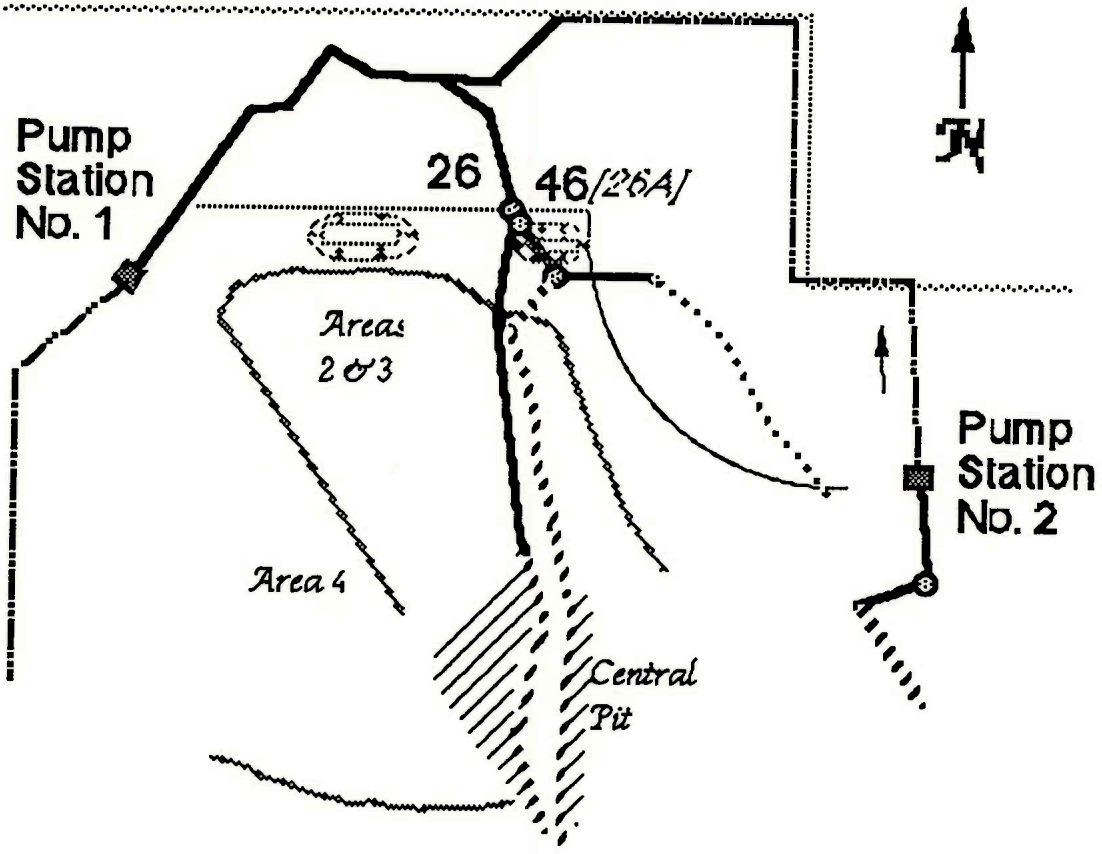
CEDAR HILLS Hydrology

What Do We Know About the Northern Area?



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CEDAR HILLS Hydrology

Northern Leachate Collection System

Pump Station 1 Data Available Minimal Man Hole Monitoring

- Pumping records are available for Pump Station 1 for 1987, 1986, 1985.
- Pumping records are available for Pump Station 2 for 1987, 1986, 1985.

- Limited data available from flow recorder at Man Hole 46 (26a] - December 23, 1987 thru May 12, 1988.

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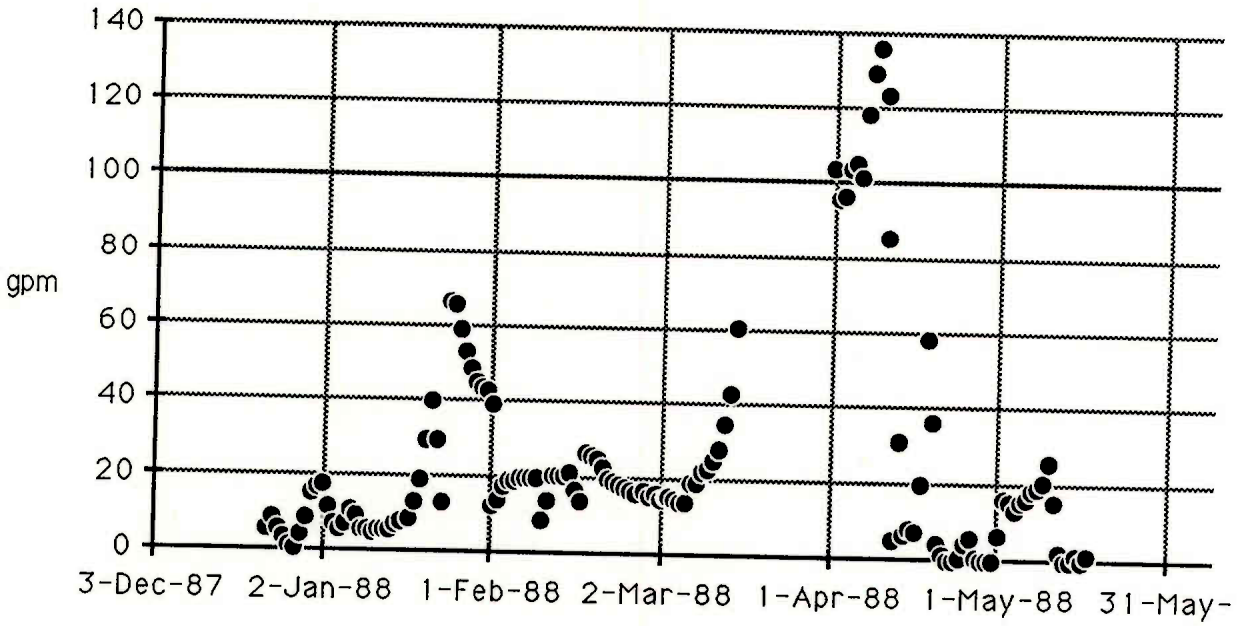
CEDAR HILLS Hydrology

Man Hole 46 Flows Originate from the Central Pit

MH 26a Daily Mean Flow



NOTE: Bubbler tube change Feb 3, 1988

What activities could explain the increase in mid-March?

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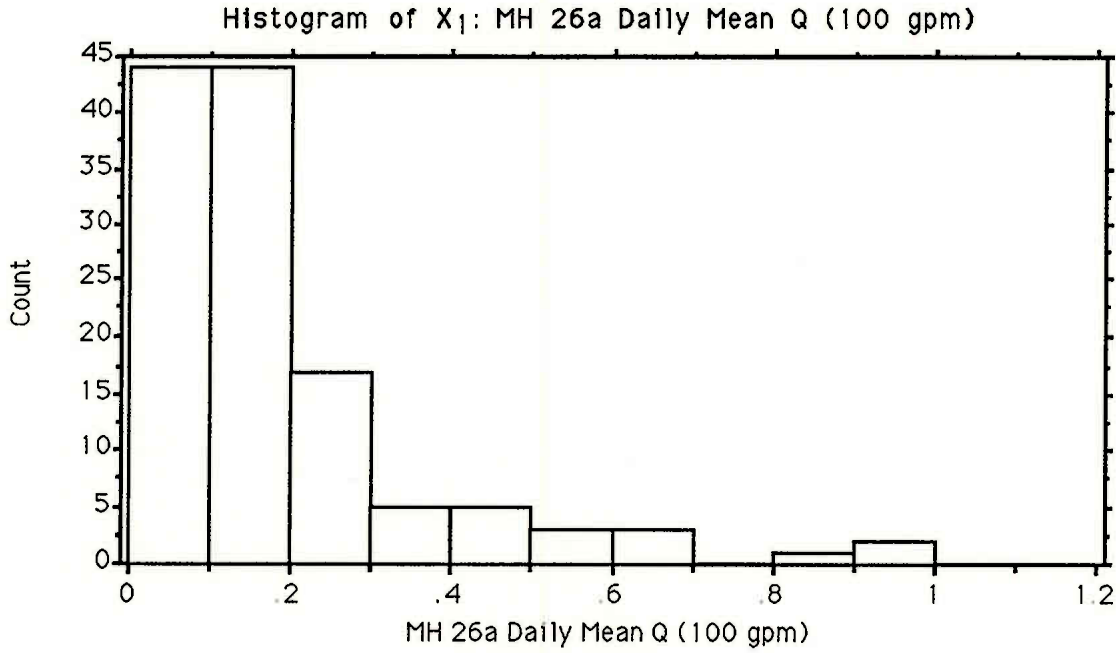
CEDAR HILLS Hydrology

Low Flows Occur Most Frequently at MH 46 [*26a*]



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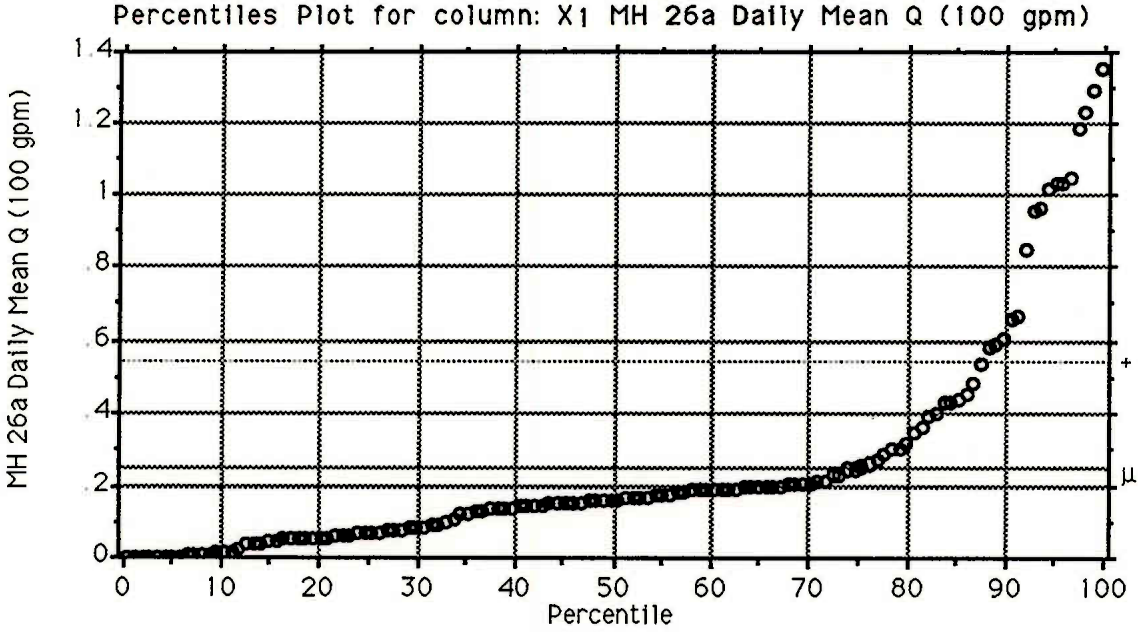
CEDAR HILLS Hydrology

Low Flows Occur Most Frequently at MH 46 [*26a*]



X_1: MH 26a Daily Mean Q (100 gpm)

Mean	Std. Dev.	Std. Error	Variance	Coef. Var.	Count
.249	.294	.026	.086	118.131	132
Minimum	**Maximum**	**Range**	**Sum**	**Sum Squared**	**# Missing**
0	1.357	1.357	32.804	19.443	0
# < 10th %	**10th %**	**25th %**	**50th %**	**75th %**	**90th %**
13	.013	.069	.163	.252	.619
# > 90th %					
13					

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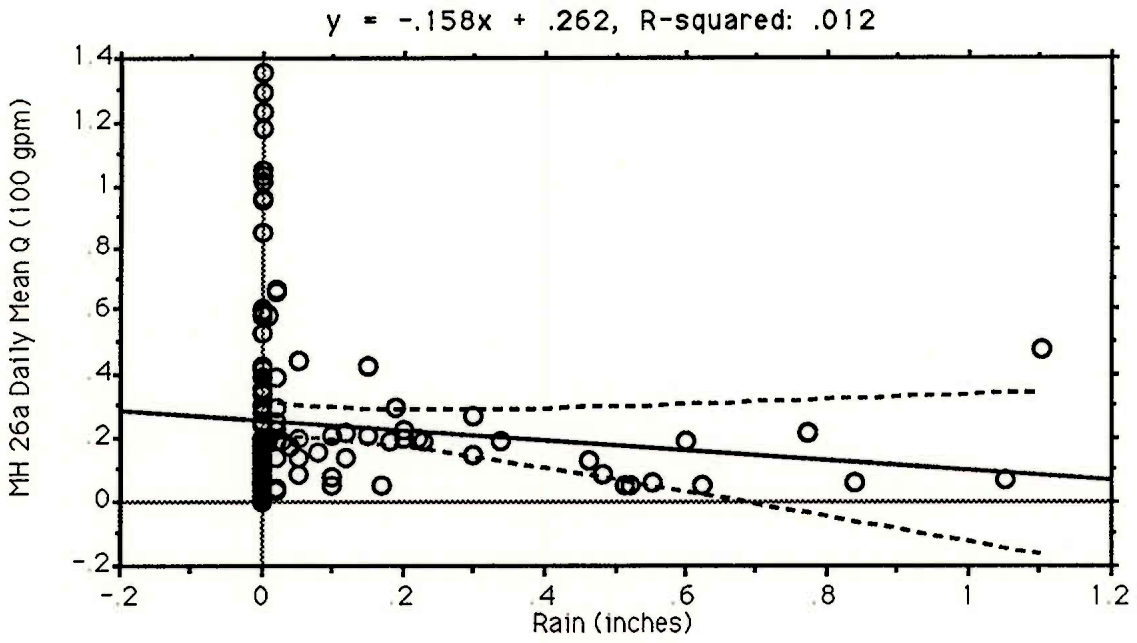
CEDAR HILLS Hydrology

No Apparent Correlation between MH 46 [*26a*] and Rainfall



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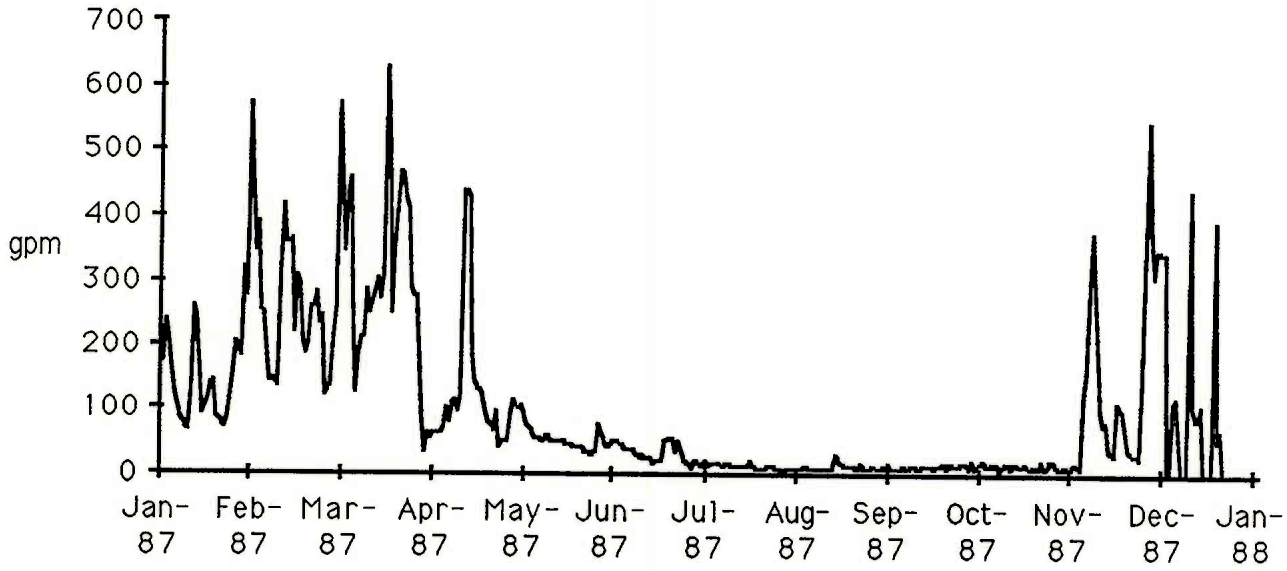
CEDAR HILLS Hydrology

Pump Station 1 Conveys All Leachate from Northern Portions of Site

Pump Station 1 Mean Daily Flows
1987



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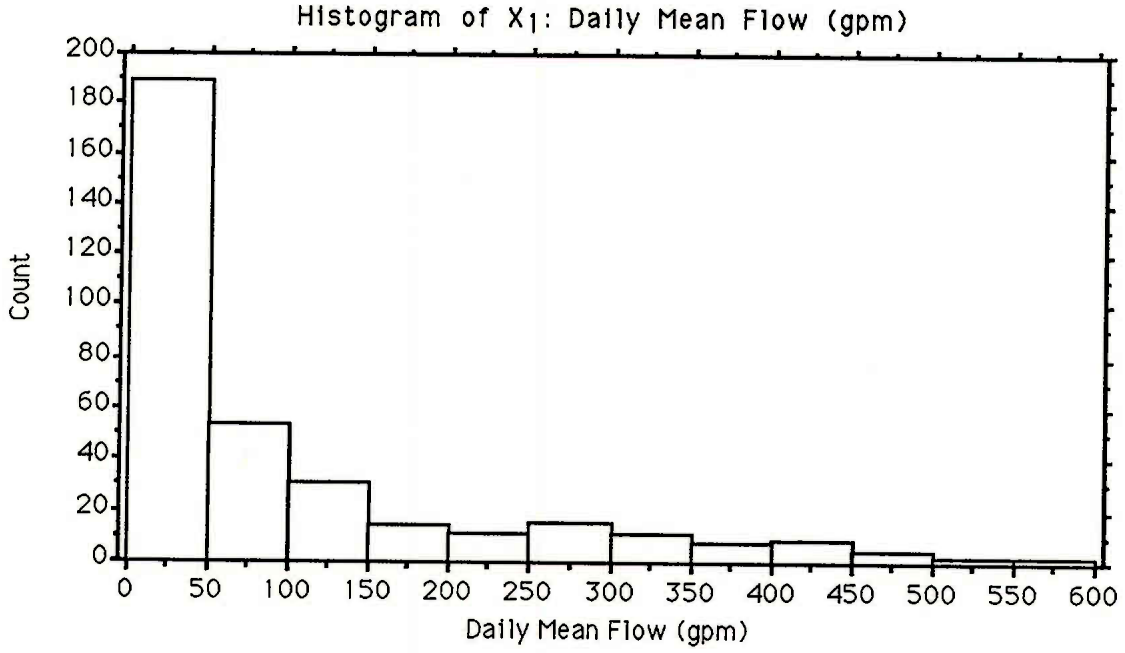
CEDAR HILLS Hydrology

Low Flows Occur Most Frequently at Pump Station 1



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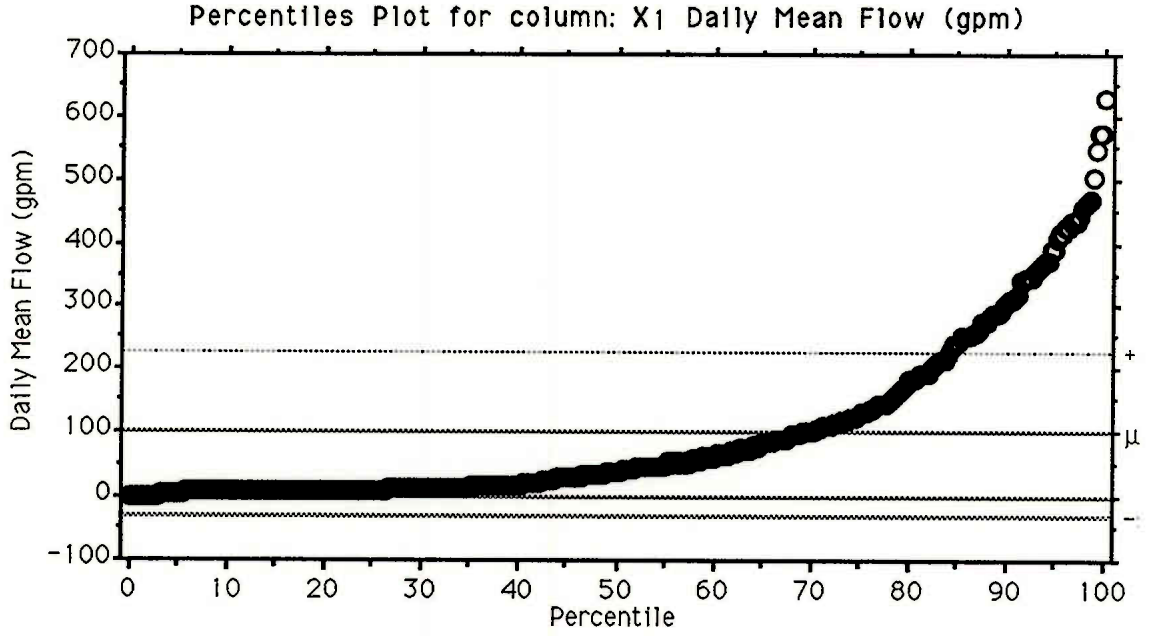
CEDAR HILLS Hydrology

Low Flows Occur Most Frequently at Pump Station 1



X_1: Daily Mean Flow (gpm)

Mean	Std. Dev.	Std. Error	Variance	Coef. Var.	Count
99.058	129.286	6.901	16714.744	130.515	351
Minimum	**Maximum**	**Range**	**Sum**	**Sum Squared**	**# Missing**
0	629	629	34769.333	9294338.444	0
# < 10th %	**10th %**	**25th %**	**50th %**	**75th %**	**90th %**
27	9	11	40	129.25	307.2
# > 90th %	**Mode**				
35	9				

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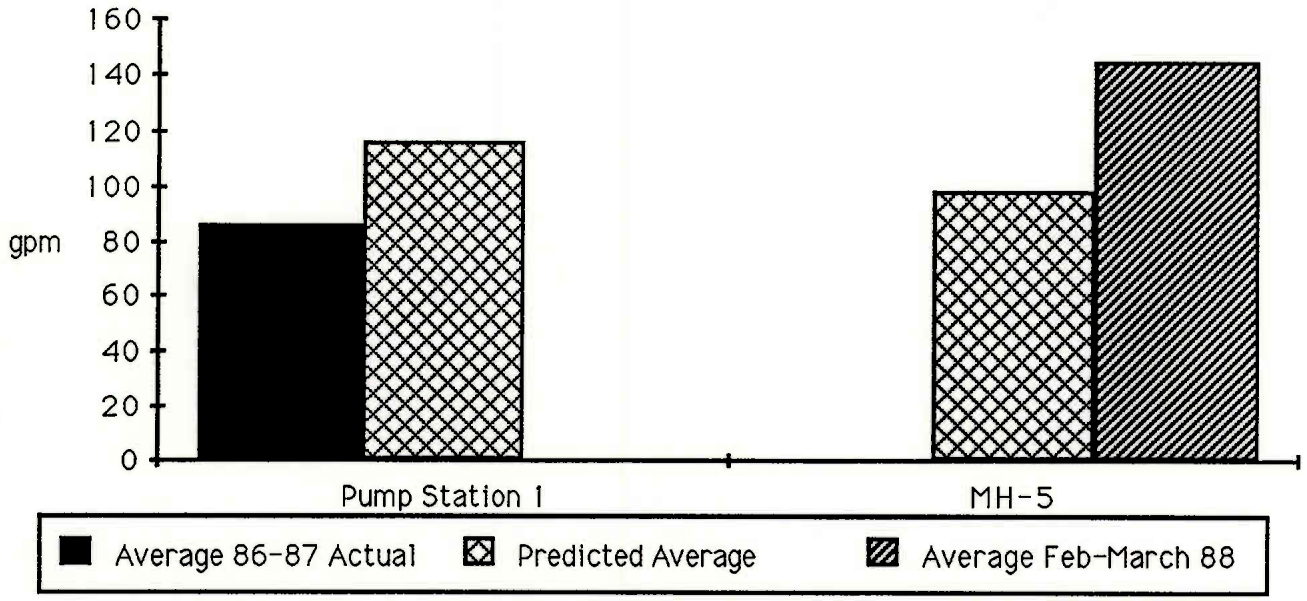
CEDAR HILLS Hydrology

How Do Monitored Flow Rates Compare with Predicted Flows?

Comparison Actua l vs. Predicted



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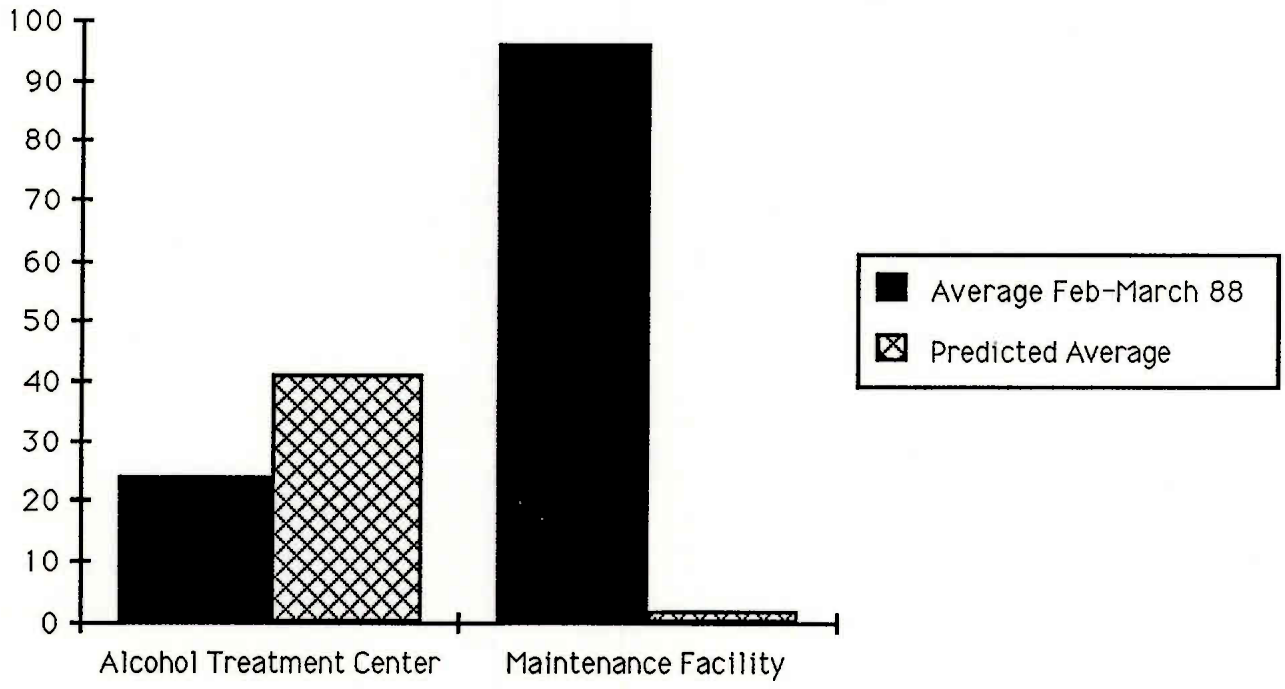
CEDAR HILLS Hydrology

Comparisons using Monitoring Data
Mean Flows



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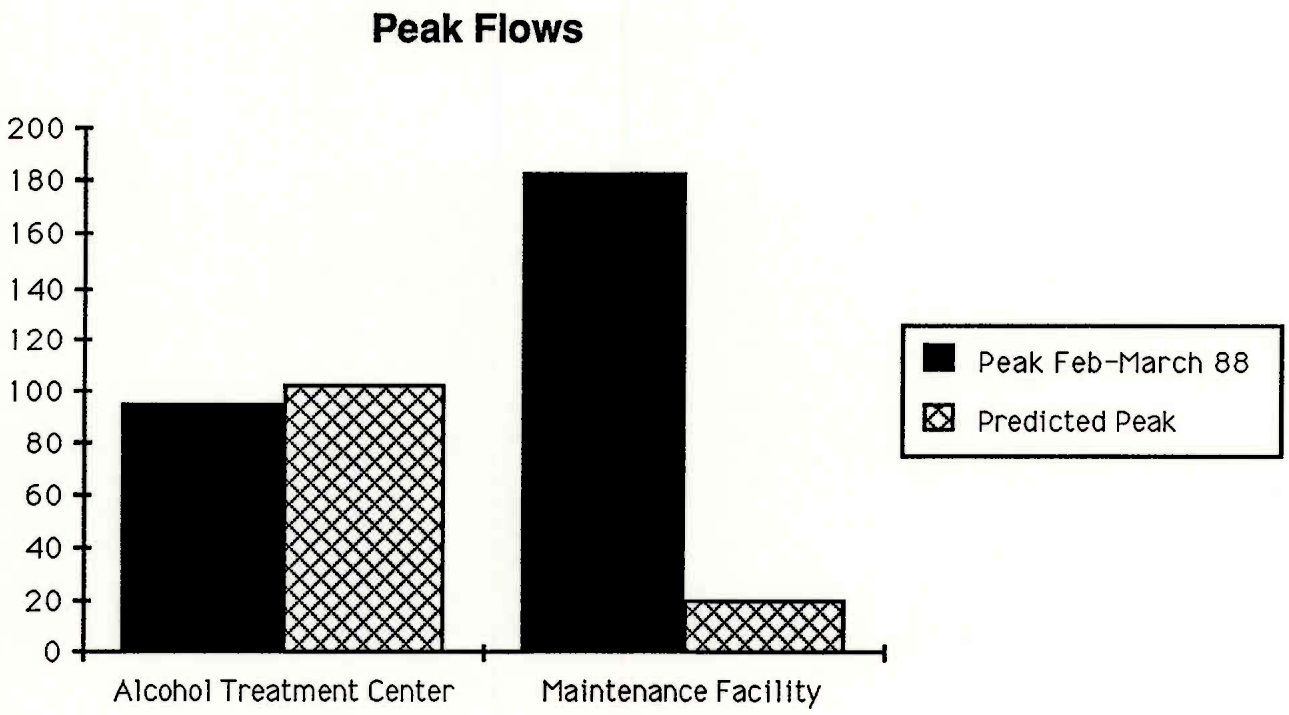
CEDAR HILLS Hydrology

Comparisons using Monitoring Data Peak Flows



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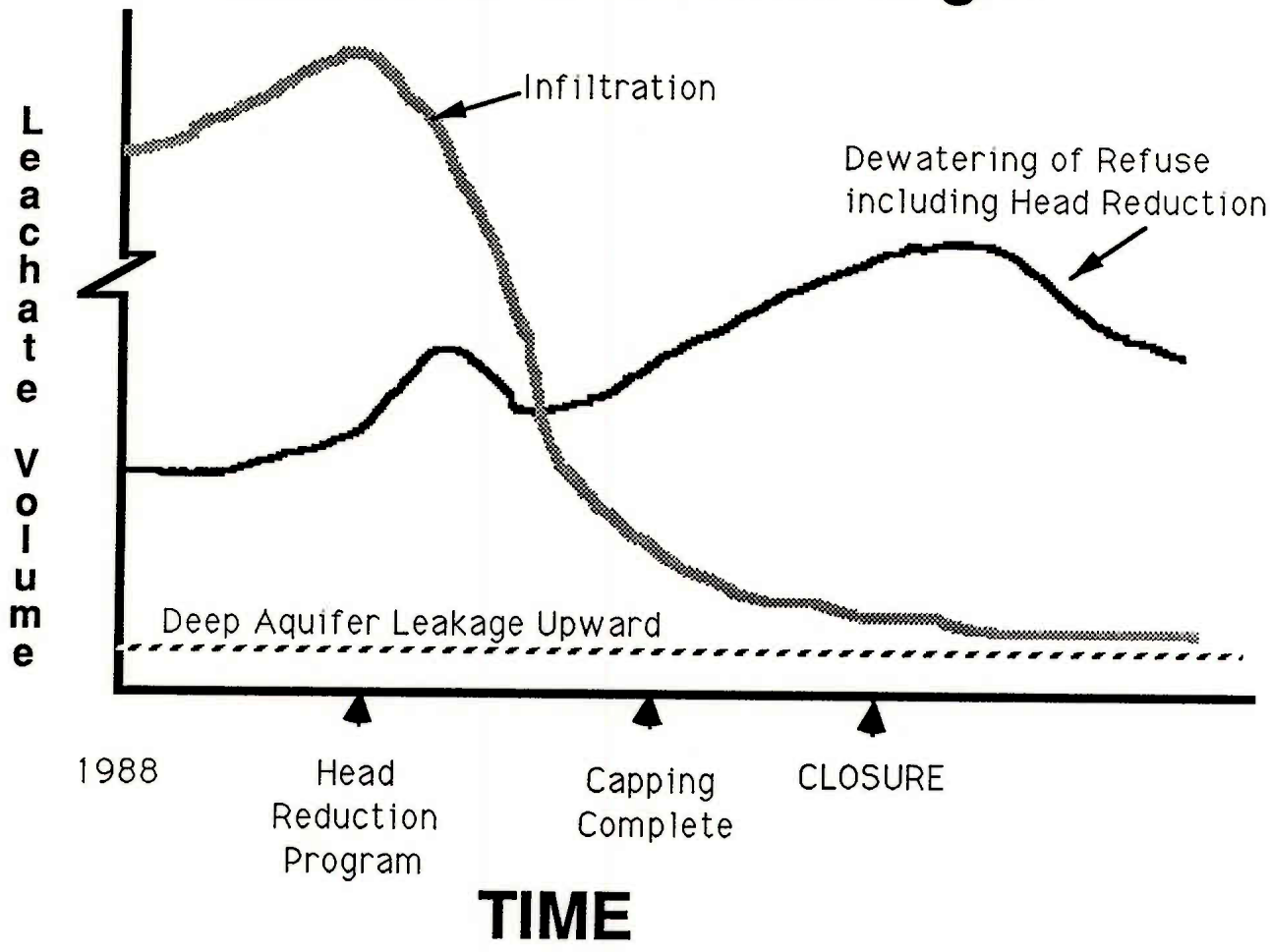
CEDAR HILLS Hydrology

Conceptual Scenario
Leachate Volume Changes



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CEDAR HILLS Hydrology

RECOMMENDATIONS

- Offsite wells to the North and Northwest should be considered for monitoring
- Seepage of leachate should continue to be reduced to lessen the chance of deep aquifer infiltration
- Northern drainage to ~~siltation pond~~ Stormwater lagoon should be fully lined.
- Continue data acquisition from ATC sewer.

  Compare Metro Pump Station data with flow recorders.

  Keep flow recorder tubes clean.
- Consider monitoring MH 46 and MH 45 inorder to confirm leachate prediction for new lined disposal areas.
- Compare leachate quality with flows from overall system, new lined areas, and "head reduction flows".
- Verify CH2 M Hill leachate predictions, particularly peaking factor analysis.

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