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VILLAGE OF SAUGET

SANITARY DEVELOPMENT AND RESEARCH ASSOCIATION

SAUGET, ILLINOIS 62201

June 9, 1977

R.W. Flint	Monsanto Company
L.W. Sprandel	Monsanto Company
W.L. Smull	Monsanto Company
P.E. Heisler	Monsanto Company
Paul Tandler	Cerro Copper Co.
Bill Corlew	Edwin Cooper, Inc.
J.E. Gorman	AMAX Zinc Company
R.C. Reinhardt	Midwest Rubber Co.
Paul Sauget	Village of Sauget

Gross Total $ 85,608.25

Monsanto.	(70.2760)	$ 60,156.41
Cerro	(9.3352)	7,990.93
Cooper.	(13.8411)	11,847.99
AMAX.	(5.7820)	4,949.41
Midwest	(0.5630)	481.93
Sterling.	(0.0769)	65.84
Rogers.	(0.0384)	32.92
Clayton	(0.0874)	74.82
Wiese	(Minimum)	4.00
Mobil	(Minimum)	4.00
TOTAL DUE FROM ALL USERS.		$ 85,608.25

Robert L Harness

Robert L. Harness
Treasurer

RLH/db

Attachments

CER 086727

May, 1977

EXPENSE CATEGORY	MONTHLY COST	(1) FLOW	(2) ACIDITY	(3) OIL	(4) SLUDGE	(5) STORM WATER
a) Net Wages	10,583.68					
b) Withhold & FICA	4,847.04					
c) Medical Expense	389.00					
d) Insurance	7,242.28					
e) Protective Cloth.	340.91					
f) Operate Supplies	593.34					
g) Legal & Account.	4,314.27					
h) Trustees Fee						
i) Pension	790.73					
j) Vehicle Expense	105.66					
k) Consulting Serv.						
l) Petty Cash	150.00					
m) Miscellaneous	525.65					
SUB TOTAL	29,882.56	17,164.55	2,274.06	944.30	3,681.53	5,821.[illegible]
		(.5744)	(0.0761)	(.0315)	(.1232)	(.194[illegible]
n) Telephone	110.54					
o) City Water	967.39					
p) Electricity						
q) Gas and Oil						
SUB TOTAL	1,077.93	730.83	53.90		286.73	6.4[illegible]
		(.6780)	(.0500)	(0)	(.2660)	(.006[illegible]
r) Lime	29,656.38		29,656.38			
		(0)	(1.0000)	(0)	(0)	(0)
s) Polyelectrolyte	3,862.20	3,862.20				
		(1.000)	(0)	(0)	(0)	(0)
t) Scum Disposal						
		(0)	(0)	(1.000)	(0)	(0)
u) Repair/Mainten.	11,171.66					
v) Equipment Purchase	9,257.52					
SUB TOTAL	20,429.18	8,171.68	3,799.83	633.30	4,963.00	2,921.[illegible]
		(.4000)	(.1860)	(.0310)	(.2400)	(.143
w) Residue Disposal	700.00				700.00	
		(0)	(0)	(0)	(1.0000)	(0)
SUB TOTAL	85,608.25	29,929.26	35,784.17	1,574.60	9,571.26	8,748.[illegible]
Less: Min. User Charges	8.00	1.26	4.74	0.25	1.45	0.30
Total For Distribution	85,600.25	29,928.00	35,779.43	1,574.35	9,569.81	8,748.[illegible]

CER 086728

May, 1977

TOTAL PLANT LOADING	11.22 MGD Avg.	110305 lb. CaO/day Avg.	20 705 lb. Oil/Mo.	663355 lb. Sludge/ Mo.			
COST FOR MONTH:	29,928.00	35,779.43	1,574.35	9,569.81	8,748.66	85,600.25	
U S E R	FLOW (1)	ACIDITY (2)	OIL (3)	SLUDGE (4)	(5) STORM WATER	TOTAL OPERATE & MAINTENANCE BILLING	% OF TOTAL
MONSANTO	19507.07 (0.6518)	31153.15 (0.8707)	616.67 (0.3917)	3044.16 (0.3181)	5,835.36 (.6670)	60156.41	70.276
CERRO COPPER	4067.21 (0.1359)	28.62 (0.0008)	42.82 (0.0272)	2184.79 (0.2283)	1,667.49 (.1906)	7990.93	9.3352
EDWIN COOPER	4785.49 (0.1599)	4060.97 (0.1135)	913.44 (0.5802)	1424.94 (0.1489)	663.15 (.0758)	11847.99	13.8411
AMAX ZINC	1334.80 (0.0445)	536.69 (0.0150)	1.26 (0.0008)	2907.31 (0.3038)	172.35 (.0197)	4949.41	5.7820
MIDWEST	62.85 (0.0021)	0.00 (0.0000)	0.16 (0.0001)	8.61 (0.0009)	410.31 (.0469)	481.93	0.5630
STERLING STEEL	65.84 (0.0022)					65.84	0.0769
ROGERS CARTAGE	32.92 (0.0011)					32.92	0.0384
CLAYTON	74.82 (0.0025)					74.82	0.0874
SUB TOTAL	29928.00	35779.43	1574.35	9569.81	8748.66	85600.25	100.000
Min. Users: Mobil						4.00	
Wiese						4.00	
TOTAL BILLING							

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APPENDIX XIV

STORM WATER

CALCULATIONS

NOTE: SEE LAST PAGE FOR SUMMARY CALCULATIONS

CER 086730

STORM WATER RUNOFF-BASES FOR CALCULATION OF FIRST FLUSH VOLUME

A. Sewer Contamination Build-Up

It is assumed that the Village of Sauget's main sewers have no appreciable contaminant build-up because of the high, consistent flow resulting in adequate scour velocities to prevent any significant build-up of deposits in the sewers. This high scour condition is not the case in larger cities where the flows are not great enough during dry weather to allow adequate scour velocities.

B. Above Ground Contamination

Contaminants present on streets, buildings, equipment and grounds will add an unknown amount of contamination to storm runoff. The contaminants washed off by the rain water would be expected to be in concentrations below the wastewater levels, thus storm runoff would act as a diluent even during the first period of the storm.

In any event, potential areas of rain water contamination are limited to the acreage bounded by the darkened lines of the attached map (note Figure 90). Areas will include 0.5 A, B, 0.5 C, D, E, F, G, H, M, N, O, Q, R, S, 0.5 T, U, V, W, X, Y and AA totaling 185 acres or 8.059 million ft^2 (note Table 98).

C Definition of First Flush

1. It is assumed that the major portion of any possible above ground contaminants will be carried off in the first 0.2" of rainfall.

2. Average runoff coefficient estimated to be 0.7.

3. First flush volume = V_{FF}

$$V_{FF} = \frac{185 \text{ acres} \times 43{,}560 \text{ ft}^2/\text{acre} \times 0.2 \text{ in.} \times 0.7 \times 7.48}{12 \text{ in./ft} \quad (\text{gal/ft}^3) - 1}$$

V_{FF} = 800,000 gal.

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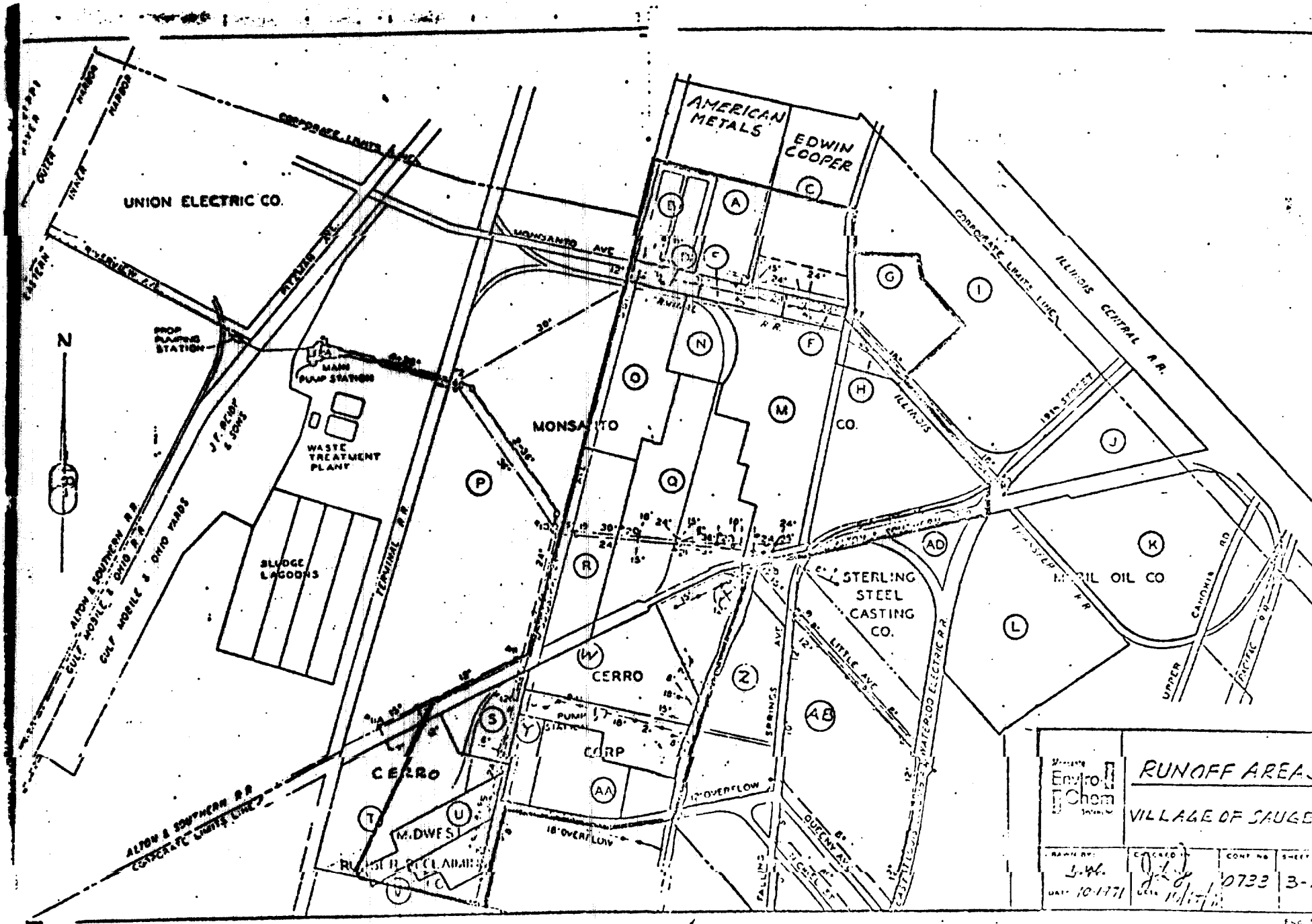

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TABLE 98

RUNOFF CALCULATIONS

Section	Area (Acres)	Runoff Coefficient	Flow (cfs)	Remarks
A	17	--	1.2	Balance to Seepage Pond
B	7	0.7	7.7	0.7 cfs from D
C	13.3	0.7	14.6	0.6 cfs from E, 0.9 cfs from F
D	2.0	0.7	0	0.9 cfs to B, 1.0 cfs to O
E	2.8	0.7	0	0.7 cfs to A M, & N; 0.6 cfs to C
F	1.8	0.7	0	0.9 cfs to C & M
G	10	0.9	9.8	Parking Area
H	2.0	0.7	1.9	
I	--	--	--	Agricultural Area
J				From Pumping
K			16.7	Station, Maximum
L				Pumping Capacity
M	45	0.7	45.6	0.7 cfs from E; 0.9 cfs from F
N	5	0.7	5.6	0.7 cfs from E
O	14	0.7	14.7	1.0 cfs from D
P	---	---	---	Agricultural Area

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Runoff Calculations (cont'd)

Section	Area (Acres)	Runoff Coefficient	Flow (cfs)	Remarks
Q	27	0.7	26.5	
R	14	0.7	13.7	Minor Flooding Allowed
S	--	--	1.0	Maximum Outlet Capacity
T	--	--	--	To Seepage Pond
U, V	8.1	0.7	7.9	
W	11.8	0.7	11.5	
X	10.0	0.7	9.8	
Y	3.0	0.7	2.9	
Z	16.7	0.2	4.6	
AA	6.0	0.7	5.9	
AB	5	0.7	4.9	Street and Residential Runoff
Total			206.5	

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4. The calculated volume of all main sewers in the potential contaminant area is 510,000 gal; thus, the surface wash will provide a volume sufficient to flush the main sewer approximately 1.6 times.

5. V_{FF} = first flush storm water surge capacity.

D. Arrival Lag of First Flush

The arrival lag of the first flush water to the treatment plant will be governed by the surface runoff time and the sewer retention time.

1. It is estimated that the runoff to sewer collection boxes will flow an average of 500 feet to the main sewers at an average velocity of 2 ft/sec. (120 ft/min.)

$$\frac{500 \text{ ft}}{120 \text{ ft/min}} = 4.2 \text{ min. surface runoff time.}$$

2. Sewer retention time is based upon a full-flow velocity of 5 ft/sec. (300 ft/min.). 4-36" sewers flowing at 128.5 cfs = $\left(\frac{D^2}{4}\right)$ = sewer area = $(3)^2$ = 28.3 ft^2, and $\frac{128.5 \text{ cfs}}{28.3 \text{ ft}^2}$ = 5 ft/sec.

   Since the longest main sewer run in the potential contaminant area is 4,300 ft, the expected sewer retention time is $\frac{4300 \text{ ft}}{300 \text{ ft/min}}$ = 14.3 min.

3. Therefore, the total delay of the arrival of the first 0.2" rainfall in reaching the treatment facility would be 14.3 + 4.2 = 18.5 min.

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E. Pumping Times

1. Minimum pumping time - In the case of an intense storm (i.e., 2"/hour for 30 min*) it is assumed that a full-flow condition (128.5 cfs) would be reached in the sewer quite rapidly. Flows of this order of magnitude would cause sewer back-up and overflow to surface ponds. In such a condition, holding lagoon capacity for storm water would be reached in approximately 16 min. assuming treatment plant design flow of 8250 gpm (18 cfs) and pumping capacity to the storage lagoon of 49,600 gpm (110.5 cfs).

2. Normal pumping time - "Normal" pumping time is defined as the time required to reach storm water holding capacity of 800,000 gal. The flows pumped to the holding lagoon or the bypass primary treatment facility would be only those flows exceeding design flows. All flows not exceeding design flow (rainfall present or not) will be accepted as normal raw waste to the treatment system.

F. Treatment of First Flush

The treatment system design capacity will be adjusted to accept the first flush water volume of 800,000 gallons during the 48 hour period immediately following cessation of storm flow conditions. In the event storm conditions are resumed during this 48 hour period, all flow exceeding design will be considered post-first flush and diverted to the storm water clarifier or bypassed if in excess of this storm water treatment system capacity. Because the average flow is predicted to be 8.75 MGD compared to the 11.5 MGD design flow, much less than 48 hours may be expected for bleeding back the first flush water.

*See attached rainfall intensity - frequency curve.

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G. Treatment of Storm Bypass Flows

It has been assumed that treatment of storm bypass flows (under Part VI, Section 602, paragraph C of the Illinois State Effluent Criteria) will consist of a settling basin with a design [illegible] gallons/day ([illegible] gal/min or [illegible] ft³/sec). This value is equal to [illegible] the MGD treated in the Village plant or 8.2 times the normal dry weather flow expected in 1974. The design overflow rate of the storm water clarifier will be [illegible] gal/ft² day. The treatment plant will normally be able to handle 0.8 MGD in storage and [illegible] MGD in treatment capacity above the average dry weather flow. It should be understood that the surge capacity located in the areas along 19th street and in Dead Creek ponds have drained into the sewers; after these cessation of maximum storm flow, greater than 8.4 times the normal daily dry weather flow will have been treated.

The flow rates shown in Table 98 were calculated from the areas and runoff coefficients shown and from the rainfall which would be expected from a two year sixty minute duration storm as determined in Figure 91 .

As may be seen, a storm of such intensity and duration would exceed the maximum calculated flow capacity (128.5 cfs) of the Village sewers (main interceptors to the pumping station). Such a condition would cause excess storm water flows to back-up storm water holding and seepage ponds at various locations in the Village.

During any storm condition in which the design flow of the treatment plant (11.5 MGD) is exceeded, the first flush volume would be diverted to storage and any remaining excess flow up to approximately 41,000 gpm would be diverted to the storm water primary clarifier.

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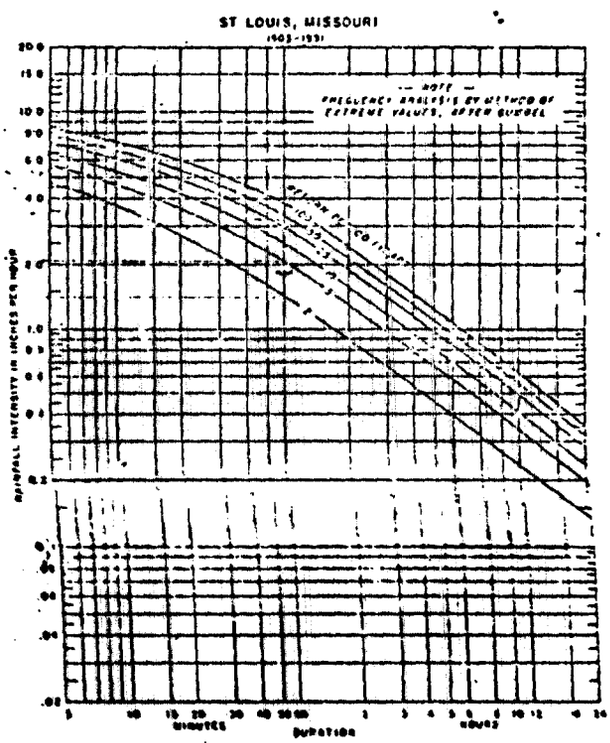
FIGURE 91

RAINFALL INTENSITY - DURATION - FREQUENCY CURVES



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RAINFALL RUNOFF AREAS

AREA (acres)

LOCATION	MONSANTO	CERRO	AMAX	COOPER	MIDWEST	MOBIL
A			8.5			
B			7.0			
C				6.65		
D			2.0			
E				2.8		
F				1.8		
G	10.0					
H	2.0					
M	45.0					
N	5.0					
O	14.0					
Q	27.0					
R	14.0					
U					} 8.1	
V						
W		11.8				
X		10.0				
Y		3.0				
AA		6.0				
TOTAL	117.0	30.8	17.5	11.25	8.1	

SUMMARY

COMPANY	AREA	%	CURRENT USER CHARGE FORMULA	
MONSANTO	119 ~~117.0~~	63.36	66.70 %	
CERRO	30.8	16.68	19.06 %	
AMAX	15.5 ~~17.5~~	9.48	[redacted]	1.97%
COOPER	11.25	6.09	[redacted]	7.58%
MIDWEST	8.1	4.39	4.69 %	
TOTAL	184.65	100.00	100.00	

CER 086739