behavior at design temperature 20 °C

s.w.d. 3 m

three PM basin cells in series

(just the first two shown)

			mgd							
wastewater flow	720	m3/day	0.190							
BOD in (mg/L)	630			999.5	lbBOD/day		1499.2	lbO2/day		
TKN in (mg/L)	33			52.4	lbTKN/day		240.8	lbO2/day		
						AOR	1740.0	lbO2/day	72.5	lbO2/hr

basin I

length	60	m					HP/mg	HP for mixing	if CFM for mixing	
width	15	m	tank volume		residence (days)		50	35.7	1162	CFM
s.w.d.	3	m	2700.0	m3	3.75		60	42.8		
	9.84	(feet)	0.713	mg			70	49.9		

k-rate	0.55	lbBOD/day 1000 cu.ft.	10.5	MLSS	3500	
temperature	20	lbBOD/day acre	4494.3	f/m	0.048	

BODout as per EPA model	206	mg/L	percent removal	67.3	%

basin II

length	60	m					HP/mg	HP for mixing	if CFM for mixing	
width	15	m	tank volume		residence (days)		50	35.7	1162	CFM
s.w.d.	3	m	2700.0	m3	3.75		60	42.8		
	9.84	(feet)	0.713	mg			70	49.9		

			lbBOD/day	1000 cu.ft.	3.4				hi speed	low speed
BODout as per EPA model	**67**	**mg/L**	percent removal		67.3	%		HP share	41.4	31.9
							basin #1	0.67	27.9	21.5
total tankage volume	1.427	mg					basin #2	0.22	9.1	7.0
total residence time	7.50	days					rest	0.11	4.4	3.4

AOR	AOR/SOR	SOR	HP at 2.5 lb/h per HP	de-rate 5	de-rate 10	de-rate 15	HP/mg	HP for mixing
72.5	0.7	103.6	41.4	43.6	46.0	48.7	50	71.3
72.5	0.6	120.8	48.3	50.9	53.7	56.9	60	85.6
72.5	0.5	145.0	58.0	61.1	64.4	68.2	70	99.9

quick-and-dirty diffused aeration estimates

CFM for diffused aeration/oxygen transfer	1259	CFM	AOR/SOR = .37	1.7% per feet
HP estimate for oxygen	43.6	HP		

notes

2. I'm taking TKN at full value for HP calculation, although some nitrogen would be used up for normal biological/BOD processes
3. Third cell would bring BOD5 under 30 mg/L as per indicated formula.