

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

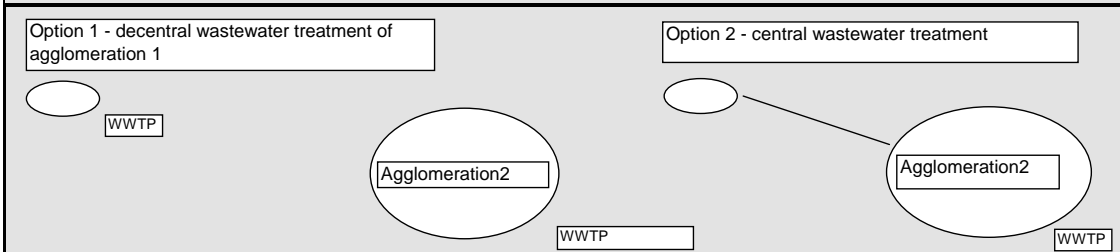
County: Mures

Agglomeration 1: SINCAI+LECHINCIOARA (group)

Agglomeration 2: CULPIU

Agglomeration 3: SABED

Agglomeration 4: BOZED



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	1.207	1.207
Size of agglomeration 2	[PE]	402	402
Size of agglomeration 3	[PE]	743	743
Size of agglomeration 4	[PE]	182	182
Size of agglomeration 1+2+3+4	[PE]		2.534
No. of WTP modules	[items]	4	
Specific wastewater amount	[l/cap x d]	80	80
Specific wastewater amount	[l/cap x d]	110	110
Infiltration rate	[%]	25	25
Wastewater amount of agglomeration 1	[m³/d]	121	
Wastewater amount of agglomeration 2	[m³/d]	40	
Wastewater amount of agglomeration 3	[m³/d]	74	
Wastewater amount of agglomeration 4	[m³/d]	18	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		253
Connection details			
Lenth of the transportation line	[m]	-	14.500
Kind of connection (g = by gravity, p = by pressure main)	[-]	-	G
Diameter of the transportation line	[mm]	-	250
Maximum difference in height Δh (only in case of pumping station)	[m]	-	0
Costs			
Specific price WWTP agglomeration 1 (according formula)	[€/PE]	250	-
Specific price WWTP agglomeration 2 (according formula)	[€/PE]	250	
Specific price WWTP agglomeration 3 (according formula)	[€/PE]	250	
Specific price WWTP agglomeration 4 (according formula)	[€/PE]	250	
Specific price WWTP agglomeration 1+2+3+4(according formula)	[€/PE]	-	250
Specific price transportation line (according Unit Price Data Base)	[€/m]	-	171
I. Investment costs			
A. Civil works			
(1.1) WWTP for agglomeration 1 (40 % of total costs)	[€]	135.700	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	55.200	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	89.300	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	33.200	
(2) WWTP for agglomeration (40 % of total costs)	[€]		268.400
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	2.472.250
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	313.400	2.740.650
Writting-off period	[years]	40	40
Cost of capital, average	[€/a]	7.835	68.516
	[%]	3	3
	[€/a]	9.402	82.220
Annual costs civil works	[€/a]	17.237	150.736

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	196.050	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	75.300	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	126.450	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	42.300	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	395.100
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) free	[€]		
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs mechanical and electrical equipment	[€]	440.100	395.100
Writting-off period	[years]	12	12
	[€/a]	36.675	32.925
Cost of capital, average	[%]	3	3
	[€/a]	13.203	11.853
Annual costs mechanical and electrical equipment	[€/a]	49.878	44.778
Annual costs I. (Investment)	[€/a]	67.115	195.514
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	17.604	15.804
III. Labour costs			
specific labour costs	[€/h]	5	5
annual expenses option 1 (2 full-time workers/module)	[h/a]	35.040	-
annual expenses option 2 (2 full-time workers)	[h/a]	-	8.760
Annual costs III. (labour)	[€/a]	175.200	43.800
IV. Operation costs consumption			
A. Energy consumption			
A 1 - Option 1			
A 1.1 WWTP agglomeration 1			
Wastewater amount of agglomeration 1	[m³/d]	121	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	114	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	40	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,87	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	75	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	74	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,70	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	126	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	18	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,11	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	38	-
Total A 1	[kWh/d]	354	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	115
Maximum difference in height Dh (only in case of pumping station)	[m]	-	0
Daily energy consumption pumping station agglomeration 1	[kWh/d]	-	0
A 2.2 WWTP agglomeration 1+2+3+4			
Specific price WWTP agglomeration 2 (according formula)	[m³/d]		253
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,41
Daily energy consumption WWTP agglomeration 2	[kWh/d]		357
Total A 1 - A 2	[kWh/d]	354	357
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	53	54

B. Chemicals consumption

The difference in the consumption of chemicals is neglectable.

C. Sludge disposal

The sludge amounts produced in both options is almost the same.

The difference in the sludge disposal costs is neglectable.

Total IV.	[€/d]	53	54
Annual costs IV. (consumption)	[€/a]	19.379	19.558
Summary			
Annual costs I. (Investment)	[€/a]	67.115	195.514
Annual costs II. (Maintenance / Repairs)	[€/a]	17.604	15.804
Annual costs III. (labour)	[€/a]	175.200	43.800
Annual costs IV. (consumption)	[€/a]	19.379	19.558
Total annual costs	[€/a]	279.298	274.675

Conclusion : according to the option analysis the Consultant proposed centralized solution to be followed.