

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

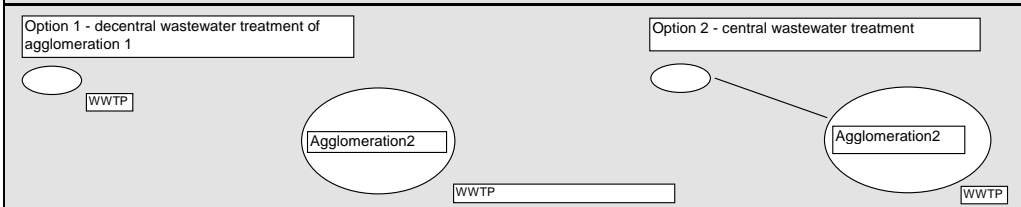
County: Mures

Agglomeration 1: IERNUT

Agglomeration 2: SAFANTU GHEORGHE+CIPAU (group)

Agglomeration 3: LECHINTA

Agglomeration 4:



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	6.704	6.704
Size of agglomeration 2	[PE]	1.509	1.509
Size of agglomeration 3	[PE]	801	801
Size of agglomeration 4	[PE]	0	0
Size of agglomeration 1+ 2+3	[PE]		9.014
No. of WTP modules	[items]	2	
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]	922	
Wastewater amount of agglomeration 2	[m³/d]	151	
Wastewater amount of agglomeration 3	[m³/d]	80	
Wastewater amount of agglomeration 4	[m³/d]	0	
Wastewater amount of agglomeration 1+ 2+3	[m³/d]		1.153
Connection details			
Lenth of the transportation line	[m]	-	3.500
Kind of connection (g = by gravity, p = by pressure main)	[-]	-	P
Diameter of the transportation line	[mm]	-	250
Maximum difference in height Δh (only in case of pumping station)	[m]	-	10
Costs			
Specific price WWTP agglomeration 1 (according formula)	[€/PE]	490	-
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]	0	
Specific price WWTP agglomeration 1+2+3 (according formula)	[€/PE]	-	433
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)	[€]	1.313.689	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	165.900	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	95.100	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	0	
(2) WWTP for agglomeration (40 % of total costs)	[€]		1.560.824
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	36.323
(4) Transportation line	[€]	-	596.750
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	1.574.689	2.193.897
Writing-off period	[years]	40	40
Cost of capital, average	[€/a]	39.367	54.847
	[%]	3	3
	[€/a]	47.241	65.817
Annual costs civil works	[€/a]	86.608	120.664

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	1.970.534	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	241.350	-
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	135.150	-
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	0	-
(2) WWTP for agglomeration (60% of total costs)	[€]	-	2.341.236
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	3.700
(4) free	[€]		
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs mechanical and electrical equipment	[€]	2.347.034	2.344.936
Writing-off period	[years]	12	12
	[€/a]	195.586	195.411
Cost of capital, average	[%]	3	3
	[€/a]	70.411	70.348
Annual costs mechanical and electrical equipment	[€/a]	265.997	265.759
Annual costs I. (Investment)	[€/a]	352.605	386.424
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	93.881	93.797
III. Labour costs			
specific labour costs	[€/h]	5	5
annual expenses option 1 (2 full-time workers/module)	[h/a]	17.520	-
annual expenses option 2 (2 full-time workers)	[h/a]	-	8.760
Annual costs III. (labour)	[€/a]	87.600	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]	922	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	871	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	151	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,53	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	230	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	80	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,68	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	135	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	0	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,00	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	0	-
Total A 1	[kWh/d]	1.236	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	231
Maximum difference in height Dh (only in case of pumping station)	[m]	-	10
Daily energy consumption pumping station agglomeration 1	[kWh/d]	-	10
A 2.2 WWTP agglomeration 1+2+3			
Specific price WWTP agglomeration 2 (according formula)	[m³/d]		1.153
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,16
Daily energy consumption WWTP agglomeration 2	[kWh/d]		1.338
Total A 1 - A 2	[kWh/d]	1.236	1.349
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	185	202
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]	185	202
Annual costs IV. (consumption)	[€/a]	67.673	73.838
Summary			
Annual costs I. (Investment)	[€/a]	352.605	386.424
Annual costs II. (Maintenance / Repairs)	[€/a]	93.881	93.797
Annual costs III. (labour)	[€/a]	87.600	43.800
Annual costs IV. (consumption)	[€/a]	67.673	73.838
Total annual costs	[€/a]	601.759	597.859
Conclusion : according to the option analysis the Consultant proposed centralized solution to be followed.			