

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

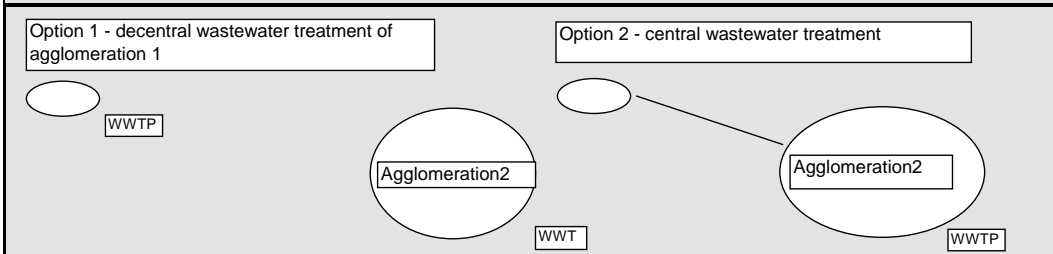
County: Mures

Agglomeration 1: SANGEORGIU DE PADURE

Agglomeration 2: VIFOROASA

Agglomeration 3:

Agglomeration 4:



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	5.223	5.223
Size of agglomeration 2	[PE]	877	877
Size of agglomeration 3	[PE]		0
Size of agglomeration 4	[PE]		0
Size of agglomeration 1+ 2+3+4	[PE]		6.100
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]	718	
Wastewater amount of agglomeration 2	[m³/d]	88	
Wastewater amount of agglomeration 3	[m³/d]	0	
Wastewater amount of agglomeration 4	[m³/d]	0	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		806
Connection details			
Lenth of the transportation line	[m]	-	3.000
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]	544	-
Specific price WWTP agglomeration 2 (according formula)	[€/PE]	250	
Specific price WWTP agglomeration 3 (according formula)	[€/PE]	0	
Specific price WWTP agglomeration 4 (according formula)	[€/PE]	0	
Specific price WWTP agglomeration 1+2+3+4 (according formula)	[€/PE]	-	510
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)	[€]	1.135.989	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	102.700	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	0	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	0	
(2) WWTP for agglomeration (40 % of total costs)	[€]		1.243.426
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	511.500
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	1.238.689	1.754.926
Writing-off period	[years]	40	40
Cost of capital, average	[€/a]	30.967	43.873
	[%]	3	3
	[€/a]	37.161	52.648
Annual costs civil works	[€/a]	68.128	96.521

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	1.703.983	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	146.550	-
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	0	-
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	0	-
(2) WWTP for agglomeration (60% of total costs)	[€]	-	1.865.139
(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	[€]	1.850.533	1.865.139
Writting-off period	[years]	12	12
	[€/a]	154.211	155.428
Cost of capital, average	[%]	3	3
	[€/a]	55.516	55.954
Annual costs mechanical and electrical equipment	[€/a]	209.727	211.382
Annual costs I. (Investment)	[€/a]	277.855	307.903
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	74.021	74.606
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]	718	-
Specific energy consumption WWTP agglomeration 1 (acc. form)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	679	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	88	-
Specific energy consumption WWTP agglomeration 1 (acc. form)	[kWh/m³]	1,66	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	145	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	0	-
Specific energy consumption WWTP agglomeration 1 (acc. form)	[kWh/m³]	0,00	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	0	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	0	-
Specific energy consumption WWTP agglomeration 1 (acc. form)	[kWh/m³]	0,00	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	0	-
Total A 1	[kWh/d]	824	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	88
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]	-	806
Specific energy consumption WWTP agglomeration 1 (acc. form)	[kWh/m³]	-	1,23
Daily energy consumption WWTP agglomeration 2	[kWh/d]	-	993
Total A 1 - A 2	[kWh/d]	824	993
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	124	149

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]	124	149
Annual costs IV. (consumption)	[€/a]	45.117	54.370

Summary

Annual costs I. (Investment)	[€/a]	277.855	307.903
Annual costs II. (Maintenance / Repairs)	[€/a]	74.021	74.606
Annual costs III. (labour)	[€/a]	87.600	43.800
Annual costs IV. (consumption)	[€/a]	45.117	54.370
Total annual costs	[€/a]	484.593	480.679

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