

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

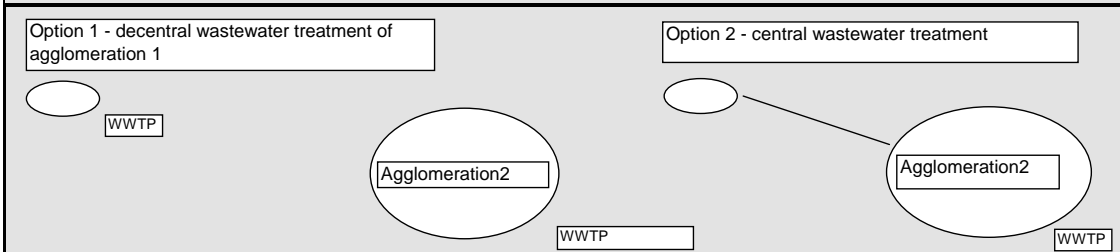
County: Mures

Agglomeration 1: DUBISTEA DE PADURE

Agglomeration 2: BUCASU

Agglomeration 3: TOACA

Agglomeration 4: URICEA



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	439	439
Size of agglomeration 2	[PE]	140	140
Size of agglomeration 3	[PE]	1.673	1.673
Size of agglomeration 4	[PE]	57	57
Size of agglomeration 1+2+3+4	[PE]		2.309
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]	44	
Wastewater amount of agglomeration 2	[m³/d]	14	
Wastewater amount of agglomeration 3	[m³/d]	167	
Wastewater amount of agglomeration 4	[m³/d]	6	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		231
Connection details			
Lenth of the transportation line	[m]	-	4.500
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)	[€]	58.900	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	29.000	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	182.300	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	20.700	
(2) WWTP for agglomeration (40 % of total costs)	[€]		245.900
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	767.250
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	290.900	1.013.150
Writting-off period	[years]	40	40
Cost of capital, average	[€/a]	7.273	25.329
	[%]	3	3
	[€/a]	8.727	30.395
Annual costs civil works	[€/a]	16.000	55.723

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	80.850	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	36.000	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	265.950	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	23.550	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	361.350
(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	[€]	406.350	361.350
Writting-off period	[years]	12	12
	[€/a]	33.863	30.113
Cost of capital, average	[%]	3	3
	[€/a]	12.191	10.841
Annual costs mechanical and electrical equipment	[€/a]	46.053	40.953
Annual costs I. (Investment)	[€/a]	62.053	96.676
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	16.254	14.454
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]	44	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	41	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	14	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,20	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	31	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	167	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,50	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	251	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	6	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,52	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	14	-
Total A 1	[kWh/d]	338	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	181
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]		231
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,43
Daily energy consumption WWTP agglomeration 2	[kWh/d]		330
Total A 1 - A 2	[kWh/d]	338	330
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	51	50

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]	51	50
Annual costs IV. (consumption)	[€/a]	18.501	18.076
Summary			
Annual costs I. (Investment)	[€/a]	62.053	96.676
Annual costs II. (Maintenance / Repairs)	[€/a]	16.254	14.454
Annual costs III. (labour)	[€/a]	175.200	43.800
Annual costs IV. (consumption)	[€/a]	18.501	18.076
Total annual costs	[€/a]	272.007	173.007

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