

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

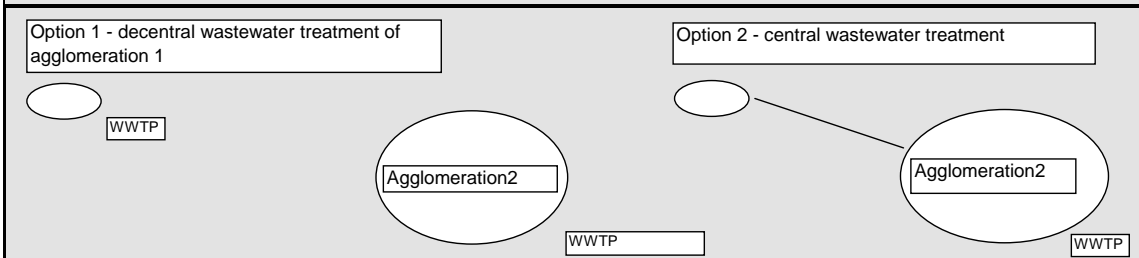
County: Mures

Agglomeration 1: PANET

Agglomeration 2: HARTAU

Agglomeration 3: CUIESD

Agglomeration 4: BERGHIA



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	2.307	2.307
Size of agglomeration 2	[PE]	296	296
Size of agglomeration 3	[PE]	789	789
Size of agglomeration 4	[PE]	239	239
Size of agglomeration 1+ 2+3+4	[PE]		3.631
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]	231	
Wastewater amount of agglomeration 2	[m³/d]	30	
Wastewater amount of agglomeration 3	[m³/d]	79	
Wastewater amount of agglomeration 4	[m³/d]	24	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		363
Connection details			
Lenth of the transportation line	[m]	-	12.500
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)	[€]	245.700	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	44.600	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	93.900	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	38.900	
(2) WWTP for agglomeration (40 % of total costs)	[€]		378.100
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	2.131.250
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	423.100	2.509.350
Writing-off period	[years]	40	40
Cost of capital, average	[%]	3	3
	[€/a]	12.693	75.281
Annual costs civil works	[€/a]	23.271	138.014

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	361.050	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	59.400	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	133.350	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	50.850	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	559.650
(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	[€]	604.650	559.650
Writing-off period	[years]	12	12
	[€/a]	50.388	46.638
Cost of capital, average	[%]	3	3
	[€/a]	18.140	16.790
Annual costs mechanical and electrical equipment	[€/a]	68.527	63.427
Annual costs I. (Investment)	[€/a]	91.798	201.441
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	24.186	22.386
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]	231	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	218	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	30	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,96	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	58	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	79	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,69	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	133	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	24	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,02	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	48	-
Total A 1	[kWh/d]	457	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	109
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]		363
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,33
Daily energy consumption WWTP agglomeration 2	[kWh/d]		484
Total A 1 - A 2	[kWh/d]	457	484
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	69	73

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]	69	73
Annual costs IV. (consumption)	[€/a]	25.038	26.523
Summary			
Annual costs I. (Investment)	[€/a]	91.798	201.441
Annual costs II. (Maintenance / Repairs)	[€/a]	24.186	22.386
Annual costs III. (labour)	[€/a]	175.200	43.800
Annual costs IV. (consumption)	[€/a]	25.038	26.523
Total annual costs	[€/a]	316.221	294.150

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