

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

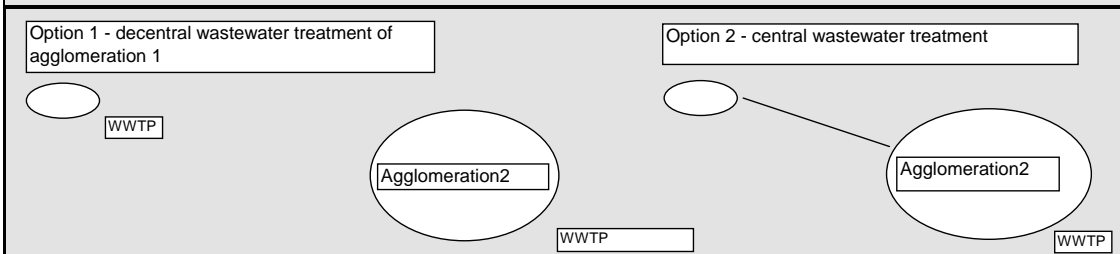
County: Mures

Agglomeration 1: FITCAU

Agglomeration 2: ALUNIS

Agglomeration 3: LUNCA MURESULUI

Agglomeration 4:



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	489	
Size of agglomeration 2	[PE]	2.036	2.036
Size of agglomeration 3	[PE]	775	775
Size of agglomeration 4	[PE]		0
Size of agglomeration 1+ 2+3+4	[PE]		2.811
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]	49	
Wastewater amount of agglomeration 2	[m³/d]	204	
Wastewater amount of agglomeration 3	[m³/d]	78	
Wastewater amount of agglomeration 4	[m³/d]	0	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		330
Connection details			
Lenth of the transportation line	[m]	-	7.000
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]	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]	0	
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)	[€]	63.900	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	218.600	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	92.500	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	0	
(2) WWTP for agglomeration (40 % of total costs)	[€]		296.100
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	1.193.500
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	375.000	1.489.600
Writting-off period	[years]	40	40
Cost of capital, average	[€/a]	9.375	37.240
	[%]	3	3
	[€/a]	11.250	44.688
Annual costs civil works	[€/a]	20.625	81.928

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	88.350	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	320.400	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	131.250	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	0	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	436.650
(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	[€]	540.000	436.650
Writting-off period	[years]	12	12
	[€/a]	45.000	36.388
Cost of capital, average	[%]	3	3
	[€/a]	16.200	13.100
Annual costs mechanical and electrical equipment	[€/a]	61.200	49.487
Annual costs I. (Investment)	[€/a]	81.825	131.415
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	21.600	17.466
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]	49	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	46	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	204	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,46	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	297	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	78	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,69	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	131	-
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]	474	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	281
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]		330
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,39
Daily energy consumption WWTP agglomeration 2	[kWh/d]		458
Total A 1 - A 2	[kWh/d]	474	458
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	71	69

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]	71	69
Annual costs IV. (consumption)	[€/a]	25.950	25.068
Summary			
Annual costs I. (Investment)	[€/a]	81.825	131.415
Annual costs II. (Maintenance / Repairs)	[€/a]	21.600	17.466
Annual costs III. (labour)	[€/a]	175.200	43.800
Annual costs IV. (consumption)	[€/a]	25.950	25.068
Total annual costs	[€/a]	304.575	217.749

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