

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

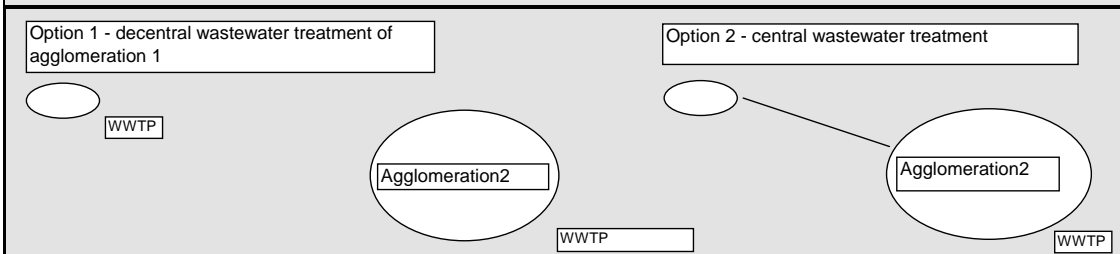
County: Mures

Agglomeration 1: BREAZA

Agglomeration 2: FILPISU MARE

Agglomeration 3: FILPISU MIC

Agglomeration 4:



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	1.207	1.207
Size of agglomeration 2	[PE]	869	869
Size of agglomeration 3	[PE]	455	455
Size of agglomeration 4	[PE]		0
Size of agglomeration 1+2+3	[PE]		2.531
No. of WTP modules	[items]	3	
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]	121	
Wastewater amount of agglomeration 2	[m³/d]	87	
Wastewater amount of agglomeration 3	[m³/d]	46	
Wastewater amount of agglomeration 4	[m³/d]	0	
Wastewater amount of agglomeration 1+ 2+3	[m³/d]		253
Connection details			
Lenth of the transportation line	[m]	-	9.500
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]	0	
Specific price WWTP agglomeration 1+2+3(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)	[€]	135.700	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	101.900	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	60.500	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	0	
(2) WWTP for agglomeration (40 % of total costs)	[€]		268.100
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	1.619.750
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	298.100	1.887.850
Writting-off period	[years]	40	40
Cost of capital, average	[€/a]	7.453	47.196
	[%]	3	3
	[€/a]	8.943	56.636
Annual costs civil works	[€/a]	16.396	103.832

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	196.050	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	145.350	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	83.250	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	0	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	394.650
(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	[€]	424.650	394.650
Writting-off period	[years]	12	12
	[€/a]	35.388	32.888
Cost of capital, average	[%]	3	3
	[€/a]	12.740	11.840
Annual costs mechanical and electrical equipment	[€/a]	48.127	44.727
Annual costs I. (Investment)	[€/a]	64.523	148.559
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	16.986	15.786
III. Labour costs			
specific labour costs	[€/h]	5	5
annual expenses option 1 (2 full-time workers/module)	[h/a]	26.280	-
annual expenses option 2 (2 full-time workers)	[h/a]	-	8.760
Annual costs III. (labour)	[€/a]	131.400	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]	121	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	114	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	87	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,66	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	144	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	46	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,83	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	83	-
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]	342	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	132
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			
Specific price WWTP agglomeration 2 (according formula)	[m³/d]		253
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,41
Daily energy consumption WWTP agglomeration 2	[kWh/d]		357
Total A 1 - A 2	[kWh/d]	342	357
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	51	54

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	54
Annual costs IV. (consumption)	[€/a]	18.713	19.538
Summary			
Annual costs I. (Investment)	[€/a]	64.523	148.559
Annual costs II. (Maintenance / Repairs)	[€/a]	16.986	15.786
Annual costs III. (labour)	[€/a]	131.400	43.800
Annual costs IV. (consumption)	[€/a]	18.713	19.538
Total annual costs	[€/a]	231.622	227.683

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