

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

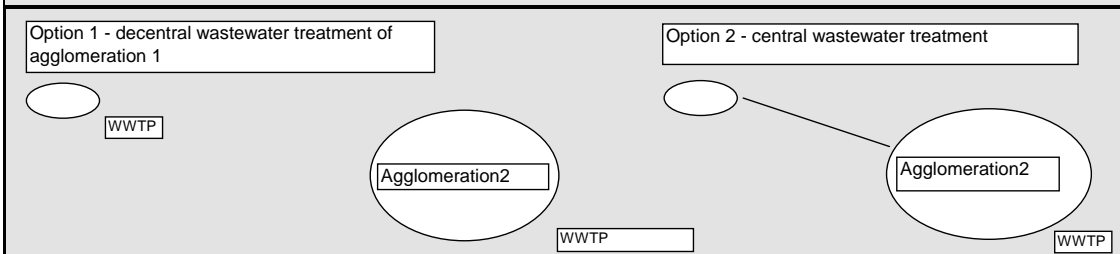
County: Mures

Agglomeration 1: BAHNEA+BERNADEA

Agglomeration 2: LEPINDEA

Agglomeration 3: DAIA

Agglomeration 4: IDICIU



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	2.141	2.141
Size of agglomeration 2	[PE]	204	204
Size of agglomeration 3	[PE]	227	227
Size of agglomeration 4	[PE]	347	347
Size of agglomeration 1+2+3+4	[PE]		2.919
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]	214	
Wastewater amount of agglomeration 2	[m³/d]	20	
Wastewater amount of agglomeration 3	[m³/d]	23	
Wastewater amount of agglomeration 4	[m³/d]	35	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		292
Connection details			
Lenth of the transportation line	[m]	-	9.000
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]	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)	[€]	229.100	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	35.400	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	37.700	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	49.700	
(2) WWTP for agglomeration (40 % of total costs)	[€]		306.900
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	1.534.500
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	351.900	1.841.400
Writing-off period	[years]	40	40
Cost of capital, average	[€/a]	8.798	46.035
	[%]	3	3
	[€/a]	10.557	55.242
Annual costs civil works	[€/a]	19.355	101.277

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	336.150	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	45.600	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	49.050	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	67.050	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	452.850
(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	[€]	497.850	452.850
Writting-off period	[years]	12	12
	[€/a]	41.488	37.738
Cost of capital, average	[%]	3	3
	[€/a]	14.936	13.586
Annual costs mechanical and electrical equipment	[€/a]	56.423	51.323
Annual costs I. (Investment)	[€/a]	75.778	152.600
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	19.914	18.114
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]	214	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	202	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	20	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,07	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	42	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	23	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,04	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	46	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	35	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,91	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	66	-
Total A 1	[kWh/d]	357	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	43
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]		292
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,38
Daily energy consumption WWTP agglomeration 2	[kWh/d]		403
Total A 1 - A 2	[kWh/d]	357	403
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	54	60

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]	54	60
Annual costs IV. (consumption)	[€/a]	19.558	22.046

Summary

Annual costs I. (Investment)	[€/a]	75.778	152.600
Annual costs II. (Maintenance / Repairs)	[€/a]	19.914	18.114
Annual costs III. (labour)	[€/a]	175.200	43.800
Annual costs IV. (consumption)	[€/a]	19.558	22.046
Total annual costs	[€/a]	290.450	236.560

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