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Project: CAMP Slovenia

REGIONAL PROGRAME OF ENVIRONMENT AND WATER RESOURCES PROTECTION

- final report -

(English version)

Februar 2006

Občina Piran | Občina Izola | Mestna občina Koper | Občina Hrpelje-Kozina | Občina Divača | Občina Sežana | Občina Ilirska Bistrica | Občina Komen

Client: ***Regionalni razvojni center Koper – Centro regionale di sviluppo***
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REGIONAL PROGRAMME OF ENVIRONMENT AND WATER RESOURCES PROTECTION

Phase: **Final report**

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Abstract: This project addresses water resources protection in the coastal area of the Republic of Slovenia. The main sources of water pollution in the region are in order to improve the current status of pollutant emissions still the settlements and tourism and industry activities. The Regional Programme of Environment and Water Resources Protection are closely linked to the national as well as municipal programmes defining the investment leading to the reduction of water from the above resources.
In the framework of this project (1), methodology was introduced for the integration – at the level of the participating municipalities – of all data required for the analysis of the current situation in the urban waste water treatment field and the analysis of the foreseen programme of measures for the reduction of pollution of water from the pollution services. With the cooperation of municipalities (2), required data were collected for the preparation of the regional programme of water resources protection with regard to the criteria defined in the Water Act and other national legislation which is in line with the requirements of the EU legislation.
The result of integration and analysis of data from individual municipalities (3) shows that the extensive and demanding measures planned for the period until 2017 exceed the financial capacities of the most of the municipal budgets. Thus, solutions for the improvement of the current situation need to be sought for in additional sources of financing (the Republic of Slovenia, the EU), improved approach and other solutions.
Project findings and results represent a basis for related projects in the framework of the CAMP project. This is particularly outstanding in the prospective of regional environment information system.

Date: Ljubljana, February 2006

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1 INTRODUCTION

Operative programme of waste water collection and treatment is the most important programming act in the water protection field and it aims to support the achievement of goals which are defined in National environment protection program. Operative programme of waste water collection and treatment is a programme of coordinated steps which should be done by national government and local authorities, to gradually fulfil all objectives for environment protection.

It has been established that due to absence of the sewerage system and treatment plants in existing agglomerations water pollution represents one of the major pressures on water quality in the area covered by the Coastal Area Management Programme (CAMP). Therefore – in the framework of the Regional Programme of Environment and Water Resources Protection – we paid particular attention to the analysis of the planned measures that would enable us to achieve a suitable target condition in providing settlements (agglomerations) with waste water collection and treatment systems. The Regional Programme of Environment and Water Resources Protection is thus closely linked to the National Operational Programme for Waste Water Collection and Treatment, adopted in September 2004.

Operative programme of waste water collection and treatment is expected to be implemented in the period from 2005 to 2017, with special intensity in period from January 1, 2005 to December 31, 2008. This operative programme defines agglomeration deadlines infrastructural development of those areas in the field of waste water collection and treatment and controls use of public finance.

The National operative programme of waste water collection and treatment is defining the largest environmental investment programme in Slovenia. This programme defines rules for the proper use of financial resources for investing in projects of waste water collection and treatment.
The main objective is to provide conditions to fulfil environment objectives. The average financial resources in the execution period of program (2005-2017) should not exceed the amount of resources which were intended for investments in the year 2003.

Operative programme of waste water collection and treatment is a complex project, which is supposed to be implemented in accordance with European legislation. The complexity of this project is defined also by a split responsibility between national government and local authorities. According to the legislation the Republic of Slovenia lies in the domain of local communities waste water collection and treatment. Waste water collection and treatment service is usually provided by a Public service provider. We also need to be aware that this project is a great financial burden.

Because of the complexity of this project, a model has been developed within the CAMP project which will help local authorities to define more precisely or the ways how to finance the implementation of their (local) operative programmes of waste water collection and treatment. Local authorities need this kind of tool to provide expert decision support tool to local political structures, which are competent to undertake an important decisions.

The input data on the investment requirements are obtained mainly from the national operative programme for the waste water collection and treatment (2004) and technical documents (pre-feasibility studies, feasibility studies) The investment capacity of a local

community is analyzed from different sources (municipality budged, financial flow on water consumption, accounts of performer of public service i.e.). The financial requirements available resources were analysed and as a result (output data) the investment programme is defined (programme of financing local operative programme of waste water collection and treatment). The investment programme is defined in the time scale while at the same time the defined financial resources guarantee its feasibility.

In the analyzed CAMP area these are 8 local communities. Three of them (Koper, Izola and Piran) are situated on the Adriatic coast, while other five are located more inlands. The differences among them are excessive. Local community of Koper with almost 60.0000 inhabitants is difficult to compare with the local community of Divača with 3.500 inhabitants yet again the local community of Komen with 800 inhabitants.

2 PREPARATION OF INSTRUCTIONS FOR THE DRAFTING OF MUNICIPAL OPERATIONAL PROGRAMMES FOR WASTE WATER COLLECTION AND TREATMENT

Municipal Operative Programmes for Waste Water Collection and Treatment are based on the National Operative Programme (Ministry of the Environment and Spatial Planning, September 2004), which is a framework defining the agglomerations that – due to their size – should be provided with waste water collection and treatment systems. The instructions state that municipalities must develop the national programme further on their level in greater detail and make a financial assessment on the basis of the produced technical documentation (at least on the conceptual level).

If the National Operational Programme for Waste Water Collection and Treatment puts stress on the definition of agglomerations as basic entities for the provision of waste water collection and treatment services and on the definition of priorities for their infrastructural development, a step forward has been made with the municipal operational programmes and the Programme of Environment and Water Resources Protection in the CAMP framework, as we have underlined the issue of provision of financial resources necessary to achieve the target condition of infrastructure in this field.

The concept of the introduced model of financing local operative programme of waste water collection and treatment includes:

- diagram, which shows model hierarchy;
- financial flows between individual stakeholders;
- other technical and accounting data (i.e. water consumption, population growth, water pricing policy, standards for the amortization of the infrastructure) that enable the consistency of the model.

The most important concept of this model is that it is following up the trends in the execution of investments for waste water collection and treatment. Based on executed investments in the past, it is possible to predict the trend of investment implementations in the future.

This model also enables monitoring of different investment sources, such as local budget, state subsidies to local communities and use of EU means, while it is at the same time in concordance with national accounting legislation and legislation that describes use of public finance.

To ensure a suitably structured approach to the programmed achieving of target condition in the field of water resources protection from pollution from urban areas, we have created a "Detailed analysis model of municipal operational programmes of waste water collection and treatment". Model description can be found in Annex 1.

2.1 PRESENTATION OF DATA MODEL AND HIS HIERARCHY

The diagram (figure 1) helps us to understand the complexity of this model. The picture shows connections among individual stakeholders are composing the entire process in the field of waste water collection and treatment. Tables in model are numbered in order to achieve improved transparency of the flows in the model.

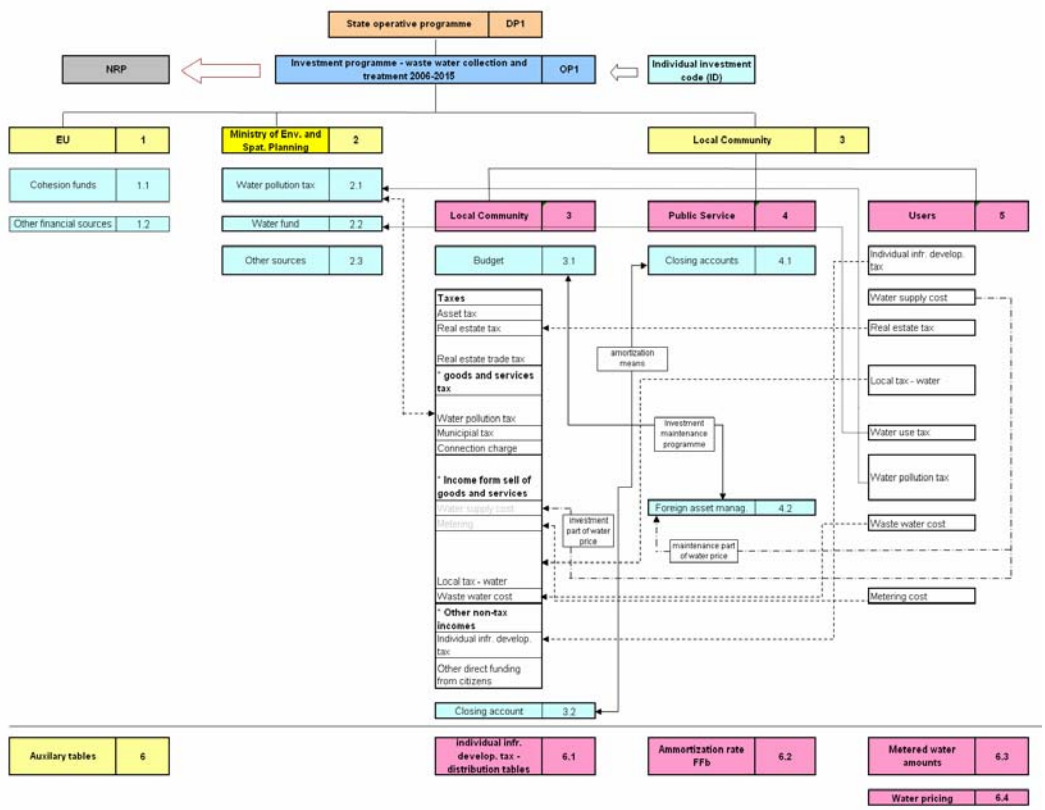

FIGURE 1: Hierarchy of detail analysis model of local operative programme of waste water collection and treatment

The figure 1 shows the basic hierarchy of the model. Additional features of the model are:

- analysis of flows (mass flows, financial flows, investments) in time, that enables the analytical capacity necessary for the long-term planning of the investments in the field of waste water collection and treatment,
- analytical part of the model enables identification of gaps (i.e. is the financial output of one stakeholder really accounted for as an input to other stakeholder).

The base of this model is the National operative programme of waste water collection and treatment. Local operative programmes of waste water collection and treatment are developed in order to elaborate in further detail the National operative programme. Later on, as those local operative programmes are confirmed by the councils of the local community and declared as such by the mayor they serve as a local programme, that has its consistency through the long period of time in which it could and should also be maintained. Those programmes suitably summarize technical-programme orientation from national operative program, especially from aspect of the pricing policy for waste water collection and treatment and budgeting of the incomes (connection fees, fee for the use of urban area).

3 COOPERATION AND COORDINATING BY PREPARING OPERATIVE PROGRAMMES OF WASTE WATER COLLECTION AND TREATMENT

In framework of this task we had performed a set of workshops and working appointments with municipalities to which necessary contents of operative programmes was introduced, above all collecting of data concerning current condition in the field of collection and treatment of waste water and definition compliance objective arranging agglomerations by the year 2015 (sewerage 2017).

We have observed a very different response of municipalities on concerning cooperation. By all local authorities (and public service provider) readiness for collaboration was expressed, although was not operatively done in all local authorities the same.

Same local authorities and their performers of public services had suitably intervened set of data (municipalities Izola, Sežana, Divača); some of local authorities had provided partial data (municipalities Hrpelje-Kozina, Komen). At some local authorities or their public services providers the response on project and cooperation was quite weak (Ilirska Bistrica, Koper, Piran). For those municipalities the data for the CAMP Project was obtained from publicly accessible databases and on own inquiries.

4 APPOINTMENT OF CONTENTS PROGRAMME CONSIDERING REGULATION OF LAW CONCERNING WATERS, THAT THEY REFER TO QUALITY OF WATER BODIES AND INTEGRATION OF PROGRAMMES

Law concerning waters addresses quality of water or water bodies in the next by-laws:

- Regulation concerning designation of water bodies surface waters (Official gazette RS, No. 65/05)
- Regulation concerning designation of water bodies underground waters (Official gazette RS, No. 65/05)
- Regulation concerning ranges and quality of bathing waters (Official gazette RS, No. 70/03)

Law concerning waters (water act), that was adopted in the year 2002, making bases to declare against conditions of water bodies (surface and underground waters) in accordance with European guideline concerning common policy to water (Water Framework Directive). According to the entire range of watercourses discharging to the Adriatic Sea is recognized as nutrient sensitive area. These criteria are already taken into consideration in the state operative programme of waste waters collection and treatment. As such they have been incorporated into municipality's operative programmes as well. More stringent criteria for the pollution discharges to water bodies in farce in these areas.

Water bodies on treated range are review in table 1 and figure 2:

TABLE 1: List of water bodies (surface waters).

						Criteria for designation of water body				
ID	**River basin or catchment area**	**Surface water**	**Name of water body**	**Rank**	**Type of classificatio n**	Type	Significant hidrological change	Seasonal appearance of water	Significant anthropogenic physical change	Significant various situation
SI512VT11	Adriatic rivers	Dragonja	VT headwaters region of Dragonja - Topolovec	V	5SMF	x	x			
SI512VT12	Adriatic rivers	Dragonja	VT Dragonja Topolovec - Brč	V	5SMF	x	x			
SI512VT3	Adriatic rivers	Dragonja	VT Dragonja Brč - Krkavče	V	5SMF		x			
SI512VT51	Adriatic rivers	Dragonja	VT Dragonja Krkavče - Podkaštel	V	5SMF		x			
SI512VT52	Adriatic rivers	Dragonja	VT Dragonja Podkaštel - discharge	V	5SMF		x		x	
SI518VT3	Adriatic rivers	Rižana	VT headwater region of Rižana - discharge	V	5SA	x				
SI5212VT1	Adriatic rivers	Klivnik	kMPVT - aquifer of Klivnik	kMPVT					x	
SI5212VT2	Adriatic rivers	Klivnik	VT Klivnik	V	5SMF	x			x	
SI5212VT3	Adriatic rivers	Moja	kMPVT - aquifer of Moja	kMPVT					x	
SI5212VT4	Adriatic rivers	Moja	VT Moja	V	5SMF	x			x	
SI52VT11	Adriatic rivers	Reka	VT Reka border segment - Koseze	V	5SA	x	x			x
SI52VT15	Adriatic rivers	Reka	VT Reka Koseze - Bridovec	V	5SA		x		x	x
SI52VT19	Adriatic rivers	Reka	VT Reka Bridovec - Škocian caves	V	5SF	x	x	x		
SI5VT1	Adriatic rivers	Sea	VT territorial waters	M	OM M3	x				
SI5VT2	Adriatic rivers	Sea	VT Lazaret - Ankaran	M	OM M1	x	x		x	
SI5VT3	Adriatic rivers	Sea	kMPVT - Koper bay	kMPVT					x	
SI5VT4	Adriatic rivers	Sea	VT Žusterna - Piran	M	OM M1	x	x		x	
SI5VT5	Adriatic rivers	Sea	VT Piran bay	M	OM M3	x	x			

Legend of abbreviation:

- 3 Hydro-eco region of the river Po (which it presents eco-region 3 - the Italy by Illies)
- 4 Hydro-eco region of the Alps (which it presents eco-region 4 - the Alps by Illies)
- 5 Hydro-eco region of the Dinarids (which it presents eco-region 5 - the Dinarid western Balkan by Illies)
- 11 Hydro-eco region of the Panonian lowland (which it presents eco-region 11 - the Hungary lowland by Illies)
- M Area smaller than 10 km^2
- SM Area between 10 and 100 km^2
- S Area between 100 and 1.000 km^2
- SV Area between 1.000 and 10.000 km^2
- V Area larger than 10.000 km^2
- F Flysch
- A Limestone
- S Silicate

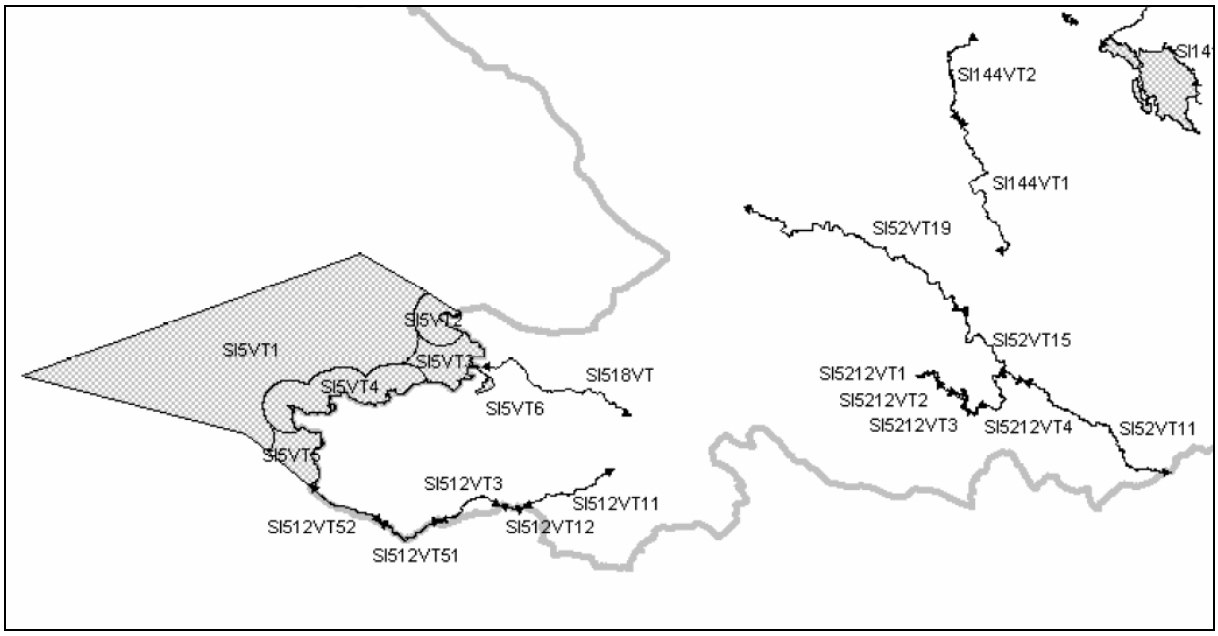

FIGURE 2: Review of water bodies on CAMP area (surface waters).

With the by-law concerning designation of underground water bodies (Official gazette RS, No. 65/05), is in accordance with first intend of first paragraph 5. link and Supplement II Directive of European parliament and Council 2000/60/ES, from day 23. October 2000, on designation of framework for water policy (Official gazette RS, No. 327/00) and with regulation that arranges methodology for designation of water bodies. On this basis the groundwater bodies on the CAMP area were determined.

In the CAMP area there is an underground water body with unique identity 5019 – Obala and Kras with Brkini. It lies in the Adriatic Sea watershed and has 3 typical aquifers. Area of this groundwater body is extent 1589,4 km^2. Average annual amount of precipitation is amounting (in the period 1961-1990) to 1507 mm.

1. AQUIFERS – Karstic aquifers

Karstic aquifers on considered area are in the category of abundant aquifers. From the point of view of hydrodynamic types it belongs to open aquifers, which is occasionally closed with flysch stratums. Average thickness of aquifers is more than 400m. Litostratigraphic characteristic of the area is characterized by the limestone or dolomite layers (Tertiary and Mesozoic; Chalk till Eocene). Thickness of unsaturated layer is more than 100 m. Typical cracks porosity is vertical (average value [m/s] $3{,}0 \cdot 10^{-7}$). (Generally the porosity varies from [m/s] $3 \cdot 10^{-7}$ to $1 \cdot 10^{-5}$).

2. AQUIFERS – Aquifers of flysch stratums

In the area under Karstic edge there is prevailing aquifer of flysch stratums, which is smaller than karstic aquifer. It has local and restricted sources of underground water. Basically this is a closed aquifer. Average thickness is more than 500 m. From the aspect of litostratigraphic characteristics we place it to flysch aquifers from Eocene. Thickness of unsaturated layers is small and porosity is low.

3. AQUIFERS – Alluvium aquifers of littoral rivers

Along littoral rivers (Rižana, Badaševica, Dragonja) are appearing smaller alluvium aquifers. Their average thickness is small (about 5 m). They are composed mostly of quaternary stratums of sand, gravel and clay. Closed aquifer layers are the layers of marine sediments of various thicknesses.

Quality of surface and underground waters is addressing beside the water law also the environment protection law which is prescribing the emission limit values for different sources of pollution. The water law (ZV-1; Official gazette RS, No. 67/02, 110/02) has determined water bodies (underground and surface), but it has not yet determined the measures for the target management with quality of water bodies, which should be a content of river basin management plans (55.-59. article. ZV-1; Official gazette RS, No. 67/02) and more detailed catchments management plans. Those plans would beside existent emission limit values systematically apply also the measures tied on mission limit values (Environmental quality standards).

Special set of criteria that refers to the collection and treatment of waste water refers to the criteria implied from the specific use of water. According to the bathing water directive we can find out that Slovenian sea mostly comply with quality parameters. Special attention would be devoted to rehabilitation of discharges of high waters from sewerages system and to the management of urban run-off. At event of showers they are presenting important source of risk for the bathers in a bathing season.

In the field of control and limitations of pollution discharges into water bodies the only applied mechanism is derived by the environment protection law. Sources of pollution are regulated by the Urban regulation concerning emission or substances from treatment plant (Official gazette RS, No. 90/98). With this regulation and its later supplementations emission limit values for pollutants from public waste water treatment plants requirements concerning the infrastructural developments of agglomerations are determined. The same regulation is also determining the criteria for the eutrofication and designating areas, which are sensitive to eutrofication.

On the CAMP area following areas from to eutrofication are determined:

- river basin of Adriatic sea
- headwaters region of river Dragonja from source to confluence with Pinjevec
- catchment area of Pinjevec
- river basin of Dragonja from confluence with Pinjevec to confluence with Poganja
- river basin of river Dragonja from confluence with Poganja to discharge into the sea
- river basin of Sečovlje saltpans
- catchment area of Drnica
- catchment area of shore from discharge Drnica to discharge Badaševica
- catchment area of Badaševica
- catchment area of shore from discharge Badaševica to discharge Rižana
- karstic headwater region of Rižana
- headwaters of river Rižana from source to discharge into the sea

- catchment area of seashore from discharge Rižana to discharge Timava
- headwaters Rižana from source to confluence with Molja
- catchment area of Posrtva
- river basin from confluence with Postrva to confluence with Mrzlek
- catchment area of Mrzlek
- river basin of Reka from confluence with Mrzlek to confluence with Padež
- catchment area of Padež
- river basin of Reka from confluence with Paleo to Škocjan caves
- catchment area of Timav to Škocjan caves

On this way is whole area taken in CAMP project, determined as sensitively area and for more stringent criteria apply regarding the infrastructural development of agglomerations with systems of waste water collection and treatment.

Those more stringent criteria reflect in following measures:

- Lower marginal size of agglomeration from the point of view of density of settlement (10 inhabitants/ha instead of 20 inhabitants/ha, later is the marginal value on non-sensitive areas).
- More stringent emission limit values for the pollution from larger agglomerations (tertiary treatment of waste water until 31st December 2008 on settlement areas (agglomerations) with more than 10.000 population equivalents (PE)).

5 INTEGRATION OF PROGRAMMES FOR COLLECTION AND TREATMENT OF WASTE WATERS AND THEIR ANALYSIS CONSEDERING EFFICIENCY OF WATER PROTECTION ON REGIONAL LEVEL

Regional programme of protecting an environment and water sources was made on basis data integration, that were obtained from the representatives of individual municipalities and their waste water collection and treatment public services providers .

During elaboration tasks of every subject and it is specific role in entire waste water management sector was consider:

- **European union -** definition of minimal standards referring to agglomerations and development of systems for waste water collection and treatment (Cohesion Funds – co financing and other sources of EU);
- **National level** – definition of legislation and deadlines public service provision standards (waste water collection and treatment, water pollution tax, water use tax, inspection control, special non-refundable state budget transactions, etc.);
- **Local level**
    - *Municipalities* (designation of long-term investment programmes, planning of financial construction of investments);
    - *Public service provider* of waste water collection and treatment;
    - *Households* (consumers of water, taxpayers, payers of water services);
    - *Other users* (especially industry).
- **Other subjects** (specific industrial polluters, other investitors).

Financial flows are represented as input-output tables between individual subjects. The most frequent transactions are found on a local level between the municipalities, public service providers, and water users.

Financial flow is analyzing the values, expressed in the model in a form of current prices for the past and in a form of constant prices for the future. With this reason the investment costs have to be recalculated using indices to a suitable date. The advice would be to update the indices every time, when the model is updated.

During the integration stage and analysis of municipal programmes according to their efficiency regarding protection of waters on regional level the model was based on following data:

MUNICIPALITY:

- Budget of municipality with the table by items for the years from 2001 to 2005;
- Annual closing account of municipality budget by items for the years from 2001 to 2004;
- Development programmes of municipality;
- Data about the amount of delivered water for the years from 2000 to 2004 (by users – households and industry), spatially agglomerations;

- Data about the number (percentage) of connected users on sewerage network (by users – households, industry), spatially agglomerations;
- Data about the water price for the years from 2000 to 2005 (price of collection and treatment for households and industry, amount of amortization in unit price, price for connected users of sewerage system and those which are not connected), eventual cost of connection on sewerage system.

PUBLIC SERVICE PROVIDER:

- Data from the balance sheet and closing accounts for the public service provider;
- Data about the price of water for the years from 2000 to 2005;
- Data about the amount of accounts led away water for the years from 2000 to 2004;
- Annual report on the provision of public service by 21. paragraph of Regulation of waste water collection and treatment (reported on March 2005 for the year 2004).

STATE:

- Explanation of the financial state plan (Reporter of National Assembly 790; explanation: No. 7; Ministry of Environment and Spatial Planning).

We entered listed data according to their availability to model and analyzed the key items, which are important regarding the development of public infrastructure in the field of waste water collecting and treatment.

5.1 ANALYSIS OF THE AGGLOMERATIONS SIZE – NO. OF POPULATION EQUIVALENTS (PE) – AND CURRENT MUNICIPAL INFRASTRUCTURE IN INDIVIDUAL AGGLOMERATIONS

5.1.1 Urban areas with more than 10.000 PE

Urban areas with more than 10.000 PEs in the sensitive areas should be equipped with public sewerage and waste water treatment plants until December 31st 2015, till then should be also connected on public sewage least 95 % of entire loads.

TABELA 2: Urban areas with more than 10.000 PE.

ID agglomeration	Aglomeration	PE	PE industry	PE together	Percent of sewerage system	ID of water treatment plant
20018	KOPER	24.471	7.341	31.812	100	158 Koper
538	PIRAN	14.369	4.311	18.680	64	82 ČN Piran
20901(ex 583)	IZOLA	12.445	3.734	16.179	95	

In the municipalities of Southern Primorska, three agglomerations belong among urban areas with more than 10.000 PEs: Koper, Piran and Izola. In the entire CAMP area these agglomerations are priority areas for the provision of waste water collection and treatment infrastructure and the deadline for the installation of treatment plants is shorter than in all other agglomerations. As can be seen in Table 1, the proportion of agglomerations with suitable sewerage system is relatively high; however, the availability of treatment plants is quite low – the Izola agglomeration does not have a treatment plant and releases the waste water into the sea through deep water release. The Koper treatment plant does not achieve sufficient level of treatment. With the investment programme (source: Amendments to the programme of investment in treatment plant and sewerage system Koper and Izola, Hidroinženiring d.o.o., June 2005) the installation of a new joint treatment plant for the Koper and Izola agglomerations is foreseen. At same time the current status of sewerage systems will be improved.

5.1.2 Urban areas between 2.000 and 10.000 PE

Urban areas between 2.000 and 10.000 PEs in sensitive areas should be equipped with public sewage and water treatment plant until 31. December 2015. By 31. December 2017 should be connected on public sewage least 95 % of entire loads.

TABELA 3: Urban areas with 2.000 to 10.000 PE.

Municipality	No. of agglomerations	Average percent of sewerage system (all agglomerations)	ID of water treatment plant
KOPER	4	52	158
IZOLA	1	21	82
SEŽANA	1	50	243
ILIRSKA BISTRICA	1	75	47

Urban areas between 2.000 and 10.000 PEs are shown in Table 2 under individual municipalities. The table also shows the average percentage of the sewerage systems already established in agglomerations of individual municipalities and treatment plants that are currently installed there.

It can be observed that mid-sized agglomerations in the CAMP area are relatively well equipped with treatment plants; however, the rather low level of sewerage system development poses a problem significant.

5.1.3 Urban areas or their parts between 50 and 2.000 PEs and the density of over 20 PE/ha or 10 PE/ha in sensitive areas

Urban areas or their parts between 50 and 2.000 PEs and the density of over 20 PE/ha or 10 PE/ha in sensitive areas should be equipped with public sewage and water treatment plant until 31. December 2015. By December 31st 2017 should be connected on public sewage least 80 % of entire loads.

TABELA 4: Urban areas or their parts between 50 and 2.000 PEs and the density of over 20 PE/ha or 10 PE/ha in sensitive areas.

ID of municipality	Municipality	No. of agglomerations	Average percent of sewerage system (all agglomerations)	ID of water treatment plant
	KOPER	54	29	158, 160, 161, 162
	PIRAN	6	67	82, 83, 84, 85, 86, 87
40	IZOLA	6		82, 176, ČN Cetore
111	SEŽANA	21	0	0
19	DIVAČA	12	4,3	225, 226
35	HRPELJE-KOZINA	16	5	227
49	KOMEN	12	0	0
	ILIRSKA BISTRICA	44	3,9	0

Urban areas or their parts between 50 and 2.000 PEs and the density of over 20 PE/ha or 10 PE/ha in sensitive areas are shown in Table 3 under individual municipalities. The table also shows the average percentage of the sewerage system already established in agglomerations of individual municipalities and treatment plants currently installed there. Individual agglomerations are listed in Annex 2, under contents display for each individual municipality.

5.2 AMOUNT OF THE DELIVERED DRINKING WATER AND COLLECTED WASTE WATER

With the data on the amounts of the delivered drinking water we can make an approximate assessment of the waste water amounts since these are more or less equivalent to the amounts of supplied water.

5.2.1 Delivered drinking water amounts

The delivered drinking water represents the basis for the calculation of waste water collection fees as it is the only measured quantity that can be attached to an individual consumer on the basis of individual measurements of the delivered water. In the CAMP area, practically entire amount of delivered drinking water is measured with a counter.

TABELA 5: Amounts of annually delivered drinking water in individual municipalities (industry and households).

Amounts of annually delivered drinking water (in m3)					
Municipality	**2000**	**2001**	**2002**	**2003**	**2004**
Izola	1.190.449	1.190.730	1.119.200	1.201.013	1.186.086
Koper				2 046 540	
Piran					
Sežana			837.321	998.644	
Divača			181.653	218.062	
Hrpelje - Kozina			190.091	208.376	
Komen			124.260	170.675	
Ilirska Bistrica					

Note: For the Koper municipality, annual drinking water amount is only given for the Koper settlement (agglomeration ID: 20018). No data on the delivered drinking water amounts is available for municipalities of Piran and Ilirska Bistrica.

TABELA 6: Amount of annually delivered water (industry and households) per resident.

Municipality	**Number of resident in the year 2002 *(source: SURS)***	**Annually delivered water in the year 2002 *(m^3 per resident)***
Izola/Isola	14767	75,8
Koper/Capodistria	48527	83,6
Piran/Pirano	17509	
Sežana	11986	69,9
Divača	3889	46,7
Hrpelje - Kozina	4165	45,6
Komen	3617	34,4
Ilirska Bistrica	14272	

An important characteristic evident from the table is that water consumption in coastal municipalities (e.g. Izola and Koper) is rather high. This can be explained by the fact that coastal municipalities (Koper, Izola, Piran) are strongly influenced by the seasonal water consumption due to tourism and industry. In the Sežana municipality, water consumption in industry is important. We can see that water consumption in general is quite stable and there is no rising trend of water consumption evident.

5.2.2 Collected and treated waste water amounts

The data on the amount of collected and treated waste water were acquired directly from questionnaires filled in by the public service providers.

TABELA 7: Amounts of annually collected waste water in individual municipalities (in m3).

Amounts of annually collected waste water (in m3)					
Municipality	**2000**	**2001**	**2002**	**2003**	**2004**
Izola					
Koper				1.509.192	
Piran					
Sežana	117.547	113.619	118.474	218.668	192.153
Divača	56.660	48.790	44.241	47.833	46.409
Hrpelje - Kozina	14.665	13.880	13.898	13.549	13.459
Komen	0	0	0	0	0
Ilirska Bistrica		676.467	690.227	628.668	628.218

Notes:
No waste water amount record has been kept in the Izola municipality. However, we can use the data on the amounts of delivered water, from which it is possible to assess the amounts of waste water, since these are more or less equivalent to the amounts of the supplied water.

Reports on the amounts of collected waste water in the Koper municipality (only the Koper agglomeration) in 2003 were taken from information source: (reports for 2003 under Article 21 of the Rules on waste water and rainwater collection and treatment).

Considering the data on the amount of collected waste water we can assess that the investments in the years 2000–2004 have had only influence on the increase of the amount of collected waste water.

5.3 PRICING POLICY IN THE FIELD OF WASTE WATER AND RAINWATER COLLECTION AND TREATMENT

Prices for services of the local public service companies are determined by the regulations on pricing practices for services offered by essential local public service companies. Proposal for these regulations is prepared and augmented by the service provider. They are confirmed by the local community and state price regulation authorities.

5.3.1 Waste water collection and treatment prices

TABELA 8: Waste water collection and treatment prices (SIT/m3).

(SIT/m3)

Municipality	households				industry			
	collection		treatment		collection		treatment	
	with sewage	without sewage	with sewage	without sewage	with sewage	without sewage	with sewage	without sewage
Izola	65,04				114,30			
Koper	225,59				322,84			
Piran	111,72				250,4			
Sežana	32,65	32,65	174,28	109,33	32,65	32,65	253,95	318,91
Divača	31,10		116,39		31,10		116,39	
Hrpelje - Kozina	17,27				36,07			
Komen								
Ilirska Bistrica	29,10		155,00		42,70		155,00	

Note: In the Izola, Koper and Piran municipalities, collection and treatment are accounted for together in unique unit cost. Displayed as net sums; 8.5% VAT not included in the price. In the case of Hrpelje-Kozina municipality, the operation of treatment plant is financed directly from the municipal budget.

TABELA 9: Waste water collection and treatment prices (€/m3); (1€ =240 SIT)**.**

(€/m3)

Municipality	households				industry			
	collection		treatment		collection		treatment	
	with sewage	without sewage	with sewage	without sewage	with sewage	without sewage	with sewage	without sewage
Izola	0,27				0,48			
Koper	0,94				1,35			
Piran	0,47				1,04			
Sežana	0,14	0,14	0,73	0,46	0,14	0,14	1,06	1,33
Divača	0,13		0,48		0,13		0,48	
Hrpelje - Kozina	0,07				0,15			
Komen								
Ilirska Bistrica	0,12		0,65		0,18		0,65	

5.4 NATIONAL WATER-POLLUTION TAX

Water-pollution tax is an environmental duty for environmental pollution from disposal of waste water, rainwater and industrial waste water. The basis for the tax level calculation is the sum of pollution units in a calendar year. Provider of the waste water collection and treatment public service is obligated to collect this duty from the individual polluters.

A regulation on water-pollution tax defines the criteria for claiming exemption from the tax or its reduction, if according to the efficiency of the waste water treatment. The collected tax is used for investment in waste water and rainwater collection and treatment facilities on the level of municipality.

5.4.1 Water-pollution tax rate in municipalities

National water-pollution tax is calculated differently for consumers with and without a connection to the sewerage system. Consumers connected to the sewerage system pay lower water-pollution tax. In Table 10, water-pollution tax prices calculated for 1 m^3 of delivered water are displayed – as derived from applicable price lists in 2005

TABELA 10: Water-pollution tax rate in municipalities in the year 2005 (SIT/m3); (1€ = 240 SIT)**.**

Municipality	Water-pollution tax rate			
	users (SIT/m3)		**users** (€/m3)	
	with sewage	without sewage	with sewage	without sewage
Izola	123,47	123,47	0,51	0,51
Koper	71,4	134,66	0,30	0,56
Piran	111,8	130,21	0,47	0,54
Sežana	51,71	127,64	0,22	0,53
Divača	46,29	127,64	0,19	0,53
Hrpelje - Kozina	63,07	127,64	0,26	0,53
Komen		127,64		0,53
Ilirska Bistrica				

Note: In the Sežana municipality, the tax for consumers in the settlement Sežana is 113.78 SIT/m^3, data for Ilirska Bistrica is not available, municipality of Komen has no sewerage system.

5.4.2 The amount of collected water-pollution tax in municipalities

In municipalities, all the water-pollution tax is used for investment in facilities for waste water and rainwater collection and treatment. In the Karst region, investment of funds obtained from water-pollution tax are divided between the four municipalities in the region that has one common public service provider (Sežana, Divača, Komen and Hrpelje–Kozina). For the allocation of funds from water-pollution tax the programme proposed by the public service provider is used. The amount of tax collected in individual municipalities in different years is displayed in Table 9.

TABELA 11: The amount of tax collected in individual municipalities in different years (in SIT 1000).

(in SIT 1000)

The amount of tax collected in different years					
Municipality	**2001**	**2002**	**2003**	**2004**	**2005**
Izola	88.725	105.967	123.713	124.247	130.250
Koper					
Piran					
Sežana	39.085	47.117	64.721	55.623	
Divača	11.929	13.922	15.765	13.733	
Hrpelje - Kozina	0	18.367	23.060		
Komen	9.856	12.730	18.725		
Ilirska Bistrica	49.739	59.305	67.214	40.164	51.013

TABELA 12: The amount of tax collected in individual municipalities in different years (in € 1000).

(in € 1000)

The amount of tax collected in different years					
Municipality	**2001**	**2002**	**2003**	**2004**	**2005**
Izola	369,69	441,53	515,47	517,70	542,71
Koper					
Piran					
Sežana	162,85	196,32	269,67	231,76	
Divača	49,70	58,01	65,69	57,22	
Hrpelje - Kozina		76,53	96,08		
Komen	41,07	53,04	78,02		
Ilirska Bistrica	207,25	247,10	280,06	167,35	212,55

6 THE ANALYSIS OF FINANCIAL FLOWS LINKED TO THE IMPLEMENTATION OF WASTE WATER COLLECTION AND TREATMENT INVESTMENT

In the framework of financial flow analysis, we were primarily comparing the capacities of municipal budgets, which – in line with their original competencies – provide the major part of funds for investment in the waste water collection and treatment infrastructure. Comparison between the investment part of the budget and the necessary investments by 2017 – the latest term for installation of waste water treatment plants and sewerage systems in the smallest agglomerations defined in the basic national operational programme – shows the feasibility of municipal operative programmes feasibility analysis. With the integration of feasibility of municipal operational programmes also the feasibility analysis Regional Programme of Environment and Water Resources Protection is provided.

6.1 MUNICIPAL BUDGET

Municipal budget is an act adopted by the municipal council and represents a basis for the financing of municipal authorities and implementation of their tasks as well as for other purposes defined by acts and regulations.

The municipal budget provides for municipality's revenue and other incomes as well as expenditure and other expenses, on the basis of which calculation of appropriate use of funds for the current year is made.

Tables 10 and 11 display the entire annual income and expenditure of individual municipalities as derived from annual accounts of these municipalities.

TABELA 13: The entire annual income of individual municipalities (in SIT 1000).

(in SIT 1000)

The entire annual income of individual municipalities			
Municipality	**2003**	**2004**	**2005**
Izola	2.968.730	3.092.975	4.152.914
Koper	8.428.639	10.360.585	9.713.180
Piran	4.769.304	4.399.954	5.407.528
Sežana	2.106.150	2.121.779	2.599.327
Divača	482.217	625.304	646.261
Hrpelje - Kozina	538.313	821.650	807.323
Komen	662.179	558.388	735.450
Ilirska Bistrica		1.701.134	1.907.303

TABELA 14: The entire annual expenditure of individual municipalities (in SIT 1000).

(in SIT 1000)

The entire annual expenditure of individual municipalities			
Municipality	**2003**	**2004**	**2005**
Izola	3.015.903	3.338.351	4.907.106
Koper	8.193.867	9.001.503	11.108.650
Piran	3.846.632	4.121.687	6.445.932
Sežana	1.916.035	2.355.579	2.699.027
Divača	482.374	590.574	795.785
Hrpelje - Kozina	526.341	781.215	899.323
Komen	643.620	573.458	796.415
Ilirska Bistrica		1.829.605	2.392.540

From these tables, economic strength of each individual municipality could be observed. Beside that one can observe a wide range between the municipality with lower budget and one

with the highest budget. Coastal municipalities (Koper, Izola, Piran) with larger numbers of citizens also have larger budgets and greater overall economic strength. The Sežana and Ilirska Bistrica municipalities with comparable budgets can also be considered large municipalities whereas the Divača, Hrpelje-Kozina and Komen municipalities are considered small municipalities, considering their economic strength.

6.1.1 Earmarked investment revenue of municipalities

TABELA 15: Annual income of earmarked investment revenue of municipalities (in SIT 1000).

(in SIT 1000)

Annual income of earmarked investment revenue of municipalities				
Municipality	**2002**	**2003**	**2004**	**2005**
Izola	166.402	635.251	652.874	558.107
Koper				
Piran				
Sežana		436.619	462.416	353.098
Divača	17.781	37.836	54.073	40.000
Hrpelje - Kozina				
Komen				
Ilirska Bistrica	148.621	160.796	136.385	165.009

Earmarked municipality income is the income that the municipality designates – entirely or in part – for investment in municipal infrastructure (municipal fee, compensation for the use of building land, national water-pollution tax, municipal taxes, funds received from the national budget and the EU, and other incomes from co-financing). The data on earmarked income can be used as one of the indicators of municipality's financial capacity for investment in waste water collection and treatment infrastructure. However, one has to be aware that some earmarked incomes (e.g. municipal fee, compensation for the use of building land) are not only designated for financing of waste water collection and treatment infrastructure but for other municipal infrastructure as well.

6.2 INFRASTRUCTURE PROGRAMMES

Infrastructure programmes are like other development programmes obligatory for public entities. Development programmes are basically financial instruments and are usually prepared for the period of next four years.

TABELA 16: Values of annual investment in waste water collection and treatment infrastructure, defined in Development programme plans (in SIT 1000).

(in SIT 1000)

Municipality	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**totalling**
Izola		305.000	364.160	813.416	825.790	539.240	2.847.606
Koper							
Piran		45.600	337.866	1.058.982	497.125		1.939.573
Sežana		61.000	100.000	100.000	100.000		361.000
Divača	60.150	102.800	107.557	106.020			376.527
Komen		87.000	109.000	235.000	173.000		604.000
Ilirska Bistrica			186.925	165.000	373.208	226.500	951.633

Table 15 displays annual values of investment in waste water collection and treatment infrastructure, stated in the Infrastructure development programmes for individual municipalities.

There was no data on Infrastructure development programme for investment in municipal infrastructure in the Hrpelje–Kozina municipality. Values of investment by 2004, displayed in Table 16, were taken from the Operational programme for waste water collection and treatment in the Hrpelje–Kozina municipality.

TABELA 17: Values of annual investment in waste water collection and treatment infrastructure in the Hrpelje – Kozina municipality by 2004 (in SIT 1000).

(in SIT 1000)

Municipality	2001	2002	2003	2004	2005	totalling
Hrpelje - Kozina	35.070	82.696	30.219	146.866		294.851

Municipal budget and the development programmes are coordinated with the Ministry of Finance of the Republic of Slovenia; prices of municipal services are coordinated with the Ministry of the Economy and the Ministry of the Environment and Spatial Planning of the Republic of Slovenia.

6.3 FINANCIAL FEASIBILITY OF THE PLANNED WASTE WATER COLLECTION AND TREATMENT INFRASTRUCTURE DEVELOPMENT

6.3.1 Assessment of municipalities' financial capacity

Assessment of the annually required financial funds for investment in waste water collection and treatment – if in view of the National Operational Programme was performed in the framework of CAMP project.

TABELA 18: Assessment of municipality's annual capacity for the waste water collection and treatment (in MIO SIT).

Assessment of municipalities financial capacity			
Municipality	**inferior limit**	**optimal capacity**	**upper limit**
Izola	280	300	350
Koper			
Piran			
Sežana	170	190	210
Divača	35	40	50
Hrpelje - Kozina	35	40	50
Komen	35	40	50
Ilirska Bistrica			

Assessment of municipality's financial capacity is based on the data on municipal budget in years 2003–2005, defined development programmes, the amount of the collected water-pollution tax, and the amount of earmarked funds for the investments in the waste water collection and treatment.

6.3.2 Assessment of average annual investment value

Following the need for planned achievement of the objectives in the field of waste water treatment the municipalities have prepared operational programmes of necessary investments by the year 2017. Average of annual investment requirements is shown on the following table.

TABELA 19: Assessment of the annually required financial funds for investment in waste water and rainwater collection and treatment by 2017 (in SIT 1000).

Municipality	**Assessment of average annual investment value** (in SIT 1000)	**Assessment of average annual investment value** (in € 1000)
Izola	65.766	274
Koper		
Piran	279.441	1.164
Sežana	387.756	1.616
Divača	104.560	436
Hrpelje - Kozina	89.908	375
Komen	131.360	547
Ilirska Bistrica	220.000	917

Notes:
For the Izola, Sežana, Divača, Hrpelje-Kozina and Komen municipalities, assessments of annual investment requirement were taken from the Operational programmes for waste water collection and treatment. The assessed values do not include values of short-term investment defined in Development programmes.

For the Koper and Piran municipalities, assessments of annual investment values were taken from the Reports on the provision of public service of waste water collection for 2003 – only for agglomerations with 2,000 to 10,000 PEs and agglomerations with 50 to 2,000 PEs (density is higher than 20 PE/ha or 10 PE/ha if it is a settlement in a sensitive or water conservation area).

For the Ilirska Bistrica municipality, the assessed value is displayed in the Development programme as the value of planned investment after 2009.

6.4 THE FORESEEN ALLOCATION OF FINANCIAL FUNDS FOR THE IMPLEMENTATION OF THE NATIONAL OPERATIONAL PROGRAMME

The proportion of the foreseen financial funds – from **basic programme** of waster water and rainwater collection and treatment – for the implementation of the National Operational Programme is derived from the operational programmes for waste water collection and treatment in individual municipalities.

TABELA 20: Requested use of financial funds for the implementation of the operational programme (in % of the financial source).

(in %)

Municipality	State budget	Municipal budget	National water-pollution tax	EU Cohesion Fund	Price of service	Municipal fee
Izola	0	10	25	40	0	25
Koper						
Piran						
Sežana	15	40	10	15	5	15
Divača	15	40	10	15	5	15
Hrpelje - Kozina	15	40	10	15	5	15
Komen	30	15	20	15	5	15
Ilirska Bistrica						

Note:
There is no data for the Koper, Piran and Ilirska Bistrica municipalities.
In the framework of the EU Cohesion Fund project planning, the Municipality of Izola received state administration's assurance that in the case of insufficient national taxes the state will contribute non-repayable funds from the state budget.

As can be seen, most municipalities rely upon external funds that have not been earmarked yet (Sežana, Divača, Hrpelje-Kozina, Komen). Since these sources have not been confirmed yet, operational programmes for these municipalities can not be considered as completely feasible.

7 REGIONAL PROGRAMME OF WATER RESOURCES PROTECTION AND A DETAILED CONCEPT OF COASTAL SHELF, USE OF SEA, AND REGIONAL ENVIRONMENT INFORMATION SYSTEM PLANNING

Analyses of Regional Programme of Environment and Water Resources Protection project focus on waste water and the project represents one of the most important bases for the development of the concept of coastal shelf and use of sea planning. The presented plan facilitates the inspection of the condition of waste water collection and treatment infrastructure already in the stage of strategy formulation for the foreseen interventions in the area for each foreseen development – particularly for the extending of the areas of settlement (agglomerations). This infrastructure is one of the basic preconditions for the development of investment intent. Installing complete infrastructure in the entire area (sewerage system and treatment plant) with the same technical / organizational approach is very expensive and economically inefficient – due to the small economy of scale. Thus, with any development of the coastal area, existing agglomerations with developed infrastructure should to be sought.

The guidelines are:

1) Priority land use developments in the areas (agglomerations) where appropriate infrastructure is already constructed.
2) When developing larger complexes in areas, where infrastructure has not been constructed yet, the project should be managed in a way that ensures that waste water collection and treatment is provided for the entire area, from which water can be treated with one treatment plant.
3) Considering the importance of water pollution from the rainfall and mixed water sewerage systems, particular attention should be devoted to the infrastructure for the retention of the rainfall in the mixed and meteoric water sewerage systems, as the release of polluted water from these systems poses a strong pressure on water resources in the area. This is particularly important for sewerage systems where excessive meteoric and mixed waste water is released directly into the sea and consequently endangers not only the nature (increased eutrophication) but also the bathers. Thus, the spatial positioning of the retention structures is very important and needs to be included in the plans of coastal shelf development. The reservation of space for the installation of retention is necessary basins and a more suitable release of high discharges from sewerage systems.
   The retention basins can be underground facilities, thus it is not necessary that the spatial reservations are provided on the surface; however, proper spatial planning for the construction of facilities should be ensured.

Regional Programme of Environment and Water Resources Protection data that are foreseen for inclusion in the environment protection information system are displayed in Annex 3.

8 CONCLUSIONS AND REMARKS

In the course of this project, we have analysed the national operational programme for waste water collection and treatment and defined the methodology for its transfer to municipal level, particularly regarding the resources for the implementation of investments. On the basis of comparison between the necessary investment and the available (existing) resources, we have reached the following conclusions:

1) Operational programme for agglomerations of priority group under EU legislation (agglomerations with more than 2,000 PEs) is properly implemented and we can expect that the goals will be achieved in accordance with National Operational Programme guidelines.
2) In the municipalities with sparse population density, high costs for municipal infrastructure development are foreseen. This is due to the location of agglomerations in sensitive areas which impose more stringent criteria regarding investment requirements. The same municipalities have relatively low financial capacities for the construction of the infrastructure.
3) Among the analysed municipalities, only the Izola municipality has closed financial construction for the implementation of an operational programme and appropriate waste water treatment by the year 2015 (2017). The reasons are following: the municipality does not have numerous small agglomerations with no infrastructure; the Izola agglomeration (town and surroundings) has a relatively well developed sewerage system; EU's co-financing of the installation of a treatment plant and a part of sewerage system.
4) Among the analysed municipalities, the Sežana, Hrpelje-Kozina, Divača and Komen municipalities have insufficient funds for the programme implementation. Investment needs of all these municipalities together amount to SIT 8.166 million (34,03 MIO €) – their estimated investment capacity is SIT 4.030 million (16,79 MIO €), (for the period between 2005 and 2017). The deficit amounting to SIT 4.136 million (17,23 MIO €) will have to be obtained from other sources or more economical technical manners of waste water collection and treatment should be found.
5) Comparative analysis of investment costs for installation of infrastructure in agglomerations in the Karst region shows that implementation of waste water collection and treatment infrastructure in these agglomerations is very expensive. This can be explained with the fact that excavations in the Karst region (limestone) are very expensive and that surface configuration is not convenient (no constant drops), which dictates larger number of pumping stations and smaller treatment plans.
6) It was only possible to make a model of waste water collection and treatment price analysis for the Izola municipality. For all other municipalities that sent data, too many unknowns are still present (e.g. investment part of the price), so the price of service cannot be defined on the level of the model.
7) When defining the investment capacity of municipalities we did not prejudice the investment part of the price. Taking into account the existing legislation and the economy, it is possible – for a certain period of time – to burden the end user with part of the investment. Rough analysis of the potential burdening of all users in the Sežana, Hrpelje-Kozina, Divača and Komen municipalities shows that, if annual water consumption of 1,595,757 m3 and in the investment part of water of SIT 100, SIT

2.074 million could be collected in 13 years (2005–2017). This approach is related to service implementation through state contracts.

8) Defined investment in waste water collection and treatment infrastructure has to be only a part of the system for the effective management of the waste water management system, as the entire system depends on effective investment implementation (e.g. adequate concept of discharging high water from the sewerage system, minimum losses from and minimum infiltration into the sewerage system).
9) With a more detailed analysis of water price and cost policies we established that the key stage for positive investment implementation is successful activation of any investment. The time, when the treatment plant or sewerage system starts operating has to be covered with a detailed investment plan that foresees the sources of financing the infrastructure system operation in the time of trial operation, its collaboration, and accelerated connection of users to the system.

An important conclusion is also that some municipalities or public service providers did not demonstrate an active interest for the cooperation in the project of Regional Programme of Environment and Water Resources Protection, thus results for some municipalities are incomplete.

The foreseen programme of measures would almost entirely eliminate the emissions from the settled areas in territory covered by the CAMP programme by the year 2017. This would positively influence water quality in water bodies of surface waters (watercourses, the Adriatic Sea) and underground waters.

9 INSTRUCTIONS FOR FURTHER WORK

In the framework of this project we have integrated a large number of data sources and produced a model serving as the regional decision support tool in the field of investment in water resources protection. With this model, we primarily compare the goals determining infrastructure requirements for effective water resources protection that define the investment requirements for their implementation – with the available financial resources.

The Regional Programme of Environment and Water Resources Protection give an overview of the current situation in the urban waste water treatment field. But beside that is it also suggesting maintenance of the data. It would be sensible to maintain the data model we created and in this way constantly follow the course of programme realisation and potential deviations from the goals. The same procedure applied for the maintenance could be used in order adds the data for the municipalities that have not sent data yet.

The model is designed to enable monitoring of the financial flow dynamic with one year period resolution. The model can be updated, probably in March, when the report should be submitted to the state regulatory agency, according to the 21st paragraph of the Waste water collection and treatment regulation (Official gazette RS, No. 102/2003).

The presented methodology is of key importance for the elaboration of operational programmes for waste water collection and treatment. Taking into consideration real financial flows related to this public service it is possible to analyze different scenarios of the infrastructure development and its implementation in realistic environment.

The basic parameters necessary for the model maintenance are: local budget, annual accounts of municipality and Public service provider, and executed investments.

The constant prices model was used in this model. To enable the long-term comparability of this model, we need to insert revalorized values or insert correction factor of those values (prices), if current prices are used for historical data.

Nevertheless one has to have in mind some inconsistencies and limitations of the model:

- Drainage of urban rainfall is not thoroughly defined in the legislation of the Republic of Slovenia. Especially the financing of the urban rainfall drainage not well defined (uncertain influence on public service price formulation) therefore the provision of this service is elaborated to the lower level in the model.
- Public service of waste water collection and treatment with contracts for greater pollutants (industry); - at the current stage the large pollutants that discharge in the public waste water collection and treatment systems are treated all the same regardless of their specifics (only standard and industry – specific emission limit values for the discharge in the public sewerage are applied for them). Individual treatment of that polluter might be necessary in the future.
- Water charge based on the amount of water consumed from the public water supply systems (WSS) – some users have their own spring of water used for combined use (together with the use of water from public WSS in their households). The amount of water released to the public sewerage could be therefore much higher than the amount of water consumed from the public WSS.

- Programming investments – in the case of significant seasonal oscillation of the number of inhabitants (private houses, apartments, tourist facilities) the model has to be adopted to enable for the two stage load of the system. Also the pricing policy for the waste water needs talking into consideration seasonal variations might be applied in the future.

As one of the most important features we would like to underline the importance of adequate pricing policy for the performance of public services price covering the costs related to the performer of public service. This price could contain also allocated for the investments needs. Thorough analysis of different pricing scenarios is important in order to achieve two main goals:

- satisfied customers, and
- adequate level of public service.