WATER REUSE IN CYPRUS

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Annual Water Balance in Cyprus

Year	Water demand (MCM)	Available quantity of water from conventional sources				Enrichment of the water balance from unconventional sources		Total available quantity of water (MCM) [from rainfall) + (from rainfall) + desalinized + recycled	Water balance (MCM) [= Available quantity of water- water demand]	Quantity of water given for drinking (MCM)
		Rainfall (mm)	Volume of rain (MCM)	Available quantity of water from rainfall (MCM) [Note: Around 90% of rainfall is lost due to evapotranspiration and around 0.02% from run off to the sea]	Water balance (MCM) [= available quantity of water from rainfall- Water Demand]	Quantity of desalinized water (MCM)	Quantity of recycled water (MCM)			
2010	257	429	2570	197	-60	53	12	262	5	82
2011	258	558	3348	265	7	49	14	328	70	81
2012	259	790	4737	404	145	18	17	438	179	80
2013	260	295	1770	117	-143	11	17	145	-115	78
2014	261	393	2358	173	-88	33	17	222	-39	80
2015	262	484	2904	228	-34	38	17	284	23	82
2016	263	430	2580	198	-65	69	19	285	22	90
2017	264	326	1956	136	-128	69	20	224	-40	94
2018	265	607	3642	300	35	70	21	391	126	95
2019	266	797	4782	405	139	55	24	484	218	94
2020	266	472	2832	221	-45	30	22	273	7	90
2021	266	454	2724	210	-56	49	22	281	15	97

- **Frequent and long periods of drought**
- **Limited water resources**
- **Water Utilization Index ~ 73%**
- **Drinking Water - Increasing demand (population, tourism, lifestyle) - Priority**
- **Farming sector - The biggest consumer of water - Deficit irrigation – cuts of up to 70% in dry periods**
- **Climate change is expected to worsen water availability**

Supplementation with alternative water sources is required:

- **Desalination for drinking water supply**
- **Reclaimed water for irrigation and other possible uses (e.g., aquifer recharge)**

Reuse of treated effluent in Cyprus

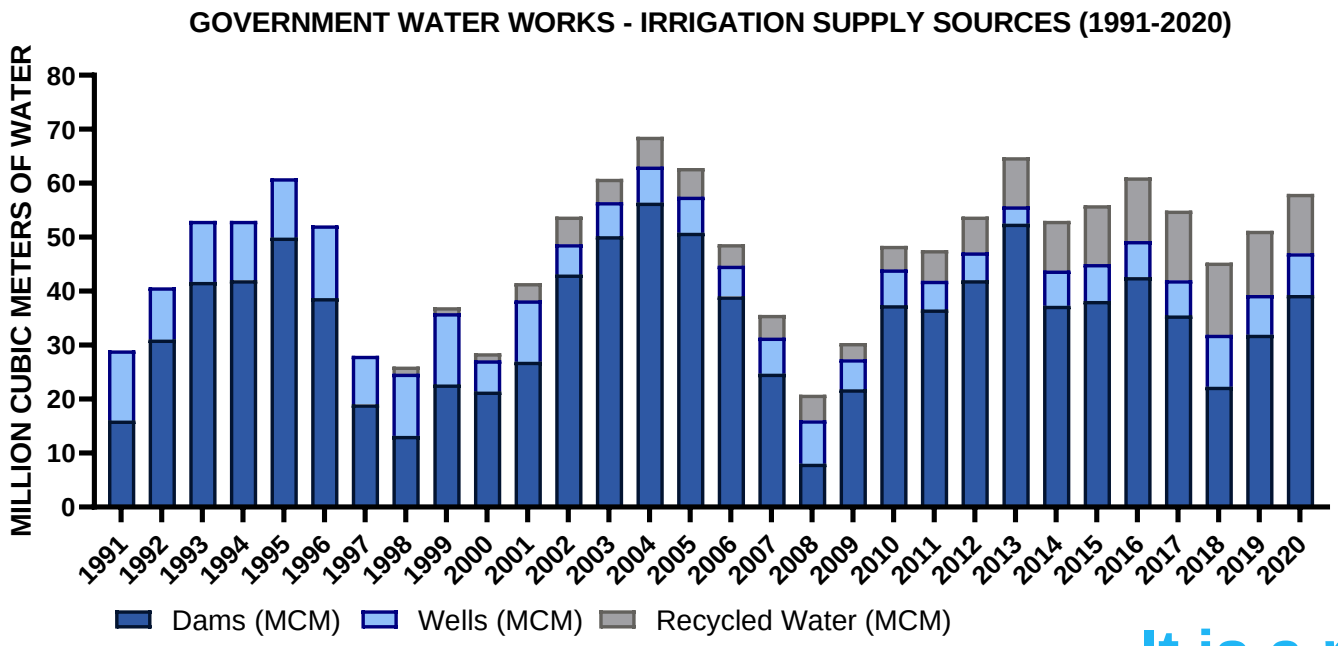
In Cyprus, the treated effluent from the urban wastewater treatment plants is reused for the following purposes:

- Irrigation (under the Code of Good Agricultural Practice)
- Enrichment of underground water (effluent of Pafos and Limassol-Moni WWTPs)
- Dry bed of rivers for infiltration

Other ways of disposal (due to seasonal demand of water for irrigation and limited storage capacity):

- **Discharge into the sea**
- **Discharge into a dam (for irrigation purposes only)**

Construction of a dam to collect treated effluent



Treated wastewater is a growing resource in Cyprus

In 2021, 25 million cubic meters (MCM) of recycled water was produced (by 2026 will be 65 MCM).

- 58% direct irrigation
- 27% indirect irrigation (aquifer recharge and discharge to irrigation dams)
- 4% discharge to sea

It is a matter of survival !

Environmental - Economic - Societal benefits

A reliable source of water which enhances the water balance

- Preserves water resources
- Extends the water life cycle
- Alleviates water scarcity
- Complies with circular economy

Benefits of Treated Effluent Reuse

Domestic Sector Cities

Freshwater can be reserved to satisfy the increasing demand for potable water

Agricultural Sector Farmers

- Constant and reliable source of water
- Savings in fertilizers
- Increases crop yield
- Maintains traditional agriculture

Environment

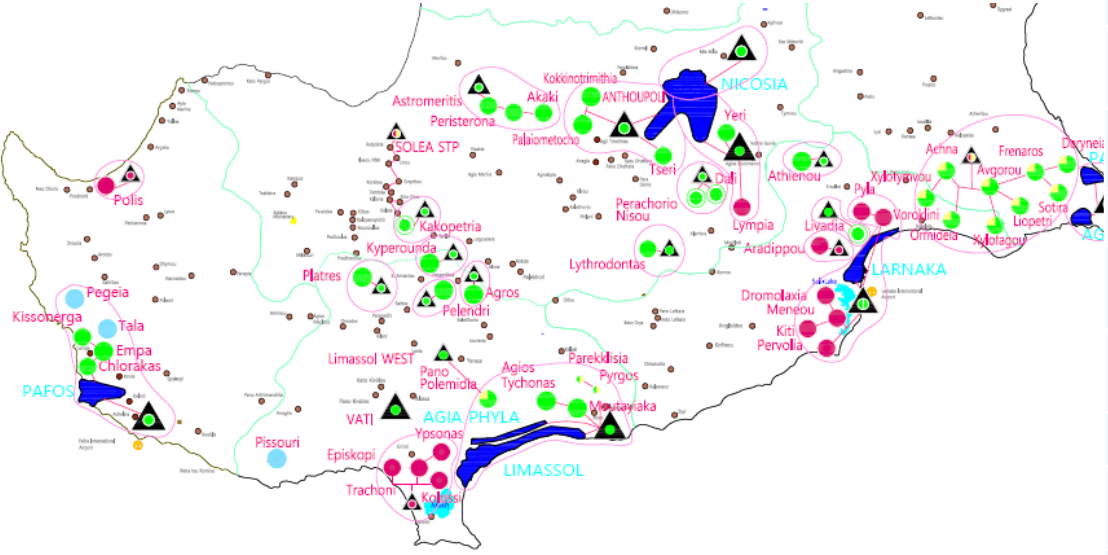
- Reduces discharge to WBs
- Reduces abstraction
- Groundwater Replenishment
- Control saltwater intrusion to groundwater bodies

- **Need for fewer desalination plants**
- **Lower carbon footprint**
- **Less dependence on oil prices**

Keeps water prices at reasonable levels

Urban wastewater treatment plants

CURRENT SITUATION OF THE CYPRUS NATIONAL IMPLEMENTATION PROGRAMME OF THE URBAN WASTEWATER TREATMENT DIRECTIVE 91/271/EEC



Wastewater treatment plant	Capacity million m^3 / year	Production 2021 million m^3	Production 2022 million m^3
Anthoupoli	4.75	1.9	2.0
Vathia Gonia SBN	8.03	3.0	3.3
Vathia Gonia WDD	0.4	0.1	0.1
Larnaca	8.03	3.1	3.3
Limassol - Moni	14.6	9.9	9.8
Limassol - West	4.75	-	0.2
Pafos	7.11	4.3	5.4
Ayia Napa - Paralimni	7.67	2.8	3.1
TOTAL		25.1	27.2

Requirements of the Directive 91/271/EOK : Secondary Treatment

Policy of Cyprus: Tertiary Treatment (meaning additional treatment processes which result in further purification than that obtained by applying primary and secondary treatment)

The cost for the construction, operation and maintenance of tertiary treatment plants carried out by the Urban Sewerage Boards is undertaken by the Government.

PARAMETERS	Limits (EU 2020/741)	Frequency of analysis (WDD/DoE)	Frequency of analysis (Sewerage Boards)
BOD_5	10 mg/L	1/week	1/15 days
Suspended Solids	10 mg/L	1/week	1/15 days
Conductivity	2500 μS/cm	1/month	1/15 days
E. coli	5 *E. coli* / 100 mL	1/week	1/15 days
Turbidity			continuous

Wastewater treatment methods applied in UWWTPs

	Name of WWTP	Type of secondary treatment	Type of tertiary treatment
1	ANTHOUPOLI	ACTIVATED SLUDGE MEMBRANE BIOREACTOR, NITRIFICATION - DENITRIFICATION, PHOSPHORUS REMOVAL	MEMBRANE BIOREACTOR
2	VATHIA GONIA – WDD (designed to receive domestic septage and industrial waste by tankers)	ACTIVATED SLUDGE EXTENDED AERATION - OXIDATION DITCHES	SAND FILTERS
3	VATHIA GONIA (SBN)	ACTIVATED SLUDGE MEMBRANE BIOREACTOR, NITRIFICATION - DENITRIFICATION, PHOSPHORUS REMOVAL	MEMBRANE BIOREACTOR
4	AYIA NAPA - PARALIMNI	ACTIVATED SLUDGE, NITRIFICATION - DENITRIFICATION, PHOSPHORUS REMOVAL	SAND FILTERS
5	PAFOS	ACTIVATED SLUDGE, NITRIFICATION - DENITRIFICATION, PHOSPHORUS REMOVAL	SAND FILTERS
6	LARNACA	ACTIVATED SLUDGE MEMBRANE BIOREACTOR, NITRIFICATION - DENITRIFICATION, PHOSPHORUS REMOVAL	MEMBRANE BIOREACTOR AND SAND FILTERS (for the collected water during winter in the lagoons)
7	LIMASSOL - MONI	ACTIVATED SLUDGE, NITRIFICATION - DENITRIFICATION, PHOSPHORUS REMOVAL	SAND FILTERS
8	LIMASSOL - WEST	ACTIVATED SLUDGE MEMBRANE BIOREACTOR	MEMBRANE BIOREACTOR

Disinfection methods applied in UWWTPs

	Name of WWTP	Type disinfection treatment	Method
1	ANTHOUPOLI	UV DISINFECTION	-
2	VATHIA GONIA – WDD (designed to receive domestic septage and industrial waste by tankers)	CHLORINATION	LIQUID SODIUM HYPOCHLORITE DOSING
3	VATHIA GONIA (SBN)	UV DISINFECTION	
4	AYIA NAPA - PARALIMNI	CHLORINATION	LIQUID SODIUM HYPOCHLORITE DOSING
5	PAFOS	CHLORINATION	LIQUID SODIUM HYPOCHLORITE DOSING
6	LARNACA	CHLORINATION	ONSITE HYPOCHLORITE GENERATION FROM SALT
7	LIMASSOL - MONI AREA	CHLORINATION	-
8	LIMASSOL - WEST AREA PANO POLEMIDIA	UV DISINFECTION	-

Reuse Perspective

The water is used in the wider area of UWTPs from which it is produced for:

- Irrigation of existing crops to replace fresh water
- Irrigation of green areas of municipalities/communities that contribute to the production of reclaimed water
- Irrigation of new crops with high efficiency, mainly livestock crops

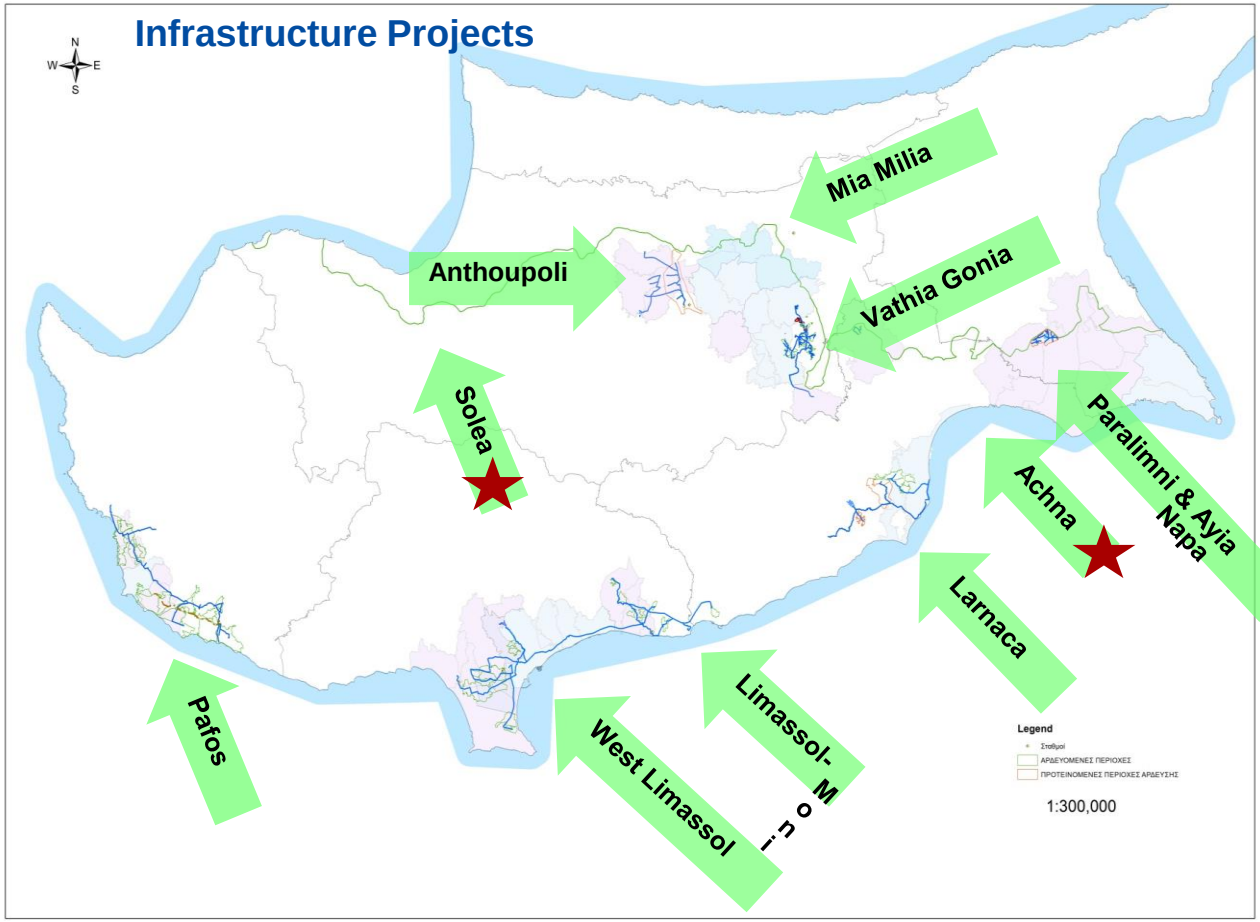
New Infrastructure Projects:

Sewerage System of the Solea Complex: construction of sewerage collection networks in seven communities of Solea, and of a wastewater treatment plant with a maximum capacity of 1287 m^3/d

Sewerage System of the Kokkinochoria Complex: construction of a wastewater treatment plant with a maximum capacity of 10644 m^3/d, which will be located in Achna

Co-funded by the Cohesion Fund of the European Union

European Union Cohesion Fund · Republic of Cyprus · Structural Funds of the European Union in Cyprus



The added value for society and the environment outweigh the capital costs, are in line with EU regional policy objectives and contribute to the well-being of the wider region

Legislative Framework in Cyprus

Water reuse in Cyprus is regulated by:

- The Water Pollution Control Laws (106(I)/2002 to 2013)
- The Water Pollution Control (Discharge of Urban Wastewater) Regulations of 2003 (No. 772/2003)
- The Water Pollution Control (Sensitive Areas for Disposal of Urban Wastewater) Ministerial Decree of 2013 (No. 280/2013)
- The Code of Good Agricultural Practice Decree (No. 283/2023)
- The Ministerial Decree for small-scale wastewater treatment plants < 2000 p.e. (No. 379/2015)
- The Environmental Impact Assessment Law (No. 127(I)/2018) for discharge to water bodies and for the management of the effluent for new UWWTPs
- Regulation (EU) 2020/741 of the European Parliament and of the council on minimum requirements for water reuse

Treatment requirements
WWTPs in agglomerations of ≥ 2.000 p.e.

- Reclaimed water in Cyprus is used for the irrigation of agricultural and livestock crops as well as green areas, under strictly regulated conditions and following EU best practices. More stringent treatment requirements than the proposed ones are already applied.

Qualitative monitoring of the effluent of UWWTPs ≥ 2.000 p.e.:

Parameters	Limit
BOD_5	<10 mg/L
COD	<70 mg/L
Suspended solids	<10 mg/L
Total Nitrogen	<15 mg/L
Total Phosphorus	<10 mg/L
Conductivity	<2500 μS/cm
pH	6.5 - 8.5
Heavy metals	
Boron	
Chlorides	<300 mg/L
E. coli	<5 *E. coli* / 100 mL
Priority substances	
Pesticides	
Toxicity	

Further monitoring obligations are set in the permits when the tertiary effluent is **recharged in aquifers** or **discharged into surface waters (dam or sea)** taking into consideration the standards specified to:
- Groundwater Directive 2006/118/EC
- Directive 2008/105/EC,
regarding Environmental Quality Standards, respectively.

Additionally, discharges from UWWTPs to sensitive areas (water bodies which are eutrophic) **meet more stringent requirements related to TN and TP**.

limit values can be TN=10 mg/L and TP=1 mg/L

Treatment requirements
WWTPs in agglomerations of ≤ 2.000 p.e.

According to the Ministerial Decree of small-scale WWTPs ≤ 2.000 p.e (No. 379/2015), the quality requirements for treated wastewater used for irrigation are:

Parameters	BOD_5 mg/L	COD mg/L	SS mg/L	FOG mg/L	*E. coli*/ 100 mL	pH	Conductivity µS/cm	Cl^- mg/L	B mg/L	Residual Chlorine mg/L
Frequency	1/month	1/month	1/month	1/month	1/month	1/month	1/month	1/year	1/year	1/month
All crops and green areas (a)	10	70	10	5	5	6.5-8.5	2.500	300	1	2
Vegetables eaten cooked (b)	10	70	10	5	50	6.5-8.5	2.500	300	1	2
Products for human consumption and green areas with limited access to the public	25	125	35	5	200	6.5-8.5	2.500	300	1	2
Crops for animal feed	25	125	35	5	200	6.5-8.5	2.500	300	1	2
Industrial plants	25	125	35	5	200	6.5-8.5	2.500	300	1	2

Regulation (EU) 2020/741 on minimum requirements for water reuse

Minimum requirements for water quality and monitoring and provisions on risk management, for the safe use of reclaimed water

Guarantee that reclaimed water is safe for agricultural irrigation

Table 3 – Minimum frequencies for routine monitoring of reclaimed water for agricultural irrigation

	Minimum monitoring frequencies					
Reclaimed water quality class	*E. coli*	BOD_5	TSS	Turbidity	*Legionella* spp. (when applicable)	Intestinal nematodes (when applicable)
A	Once a week	Once a week	Once a week	Continuous	Twice a month	Twice a month or as determined by the reclamation facility operator according to the number of eggs in waste water entering the reclamation facility
B	Once a week	In accordance with Directive 91/271/EEC (Annex I, Section D)	In accordance with Directive 91/271/EEC (Annex I, Section D)	-		
C	Twice a month			-		
D	Twice a month			-		

26th of June 2023

- ✓ High-level protection of the environment and of human and animal health
- ✓ Promoting the circular economy
- ✓ Adaptation to climate change
- ✓ Contributing to the objectives of Directive 2000/60/EC (by addressing water scarcity and the resulting pressure on water resources)

Risk Assessment
(Article 5 of the Regulation)

Risk management

- identify and manage risks in a proactive way
- ensure that reclaimed water is safely used and managed and that there is no risk to the environment or to human or animal health

Conditions relating to the additional requirements

(a) heavy metals;

(b) pesticides;

(c) disinfection by-products;

(d) pharmaceuticals;

(e) other substances of emerging concern, including micro pollutants and micro plastics;

(f) anti-microbial resistance.

Harmonization of the Republic of Cyprus with the New Regulation:

As part of the Water Resources Management System Reform of the Recovery and Resilience Plan

€0,7 million. – 2.3 - Smart and sustainable management of water resources

Risk Assessment (Article 5 of the Regulation)

Cyprus: Tertiary Treatment, which consists of

Secondary treatment, filtration and disinfection

or

Membrane Bioreactor

Quality class of reclaimed water A

Table 1 – Classes of reclaimed water quality and permitted agricultural use and irrigation method

Minimum reclaimed water quality class	Crop category (*)	Irrigation method
A	All food crops consumed raw where the edible part is in direct contact with reclaimed water and root crops consumed raw	All irrigation methods
B	Food crops consumed raw where the edible part is produced above ground and is not in direct contact with reclaimed water, processed food crops and non-food crops including crops used to feed milk- or meat-producing animals	All irrigation methods
C	Food crops consumed raw where the edible part is produced above ground and is not in direct contact with reclaimed water, processed food crops and non-food crops including crops used to feed milk- or meat-producing animals	Drip irrigation (**) or other irrigation method that avoids direct contact with the edible part of the crop
D	Industrial, energy and seeded crops	All irrigation methods (***)

(*) If the same type of irrigated crop falls under multiple categories of Table 1, the requirements of the most stringent category shall apply.

(**) Drip irrigation (also called trickle irrigation) is a micro-irrigation system capable of delivering water drops or tiny streams to the plants and involves dripping water onto the soil or directly under its surface at very low rates (2–20 litres/hour) from a system of small-diameter plastic pipes fitted with outlets called emitters or drippers.

(***) In the case of irrigation methods which imitate rain, special attention should be paid to the protection of the health of workers or bystanders. For this purpose, appropriate preventive measures shall be applied.

Table 2 – Reclaimed water quality requirements for agricultural irrigation

Reclaimed water quality class	Indicative technology target	Quality requirements				
		E. coli (number/100 ml)	BOD_5 (mg/l)	TSS (mg/l)	Turbidity (NTU)	Other
A	Secondary treatment, filtration, and disinfection	≤ 10	≤ 10	≤ 10	≤ 5	*Legionella* spp.: < 1 000 cfu/l where there is a risk of aerosolisation Intestinal nematodes (helminth eggs): ≤ 1 egg/l for irrigation of pastures or forage
B	Secondary treatment, and disinfection	≤ 100	In accordance with Directive 91/271/EEC (Annex I, Table 1)	In accordance with Directive 91/271/EEC (Annex I, Table 1)	-	
C	Secondary treatment, and disinfection	≤ 1 000			-	
D	Secondary treatment, and disinfection	≤ 10 000			-	

Urban Wastewater Treatment Directive Revision

- Council adopts position **on new rules for more efficient treatment of urban wastewater**
- **October 16th, 2023**, the Council reached an agreement (‘**general approach**’) on a proposal to review the urban wastewater treatment directive (91/271/EEC)
- The revised directive is one of the key deliverables under the EU's zero-pollution action plan.

Revision aims to update the directive by extending its scope and aligning it with the European Green Deal’s objectives.

Scope: The objectives of the directive were extended, **beyond environmental protection, to also include the protection of human health and the reduction of greenhouse gas (GHG) emissions**.

To address pollution from small agglomerations, the Council extended the scope of the directive to include all agglomerations of **1 250 p.e.** and above, as opposed to the 2 000 p.e. of the current directive.

Urban Wastewater Treatment Directive Revision

Main changes agreed by the Council

The Council's text strikes a balance between keeping the main ambition of the proposed revision **to improve the collection and treatment of urban wastewater and providing flexibility for member states in the implementation** of the directive, while ensuring a high level of protection for human health and the environment.

The obligations to:

- set up urban wastewater **collecting systems** and
- **apply secondary treatment** (i.e., the removal of biodegradable organic matter) to urban wastewater before it is discharged into the environment

were extended to all agglomerations of 1 250 p.e. or more.

The text sets deadlines for MS to establish an **integrated urban wastewater management plan** covering:

- agglomerations of over 100 000 p.e.
- agglomerations between 10 000 and 100 000 p.e.

2035

derogations available for smaller agglomerations and MS that most recently joined the EU.

e.g., MS that joined in 2004 and after 2006 may have their deadlines for compliance extended for eight or twelve years, respectively

2035

2040

reviewed at least every six years

Urban Wastewater Treatment Directive Revision

Application of **tertiary treatment**
(i.e., the removal of nitrogen and phosphorus)
in larger plants of 150 000 p.e. and above

2045

Tertiary treatment will be mandatory in smaller agglomerations in areas at risk of eutrophication.

MS introduced a derogation from this requirement **when treated urban wastewater is reused for agricultural irrigation**, provided that there are no environmental and sanitary risks.

Application of **quaternary treatment**
additional treatment **removing a broad spectrum of micropollutants**, is to be mandatory for all plants of over 200 000 p.e.

2045

Address contaminants of emerging concern

To cover the additional costs entailed by quaternary treatment and **in line with the 'polluter pays principle'**, producers of pharmaceuticals and cosmetics leading to urban wastewater pollution by micropollutants would need to contribute to the costs of this additional treatment, through an **extended producer responsibility (EPR) scheme**.

Urban Wastewater Treatment Directive Revision

Introduction of an **energy neutrality target**, meaning that **UWWTPs will have to produce the energy they consume**.

This energy can be produced on or off-site, and up to 30% of energy can be purchased from external sources.

2045

Wastewater surveillance and risk assessment

Immediate

Obligations for MS to:

- **monitor health parameters** in urban wastewaters to **track the presence of pathogens** responsible for human diseases and pandemics, such as SARS-CoV-2 virus, poliovirus, and influenza virus.

In addition, MS are required to **assess the risks to the environment and human health caused by urban wastewater discharges**, and, where necessary, take additional measures on top of the minimum requirements set in the directive to address these risks.

Revised Urban Wastewater Treatment Directive

European Commission
Put forward a **proposal** for Directive

October 2022

European Council
Agreement on **general approach**

October 2023

Next step…
Trilogue negotiations to follow

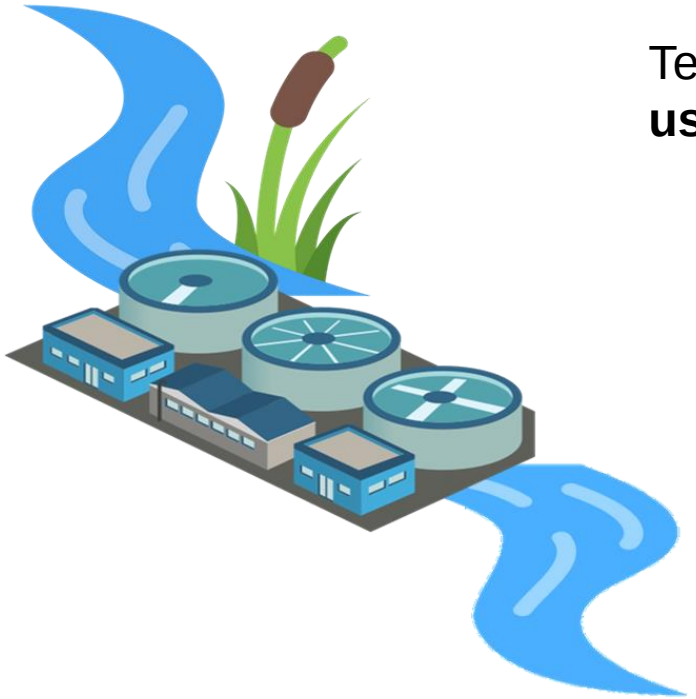
European Parliament
Adoption of **legislative Resolution** on the proposal

The general approach will serve as the Council's mandate for negotiations with the European Parliament on the final shape of the legislation.

The outcome of the negotiations will have to be formally adopted by the Council and the Parliament.

Water Reuse in Cyprus

In Cyprus, irrigation is done under the Code of Good Agricultural Practice



Tertiary treatment **mandatory, regardless of the use of the treated effluent:**

- Irrigation
- Recharge of aquifers
- Disposal to the sea

- **Eliminate the possibility of any health incident**
- **Reduce the risk of possible eutrophication** when discharging to the Eastern Mediterranean Sea, the most oligotrophic sea in the world
- **Reduce farmers skepticism and barriers to reusing**
- **Encourage public acceptance - enhance marketability of crops**

Water Reuse in Cyprus

- If the land farm has access to a reclaimed water irrigation network, the end user (i.e., the farmer) applies to the Water Authority/ Reclamation facility operator for the supply of reclaimed water, stating the type of crop and the required water quantity.

- The Water Authority/ Reclamation facility operator approves the application and provides the end user with the necessary information regarding the crops allowed to be irrigated as well as the irrigation methods and techniques to be used.

In Cyprus, **the end users have small agricultural farms and 90% of them are smaller than 0.5 ha.**

Reclamation facility operator

A natural or legal person who operates or controls a reclamation plant.

Reclamation facility operators should:

- ensure that the outlet of the reclamation plant complies with the minimum requirements
- draft a Reclaimed Water Reuse Risk Management Plan.
- perform key risk management tasks, in cooperation at least with the reclaimed water distribution and the storage operator.

Code of Good Agricultural Practice
Regulation No. 283/2023)

Goal: proper use of reclaimed water in agriculture → protection of the public health and the environment

Restriction on the type of crops irrigated: **Irrigation of** all types of plants, seasonal and permanent **except of foliaceous vegetables, bulbs and condyles that are eaten raw**.

Type of plants: citrus fruits, fodder crops and industrial plants (cow grass and corn), olive trees, lolium and sutax, potatoes, **flowers (e.g., carnations)**, public green areas, football fields, grass production.

Safety precautions for the proper use of water

- The use is prohibited by unauthorized persons
- Marking pipes with red line
- Clear signaling to alert the public that the water is undrinkable
- Hydrants and distribution system should have protection and always be in good operational condition

Irrigation practices	Methods of irrigation	Recommendations
Irrigation for grass, green areas with limited use, and forage crops	• groundwater irrigation, • drippers, low-capacity sprinklers, • surface irrigation, • high-capacity sprinklers - 300 m buffer zone	▼ cultivated forage, irrigation stops at least one week before harvest ▼cultivated forage for grazing, dairy animals are not permitted.
Irrigation conditions for grass, green spaces with free use	• subsurface drip irrigation, • low angle Pop-up sprinklers (<15°) • irrigation during night • (no wind)	
Vineyard	• drip irrigation • micro sprinkler	• Where drops comes with contact with fruit, irrigation must stop two weeks before harvest • Collection of fruit from the ground should be avoided
Tree crops	• drip irrigation • Micro sprinkler	The collection of fruit from the ground is prohibited except in cases of nuts. Where irrigation drops comes in contact with fruit , irrigation must stop at least a week before harvest.
Vegetables that are cooked before consumption	• sub surface drip irrigation, sprinkler irrigation • drip irrigation	

Original Assessment of the Reclaimed Water Reuse

Original Studies: The Ministry Of Agriculture before using the Reclaimed water for irrigation tried in 1996 to demonstrate the benefits in practice:

- A **Pilot irrigation** area of 30 ha close to Limassol WWTP was initiated, to demonstrate that reclaimed water enhances agricultural productivity and is safe to use by the farmers
- **Sorghum, alfalfa and corn** were used as verified crops irrigated with effluent water for a period of 5 years
- Agricultural Research Institute was responsible for the collection and analysis of all data and verification of the results
- **Results: Crop yield increased by 30% on average**

On Going studies: After these initial tests, further plant uptake studies regarding the effects of water reuse irrigation were conducted by the Agriculture Research Institute of the Ministry of Agriculture, Rural Development and Environment. No negative results were demonstrated.

Further Research

- Research is ongoing by the Agricultural Research Institute of Cyprus and the University of Cyprus
- Research results, concerning the long-term wastewater irrigation of **forage and citrus** revealed that there are **no impacts** of wastewater reuse **on** both **soil physicochemical properties** and **heavy metal** content, as well as on agricultural produce heavy metal content
- Research concerning wastewater irrigation of **tomato crops** highlighted that there is **no accumulation of heavy metals** in tomato fruit, whereas examination of the presence of **various pathogens** related to public health revealed that **total coliform** and **fecal coliforms** were **not quantified** in both fruit flesh and fruit peel, while ***E. coli*, *Salmonella spp* and *Listeria spp*. were not detected** in fruit homogenates

Public Acceptance

At the early days of implementing water reuse projects in Cyprus, there was significant reaction and skepticism from farmers, due to ignorance, misconceptions and psychological reasons

Acceptance issues were addressed through:

- **Information / consultation campaigns**
- **Education of the farmers in small groups**
- **Regulating effluent reuse through the Code of Good Agricultural Practice**
- **Making recycled water much cheaper than freshwater**
  - **Rate of Tertiary Treated Effluent for agriculture: 7 cents/ m^3 (The price is subsidized in order to encourage and promote the use.)**
  - **Selling Rate of Fresh not filtered water from governmental water works: 17 cents/ m^3**

Selling rates of treated effluent

The rate of the treated effluent from the UWWTPs has been set by a ministerial Decree ΚΔΠ 48/2017 as per the following table

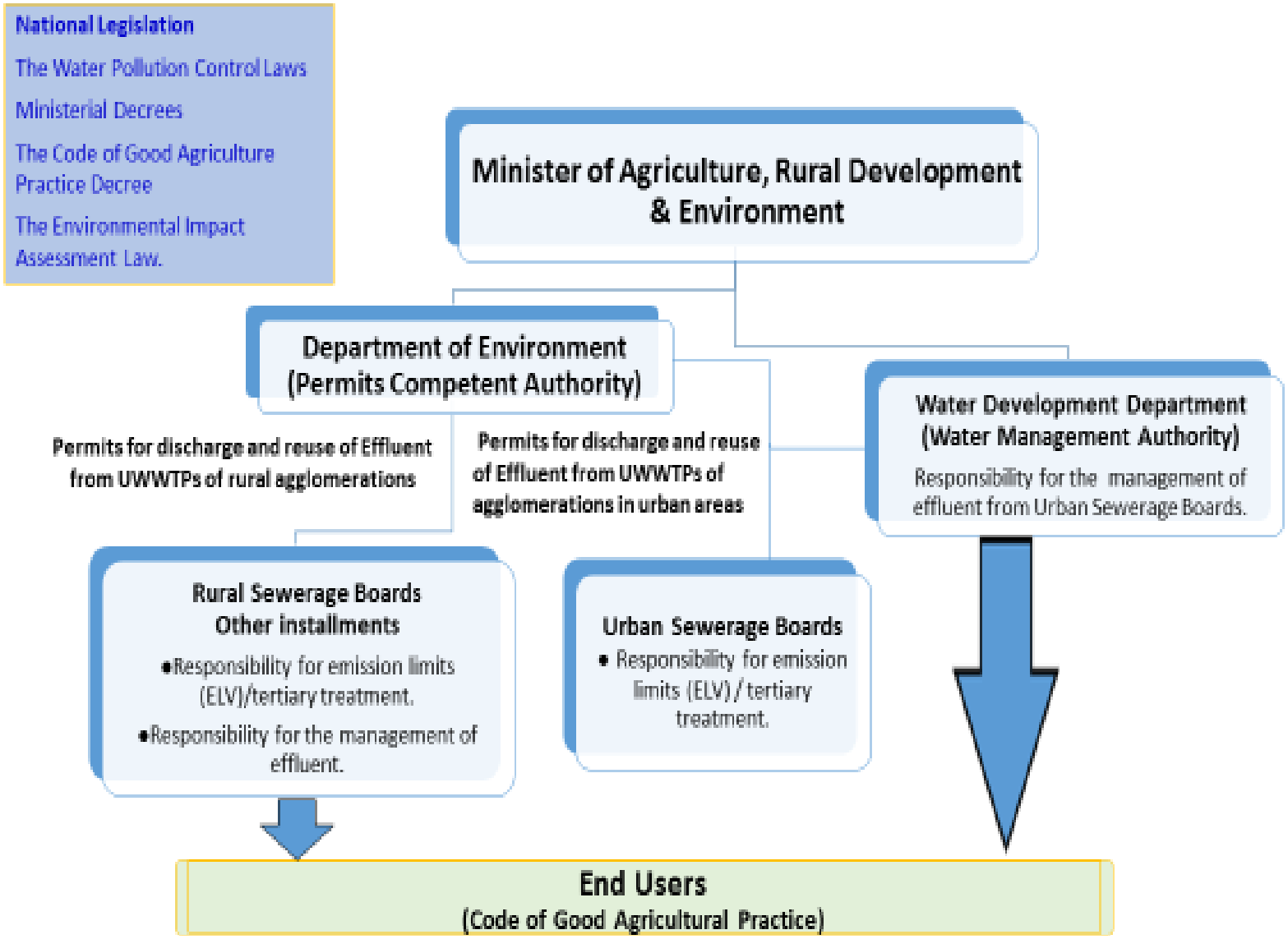
	Provision of reclaimed water from tertiary treatment units that fall under the jurisdiction of the state	Financial	Environment and resource	Total
		€ / m³		
1	Fixed annual fee	€ 2,40 / he		
2	For Persons for agricultural production	0,06	0,01	**0,07**
3	To irrigation water providers	0,01	0,01	**0,02**
4	Industrial use	0,15	0,02	**0,17**
5	Irrigation for other uses			
	a) turf of football pitches and sports fields and islands, parks and other green spaces falling under the jurisdiction of State / Local Authorities	0,10	0,02	**0,12**
6	b) turf of private football and sports fields and private green areas, hotel gardens and houses	0,15	0,02	**0,17**
	c) Golf courses irrigation	0,15	0,08	**0,23**
7	Overconsumption for all uses			Twice as normal

Suggested selling rate of fresh not filtered water from governmental water works: € 0,17

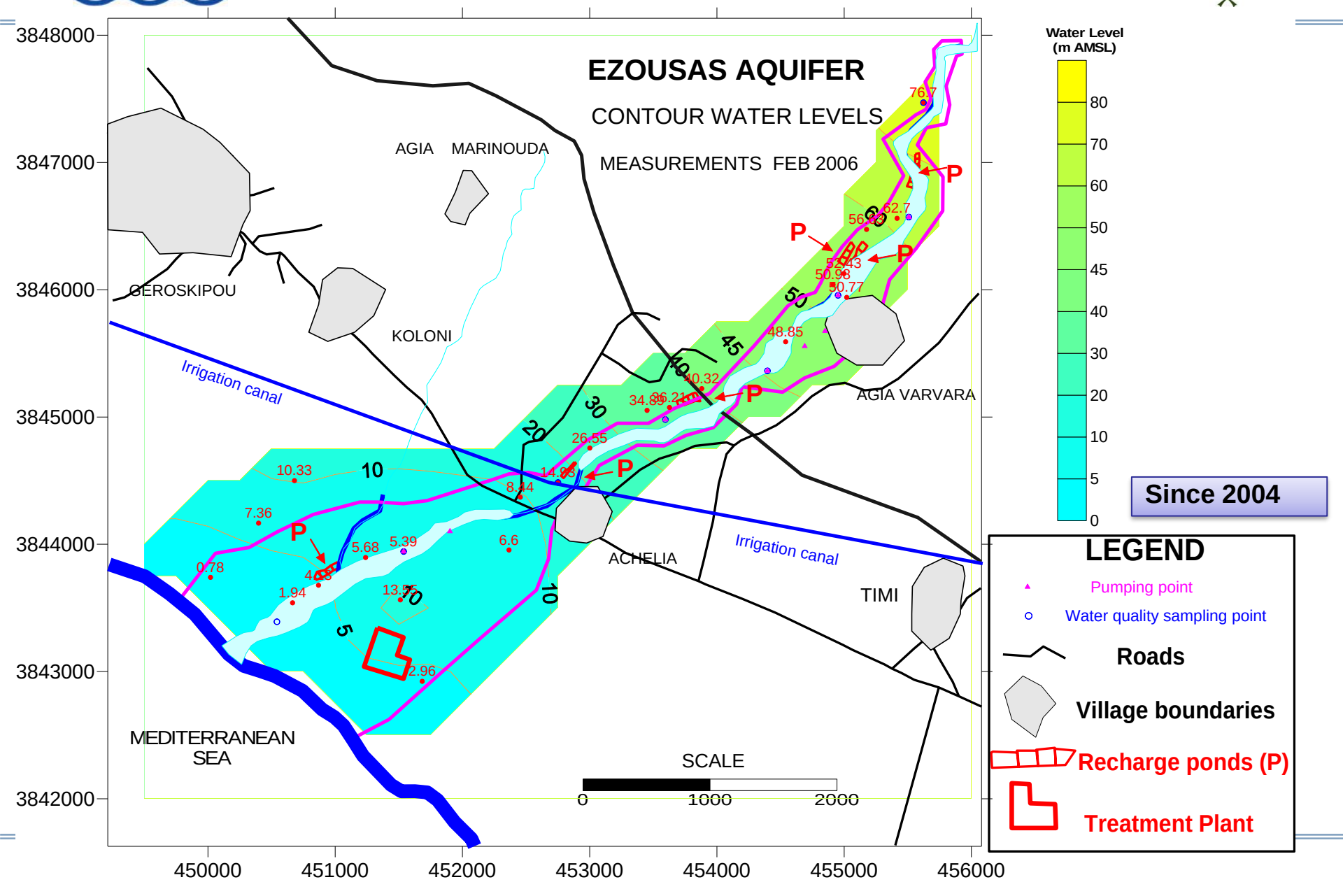
Irrigation with treated effluent – Type of plants

LIMASSOL PLANT	LARNACA PLANT	PARALIMNI – AYIA NAPA PLANT	VATHIA GONIA PLANT
CITRUS FRUITS	COWGRASS	CITRUS FRUITS	COWGRASS
FODDER CROPS AND INDUSTRIAL PLANTS (COWGRASS AND CORN)	CORN	OLIVE TREES	CORN
VEGETABLES	LOLIUM AND SUTAX	POTATOES	BARLEY
PUBLIC GREEN AREAS	PUBLIC GREEN AREAS	PUBLIC GREEN AREAS	FODDER CROPS
	FOOTBALL FIELDS	FOOTBALL FIELDS	GRASS PRODUCTION

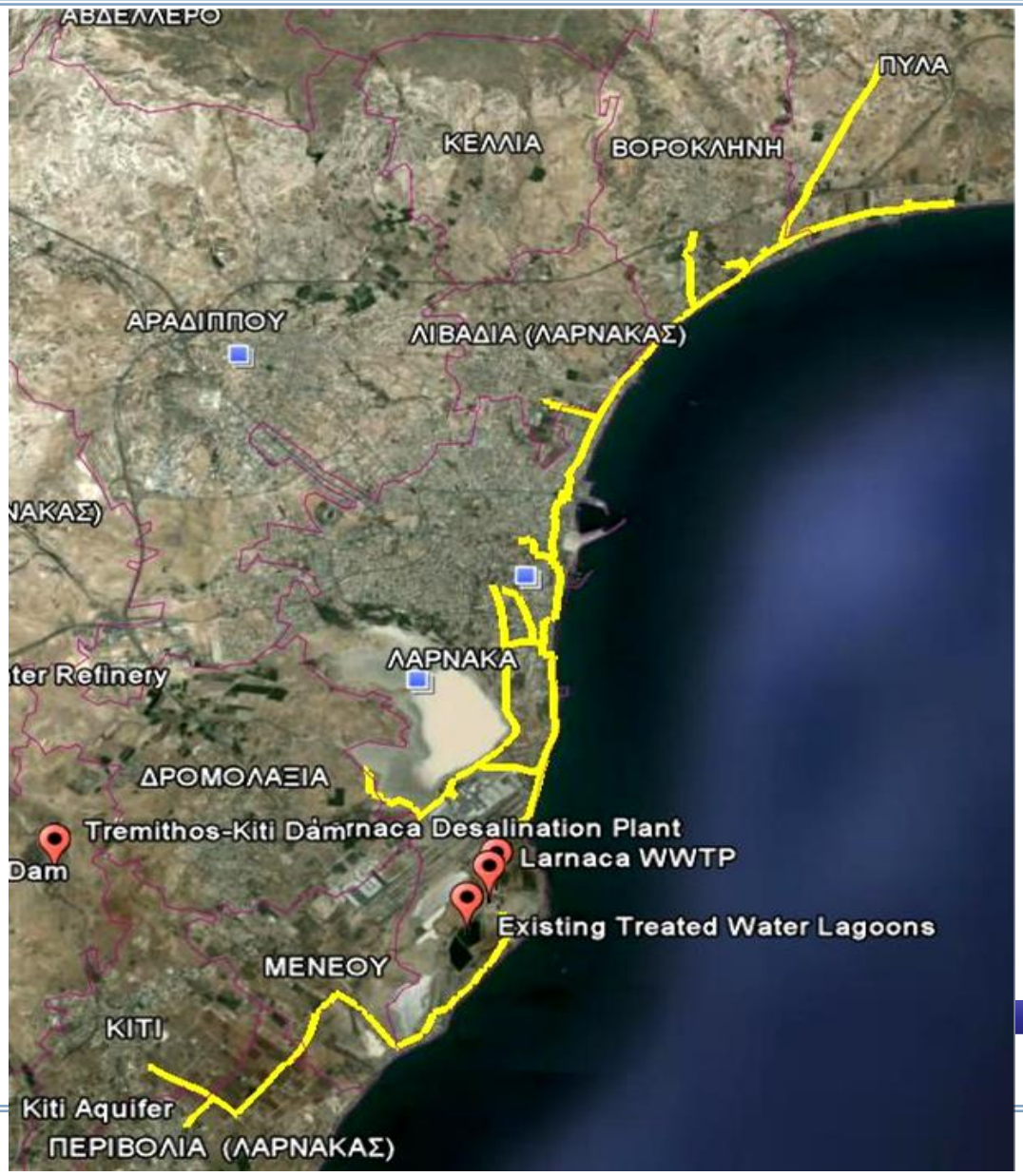
Permitting and Management of Reclaimed Water



Aquifer Recharge - Pafos



Larnaca Reclaimed Water – Irrigation Network



Quality: Tertiary treated

→ ***Conductivity and chlorides are high*** (WDD monitoring program)

The plant should reduce conductivity

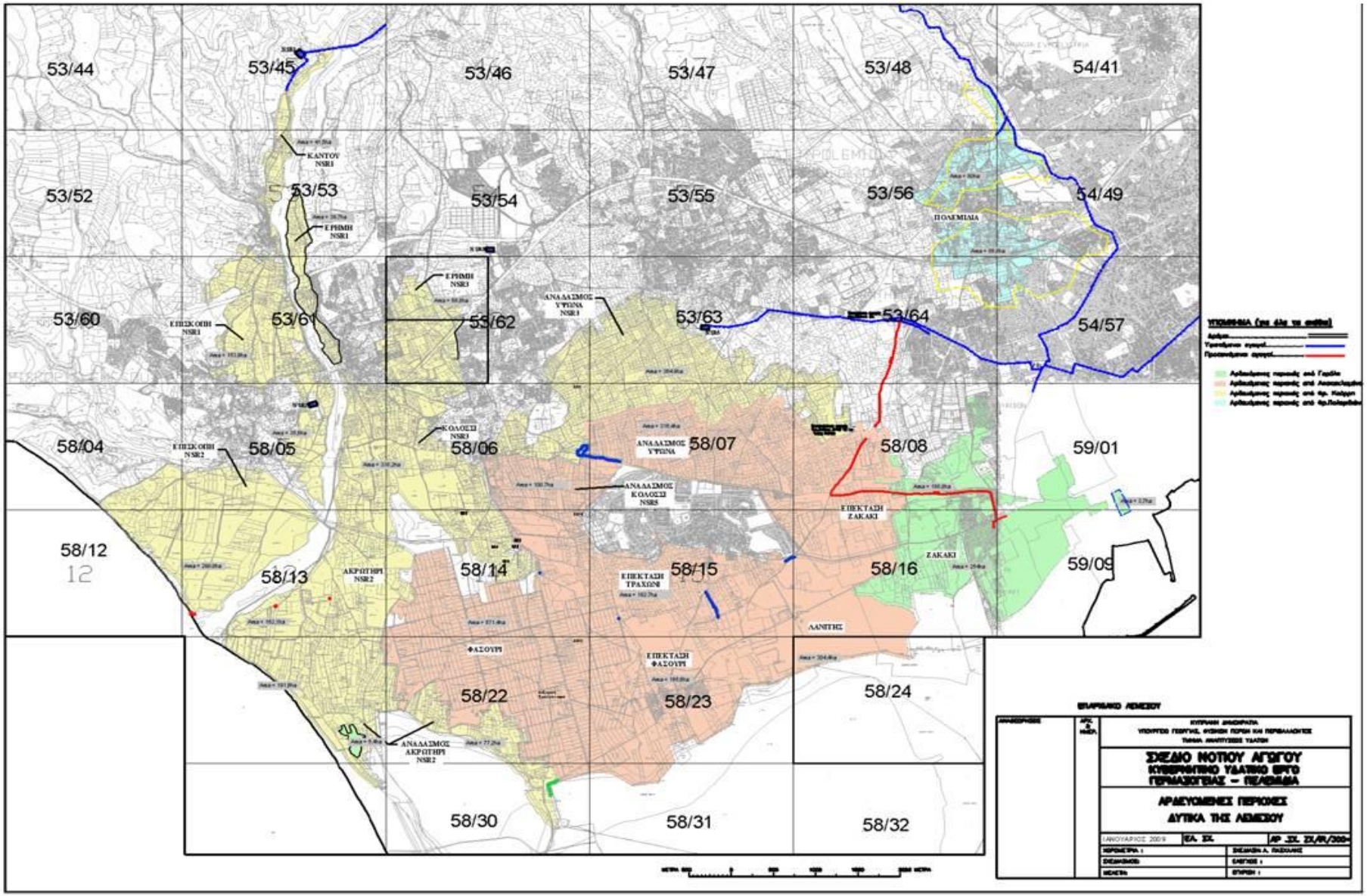
Average value of **Conductivity**: **3563 µS/cm** (limit: 2500 µS/cm)

Average value of **Chlorides**: **799 mg/L** (όριο: 300 mg/L)

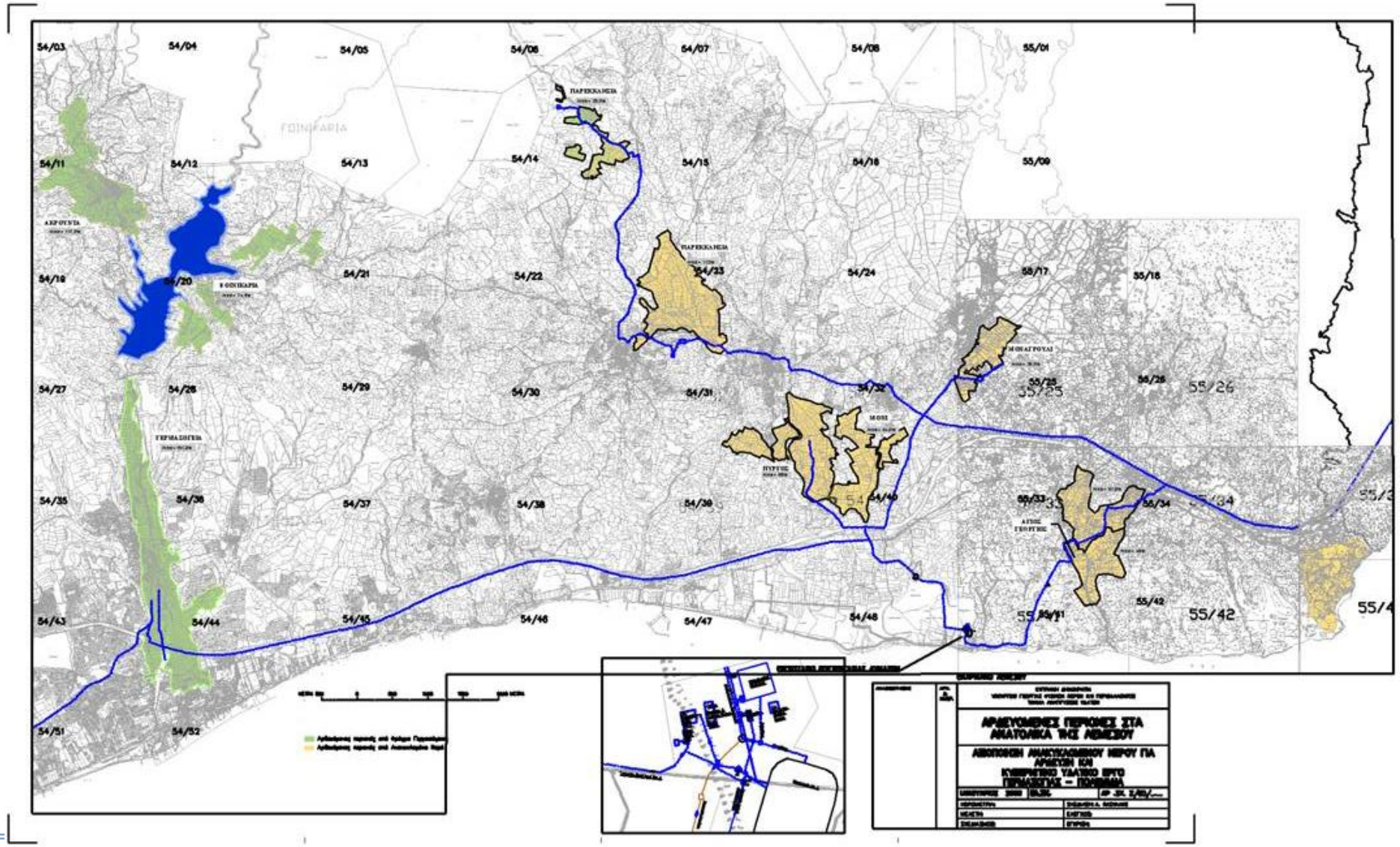
To solve the problem, a study was prepared in the past by TAU, for the installation of a desalination unit at the Larnaca station with the aim of reducing salinity and removing nitrogen and phosphorus

→ It was dropped due to the refusal of the communities of the surrounding area to dispose of the brine of the unit to the sea.

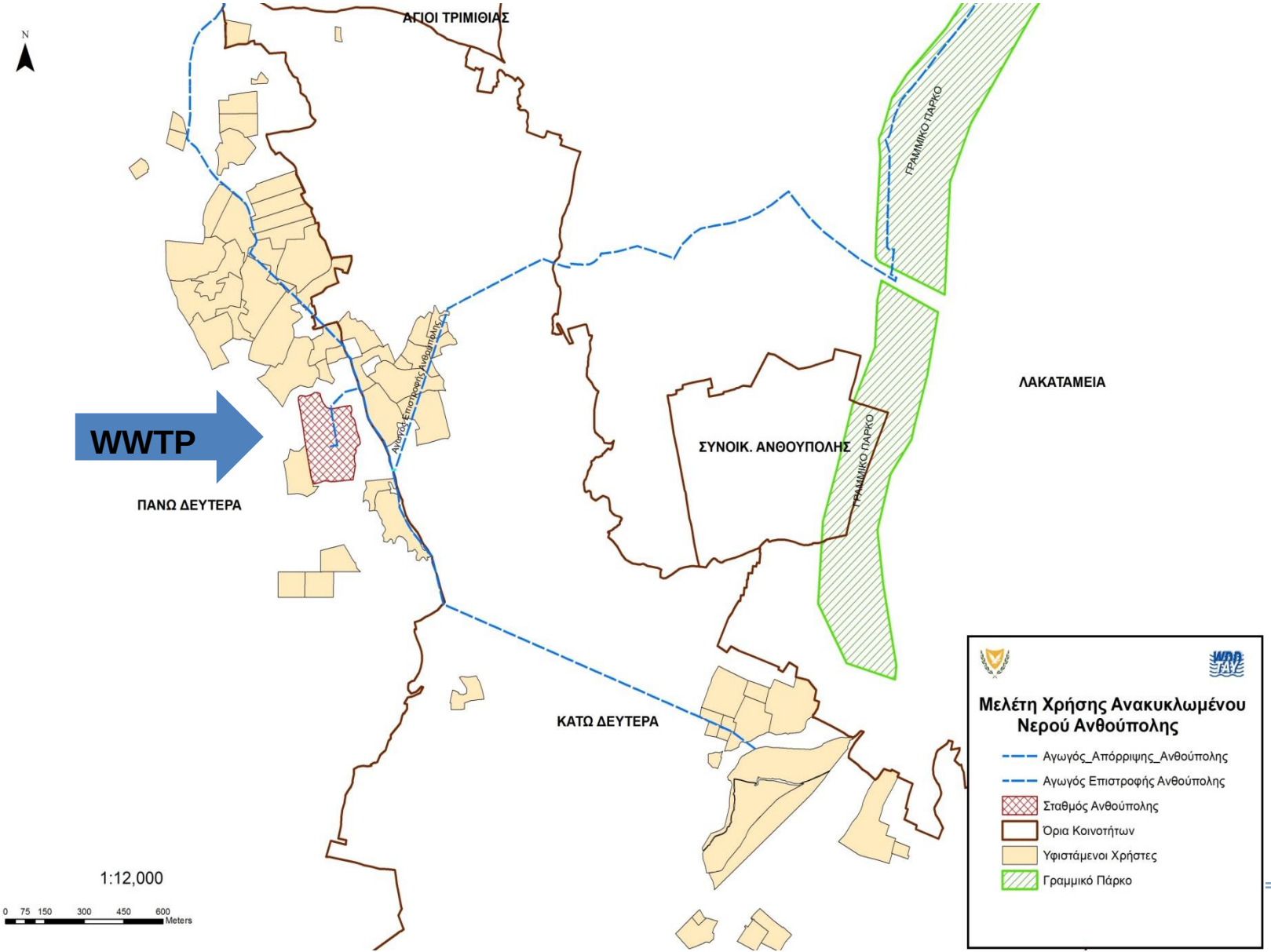
Limassol Reclaimed Water – Irrigation Network



Limassol Reclaimed Water – Irrigation Network



Anthoupolis Reclaimed Water – Irrigation Network



Limassol Moni Wastewater Treatment Plant
40,000 m^3/day

Limassol West Wastewater Treatment Plant
13,000 m^3/day

Anthoupolis Wastewater Treatment Plant
13,000 m³/day

Vathia Gonia Wastewater Treatment Plant - SBN
22,000 m^3/day

Vathia Gonia Central Wastewater Treatment Plant –WDD 1,320 m^3/day

Larnaca Wastewater Treatment Plant
18,000 m^3/day

Ayia Napa - Paralimni Wastewater Treatment Plant
31,600 m^3/day

THANK YOU

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