

**Decision by the Full Session of the  
Sewerage Board of Limassol-Amathus**

**Coordination among local authorities with the aim of promoting a common policy on the  
Sustainable Urban Drainage Systems (SUDS) storm water drainage projects**

The 8<sup>th</sup> Full Session of the Board took a very serious decision on 26/8/2009, with the aim of implementing measures to promote a common policy on storm water drainage projects and Sustainable Urban Drainage Systems (SUDS) in coordination and collaboration with the five Municipalities of Greater Limassol.

Specifically, the Board meeting decided and approved the following:

**1. Implementation of Sustainable Urban Drainage Systems (SUDS)**

The promotion of Sustainable Urban Drainage Systems (SUDS) must be started to the degree possible by all the local authorities of Limassol. These systems, which were first implemented some years ago in most developed countries, essentially aim at carrying out storm water drainage and anti-flooding projects in order to resolve the problems at source, i.e. where they are created and not in other areas.

SUDS are basically a number of surface water management/monitoring practices that take long-term environmental and social factors into account.

When these projects are being designed, they take account of not only the volume but the quality of the rainwater flows.

Among the measures included in the implementation of these projects are the following:

- (a) Construction of retention reservoirs wherever possible and exploiting existing natural reservoirs.
- (b) Avoidance of waterproofing of open spaces and construction of pavements and roads with porous surfaces.
- (c) Construction wherever possible of earthen channels for rainwater, the laying of non-waterproof pipes and/or the construction of storm water absorption pits in public and other spaces. (The design of such drainage systems now includes ditches and retention reservoirs.)
- (d) Avoiding the flow of water from private property onto public roads by various means, such as the construction of storm water absorption pits in the garden or basement of properties or retaining water for re-use in, for example, water tanks.

**2. Promotion of a Common Policy regarding the Terms for Permits issued by Local Authorities**

- (a) Promotion of a common policy regarding the issuing of permits for new developments and buildings with the implementation of standard Terms and Specifications for the use of the responsible local authorities.
- (b) Preparation of standard Terms & Specifications and a code of correct practice for the use of the responsible local authorities, with the objective of implementing a common policy on sustainable development.

The standard Terms & Specifications will be prepared by the Board's Technical Services, in

conjunction with the Technical Services of the Municipality of Limassol and the other Municipalities.

(c) The files containing building and/or planning permits should be sent by the Municipal services to the Board for the submission of suggestions and terms to be imposed by the responsible local authorities.

Given the fact that this process started some years ago and the very high level of cooperation with the technical services of the five Municipalities, it was decided that it should continue and be further expanded.

(d) Specifically, new planning and/or building permits should be subject to terms that ensure the reduction or retention of water flowing onto roads.

- Construction of storm water absorption pits in all new properties and mainly in open spaces.
- Construction of a storm water absorption pit to be a requirement of all those applying for a building permit from now on.
- Construction of storm water absorption pits in all basements or semi-basements.
- Installation of a rainwater pump in case water accumulates in these places.

In all basements or semi-basements, in addition to the requirement for the construction of storm water absorption pit, there should be a requirement for the installation of a rainwater pump in case water accumulates in these places.

- Construction of porous roads and pavements wherever practical and possible.
- Construction of earthen channels wherever practical and possible.

(e) At the final approval stage, an inspection should take place to ensure that the storm water drainage project has been carried out in accordance with the terms of the Building or Planning Permit.

(f) Strict enforcement of the law preventing the placing of building materials on pavements and roads during construction work.

(g) Informing the public about the removal of illegal or inadequate constructions.

(h) Revision and updating of the institutional framework so that each development, small or large, provides rational storm water drainage solutions that enable the absorption of the greatest possible amounts of water underground.

### **3. Uniform Storm Drain Maintenance and Cleaning**

(a) Preparation of a uniform maintenance and cleaning programme for storm drains located within the boundaries of the five Municipalities of Greater Limassol. To this end, the Board will be responsible for requesting tenders from contractors for the regular cleaning of the storm drains. Pipes requiring maintenance will be identified and agreed upon with the Technical Services of the particular Municipality.

(b) An annual budget of €200,000 has been allocated, starting from 2009.

(c) The cost of storm drain maintenance and cleaning will be shared equally between the SBLA and the responsible Municipality, within whose boundaries the storm drains to be cleaned are located.

(d) Sole responsibility for the organization and coordination of the process lies with the SBLA, while the Technical Services of each Municipality, in conjunction with the SBLA, will be responsible for

identifying, supervising and/or recording the cleaning and maintenance work carried out in each Municipality.

(This measure has been in place since 2009, after the publication and awarding of tenders).

#### **4. Information for the Public**

(a) The five Municipalities of Greater Limassol, in conjunction and cooperation with the SBLA, will keep the public informed through announcements or circulars and recommend that any illegal constructions or interventions with the potential of causing floods in basement areas be removed or replaced.

(b) Wherever illegal interventions are identified, the Municipalities will request in writing that those responsible should remove them and comply with the law and the terms of the relevant permits, and that the law be enforced.

The SBLA will cooperate with and assist the Municipalities by providing evidence and information concerning any illegality.

Finally, the Full Session of the Board decided to hold a press conference with the aim of informing the public about the new storm water drainage policy being promoted by the Board and the five Municipalities of Greater Limassol.

## **Summary Report**

### **Sustainable Development**

#### **Sustainable Urban Drainage Systems (SUDS)**

##### **International Treaties**

In addition to national legislation, which deals with issues pertaining to the management of environmental resources, there are various international treaties as well as a range of European Directives and practices which regulate the main obligations of the responsible authorities and citizens' rights.

The Stockholm Declaration (1972) was one of the first to state that the earth's natural resources, with the air, land, flora and fauna, water and anything forming part of the natural ecosystem, must be safeguarded for the good of present and future generations.

##### **Sustainable Development and Agenda 21**

Twenty years later, at the 1992 UN Earth Summit in Rio de Janeiro, Agenda 21 was adopted, stating that the right to development must be exercised in such a way as to comply with the need to protect the environment and with the adoption of measures to minimize the impact on biodiversity, through practices compatible with the sustainable use of environmental and natural resources.

Sustainable Development and Agenda 21 was introduced with the aim of achieving a balance between social, financial and environmental demands and the need for economic growth on the one hand and protection of the environment on the other.

Since then, many countries have complied with the decision and many governments have prepared their own Agenda 21, which represents the Sustainable Development framework or strategy at both the national and local level.

##### **Sustainable Urban Drainage Systems (SUDS)**

What is meant by sustainable or viable storm water drainage systems or "Sustainable Urban Drainage Systems (SUDS)"? In essence, the term refers to a range of practices concerning the management and monitoring of surface water drainage systems in the most viable or sustainable manner, compared to conventional methods such as those with which we are familiar today.

The term "Sustainable Urban Drainage Systems" takes account of long-term environmental and social factors during the decision-making process and in the design of storm water drainage systems. It considers not only the quantity of water flows but the quality, and the importance of surface water to the urban environment. Many existing storm water drainage systems are inadequate and, as time passes, they prove to be unviable and environmentally unacceptable, causing problems with flooding, pollution and/or environmental damage.

SUDS can be developed on the basis of the principles of sustainable development, while **balancing** the various issues affecting their design. Surface water drainage systems that are designed in such a way as to take account of the water volume and quality, the correct landscaping of the area and the environment, are referred to in total as Sustainable Urban Drainage Systems. Such systems are more sustainable and environmentally viable than conventional drainage systems for the following reasons:

- They provide better control of the runoff flow, thereby reducing effects of urbanisation such as flooding
- They maintain and/or improve the water quality
- They are environmentally friendly and satisfy the needs of the local community for development
- They allow the conservation of flora and fauna in urban areas and watercourses
- They permit the enhancement of underground waters wherever possible.

This is achieved by:

- Dealing with the problem at source
- Managing the danger of pollution at source and at once rather than in the future
- Protecting water sources from local sources of pollution, such as leaks.

They can also allow development in new areas, where existing storm water drainage systems have reached saturation point and cannot be expanded further, thereby allowing development in existing urban areas.

**SUDS** get away from the conventional approach to planning against flooding by balancing the effects of urbanization against the need to prevent flooding by managing water quality and improving the quality of life.

Conventional methods of draining away surface water cannot easily manage and improve water quality and they can actually contribute to the problem. Moreover, sustainability issues have been ignored to a great extent, such as safeguarding water sources and issues concerning improvements to the quality of life in the urban centres, such as communal facilities, landscaping, the creation of habitats, etc. Conventional drainage systems do not take account of the above broader concepts or demands. The conventional approach does not have long-term, broader objectives and it ignores the above issues. Conventional systems do not make for viable or sustainable solutions, nor can they be long-term. On the contrary, they can have a serious impact on the ground and on water sources.

### **Sustainable Urban Drainage Systems: Techniques**

**SUDS** are a combination of measures and structures, created for the management of surface runoff water. These are implemented in combination with the rational management of the area so as to avoid flooding and pollution. The most common management measures/principles are the following:

- Prevention
- Use of organic/natural filters and swales
- Use of porous land and surfaces, creation of earthen channels
- Adoption of penetration and inflow techniques
- Use of basins and reservoirs

These measures should be implemented as close as possible to the point where surface water is created or rain falls, so that the runoff is slowed down and weakened. They also enable various types of processing of the surface water, through the use of natural subsidence, filtration, adsorption and organic decomposition.

**SUDS** may be designed to function in most urban areas, on hard or soft surfaces. The variety of available design options enables researchers who undertake such projects to go beyond simple, conventional surface water management practices and flood prevention, by taking into account the requirement to use the land, planning, future management and the needs of the local population. The breadth of options permits the taking of drastic decisions to balance the intentions of the various involved bodies against the need to deal with the dangers that are linked to each option.

## **Natural Filter Strips and Ditches**

Natural Filter Strips and Ditches are made up of linear vegetation and allow the uniform drainage of water from impermeable surfaces to areas of greater absorption. Ditches are small, shallow earthen channels while Natural Filter Strips are used in slightly sloping areas.

### **How they work**

Both techniques copy natural storm water drainage models by allowing the flow through vegetation, slowing down and filtering it. Ditches can also be designed with the goal of combining the flow, penetration, retention/slowing down and processing of the water.

### **Amount/Volume**

Ditches are usually designed to carry and drain away water but they can be connected to small dams or artificial reservoirs in order to further weaken the flow and, where necessary, for adsorption. Natural Filter Strips alone can reduce the intensity of the flow to some degree but they can also be used to reduce the area of an impermeable space.

### **Quality**

Ditches and Natural Filter Strips are effective measures for removing solid pollutants via filtration and subsidence. The vegetation traps organic and inorganic particles, which are later absorbed into the ground, and it also absorbs the nutrients. The same applies to the reservoirs, which can be built along the length of the surface water's flow.

### **Amenities and Upgrades to the Built Environment**

Reservoirs, ditches and Natural Filter Strips are often incorporated into the surrounding area as, for example, in an open public space or on the hard shoulder of a road. Local wild vegetation and flowers can be used for aesthetic reasons and for the development of flora and fauna and endemic and wild life. Attention should be paid to the choice of vegetation, however, since certain types can contribute to the erosion of the sides or banks. In areas with sufficient width and a relatively smooth slope, shrubs and trees may be planted.

### **The Situation in Cyprus**

Our country has, unfortunately, not prepared a Sustainable Development Strategy, either at a national or local level, or if it has, the document has probably been forgotten in a drawer and has never been forwarded to the responsible bodies.

One could go so far as to say that the only case in which there has been planning, as regards storm water management, is that of Limassol where planning started in 1992 with the drawing up of the first Storm Water Master Plan, which has been updated regularly and is slowly but surely being implemented. The problem with implementing it lies in the lack of a Sustainable Development Strategy, either at a national or local level.

In Limassol, the body that undertook the preparation of the Storm Water Master Plan was the Sewerage Board of Limassol-Amathus (SBLA).

Furthermore, in recent years there has been growing collaboration between the SBLA and the five Municipalities of Greater Limassol.

### **Cooperation between the SBLA and the Municipal Authorities**

This cooperation extends to the following areas:

- Anti-flood works undertaken by the SBLA
- New Building Permits – imposition of terms by the local authorities after negotiations and discussions with the SBLA
- In 2009, a joint programme began for the maintenance of existing storm drains
- Joint planning of new projects

### **The SBLA's Proposals for the Promotion of Sustainable Urban Drainage Systems**

The Board is drawing up a SUDS plan in conjunction with the five Municipalities of Greater Limassol and submitting specific proposals. These proposals, some of which are already being implemented, are the following:

1. Strict enforcement of the law banning the placing of building materials on pavements during construction and building work.
2. New planning and/or building permits should be subject to terms that ensure the reduction or retention of water flowing onto roads.
  - Construction of storm water absorption pits in all new properties and mainly in open spaces.
  - Construction of storm water absorption pits in all basements or semi-basements.
  - Installation of a rainwater pump in case water accumulates in these places.
  - Construction of porous roads and pavements.
  - Construction of earthen channels.
3. At the same time, in areas where sewerage system construction work has been completed, in the context of the process for issuing permits for connection to the system, the Board no longer obliges the owners of existing absorption pits to phase them out but, on the contrary, requests that they be kept and transformed into storm water pits. Given that over the next few years, around 20,000 properties will connect to the system, this means the creation of at least 20,000 storm water absorption pits, providing a temporary retention/storage space for some 150.000-200.000 cubic metres of water.
4. At the final approval stage, an inspection should take place to ensure that the storm water drainage project has been carried out in accordance with the terms of the Building or Planning Permit.
5. Preparation of standard Terms & Specifications and a code of correct practice for the use of the responsible local authorities, with the objective of implementing a common policy on sustainable development.
6. Provision of information to the public about the removal of illegal or inadequate constructions.
7. Revision and updating of the institutional framework so that each development, small or large, provides rational storm water drainage solutions that enable the absorption of the greatest possible amounts of water underground.
8. The design of such drainage systems now includes ditches and retention reservoirs.

### **Promotion of the Construction of Four Retention Reservoirs in the Greater Limassol Area**

In the framework of the implementation of the second Integrated Storm Water Drainage Plan for Greater Limassol, the construction of four retention reservoirs is being promoted. The first one is already functioning as part of the Milton Street anti-flood project in the area to the west of Limassol New Port and has developed into an important freshwater habitat. Work on the second one is being speeded up as part of the anti-flooding works in the area to the west of the 1<sup>st</sup> Limassol Industrial Estate. The two other reservoirs will be located in the areas of Ayia

Phyla and Ayios Athanasios respectively.



Photograph of the Makria reservoir, which is an important freshwater habitat today, west of Limassol New Port and part of the Milton Street storm water drainage project.

Natural Filter Strips and ditches