STORMWATER GUIDELINES
A NEW APPROACH APPLIED IN VENICE LAGOON

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In application of Law 192/04, the stormwater outfalls in Venice Lagoon do not need a specific authorization, but they do need to have a specific Plan to be presented to Water Authority, with management procedures and prevention measures to avoid pollution.

In July 2010 some Guidelines have been published for the implementation of the Stormwater Plans.

The Guidelines are been wrote in partnership between Envicon s.r.l., Thetis S.p.A., Consorzio Venezia Nuova and Venice Water Authority.
The knowledge acquired over the years has allowed us to:

- plan and design activity for the Ministry of infrastructure and transport – Venice Water Authority,

- advice and assist the Ministry of infrastructure and transport – Venice Water Authority,

- monitor activities for the Ministry of infrastructure and transport – Venice Water Authority,

- manufacture and supply of systems and control procedures and monitoring for the Ministry of infrastructure and transport – Venice Water Authority,

- training and dissemination of the activities carried out for the Ministry of infrastructure and transport – Venice Water Authority.

Collaboration with the Ministry of Infrastructure and Transport – Venice Water Authority - has led to the definition of the methodological approach for stormwater management and treatment by drawing up guidelines that suggest the structural and non structural BMPs depending on the activities and physical characteristics of the different sites.

Activity will continue with monitoring campaigns and development of models capable of assessing the amount of pollutants from stormwater runoff and efficiency of structural and non structural BMPs.
METHODOLOGICAL APPROACH FOR STORMWATER MANAGEMENT AND TREATMENT

A1
COGNITIVE FRAMEWORK

A2
IDENTIFICATION OF PRESSURE

B3
DEFINITION OF BEST MANAGEMENT PRACTICES

B3
GUIDELINE
Guidelines for the preparation of Plans

- Definition of site-specific parameters for identifying the best solution and project management on stormwater runoff

- Identification of best management practices and design (structural and nonstructural solutions)

- Setting quali – quantitative objectives to be achieved in terms of environmental safeguard and protection of water resources
## Definition of Site-Specific Parameters

### Impacts arising from activity

Example of reference value

<table>
<thead>
<tr>
<th>Destinazione d'uso</th>
<th>Manganese (μg/l)</th>
<th>Vanadio (μg/l)</th>
<th>Cromo totale (μg/l)</th>
<th>Rame (μg/l)</th>
<th>Ferro (μg/l)</th>
<th>Zinco (μg/l)</th>
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<td>min</td>
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<tr>
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<td>800</td>
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<td><strong>1,9</strong></td>
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**ANALYSIS OF APPROACHES AND TECHNOLOGIES**

- Approaches used
- Costs
- Success factors

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**Table: Approaches and Technologies**

<table>
<thead>
<tr>
<th>Paese/Area</th>
<th>Sistemi di infiltrazione</th>
<th>Pavimentazioni alternative</th>
<th>Stagni (temporanei e permanenti)</th>
<th>Sistemi di filtrazione</th>
<th>Canali irrigabili e fasi lamponi</th>
<th>Altre strutture (‘)</th>
<th>LID</th>
<th>Manuali e linee guida</th>
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</table>

**Legend**
- **Uso molto frequente**
- **Uso frequente**
- **Trovate frequentemente**
- **Trovate occasionalmente**
- **Trovate raramente**
- **Nessuna informazione**
STORMWATER MANAGEMENT AND TREATMENT SYSTEMS

Non structural BMPs

• Education, Recycling and Control of Pollution Sources
• Maintenance Practices
STORMWATER MANAGEMENT AND TREATMENT SYSTEMS

Structural BMPs

- Sedimentation tank/Oil separators
- Filtration systems
- Runoff collection and reduction
STORMWATER MANAGEMENT AND TREATMENT SYSTEMS

- Infiltration systems
- Detention system
- Alternative road and paving structures

Structural BMPs
IDENTIFICATION OF BEST MANAGEMENT PRACTICES

Example of matrix for the assessment of Structural BMPs

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Environmental</th>
<th>Site Features</th>
<th>Technical (hydraulic)</th>
<th>Social</th>
<th>Economical</th>
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<tbody>
<tr>
<td></td>
<td>Removing potential pollutants</td>
<td>Contamination of groundwater from reduction pollutants</td>
<td>Protecting infiltration capacity</td>
<td>Employment areas</td>
<td>Volumes reduction</td>
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<tr>
<td>Indicators</td>
<td>Parameters</td>
<td>General</td>
<td>Metals</td>
<td>PAH</td>
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</table>

Legend (standards)

- **Preferable**: High
- **Low**: Medium
- **Middle**: Low
- **High**: Preferable
- **Not better**: Not relevant/data not available

9th International Conference on Urban Drainage Modelling
Belgrade 2012
PLAN FOR STORMWATER MANAGEMENT AND TREATMENT
Flowchart for the preparation of the Plan

FACT STATE

1. ADMINISTRATIVE FRAMEWORK OF THE AREA
2. PHYSICAL DEFINITION OF THE AREA
3. HYDROGEOLOGY, GEOMORPHOLOGY, SOIL TYPE AND PERMEABILITY, SEWERAGE, CHARACTERISTICS OF STORMWATER
4. ACTIVITIES CHARACTERIZATION
5. WATER BALANCE
6. WATER INPUT IN THE SITE
7. WATER OUTPUT IN THE SITE
8. POLLUTANT LOADS REDUCTION
9. WATER VOLUME REDUCTION

REFORM STATE

- Structural BMP
- Non structural BMP

OBJECTIVES SET

- ACCIDENTAL RISK REDUCTION
- CONTINUOUS RELEASE REDUCTION
- MANAGEMENT CONDITIONS

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