

9th WWW-YES workshop

Urban water: resource or risks ?

# DayWater

follow-up of a European  
research project on storm water  
source control

*Laboratoire Eau, Environnement et  
Systèmes urbains (Leesu)  
Université Paris-Est*

**Daniel Thévenot**



**LEESU**

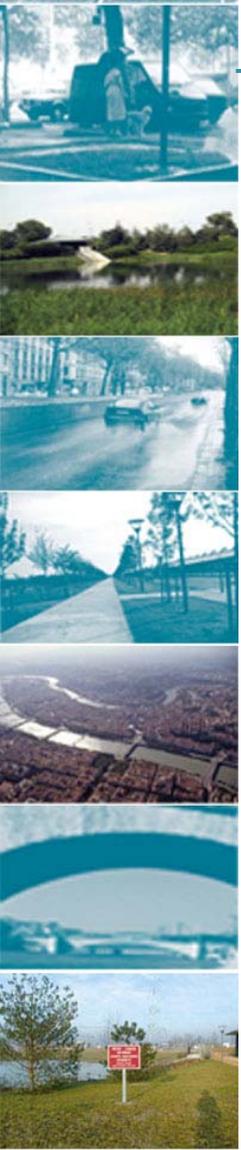
Laboratoire Eau Environnement  
et Systèmes Urbains

[www.daywater.org](http://www.daywater.org)

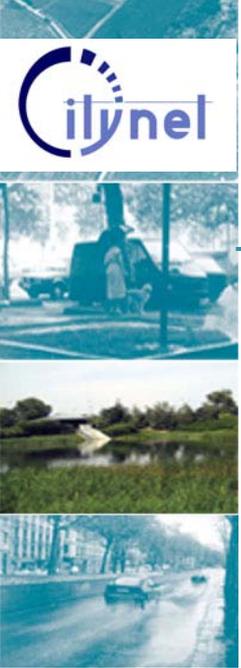
Belo Horizonte, 26  
October 2009



# DayWater



- Swedish word for rain!
- Water promotion and day-lightening in cities!
- Decision support for storm water source control
- Alternative to common sewer system



# Impacts of urban storm water

Summer  
floods  
in France



Spring floods  
in Norway

# Impacts of urban storm water

- Pollution illustrations in Paris district

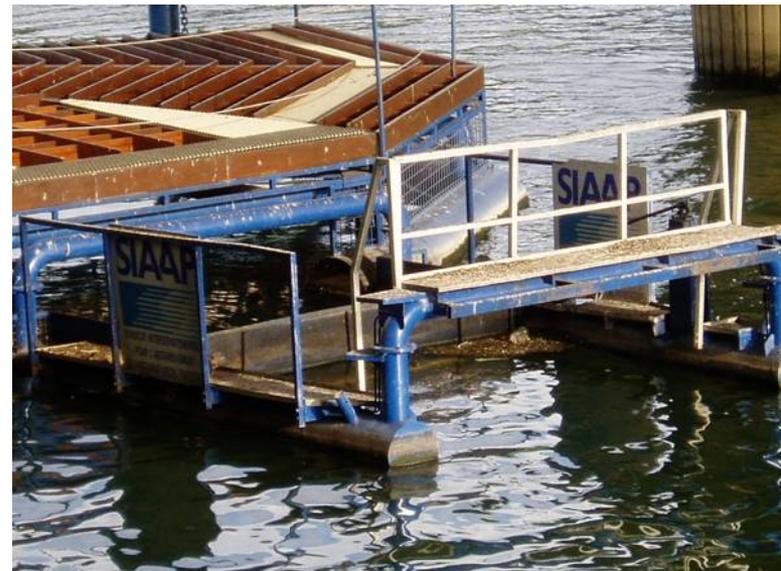
Sewer overflows (hydrocarbons)



Combined sewer overflows



Floating barrier





# Urban storm water source control



## Flat roof



## Porous pavement



## Green roof

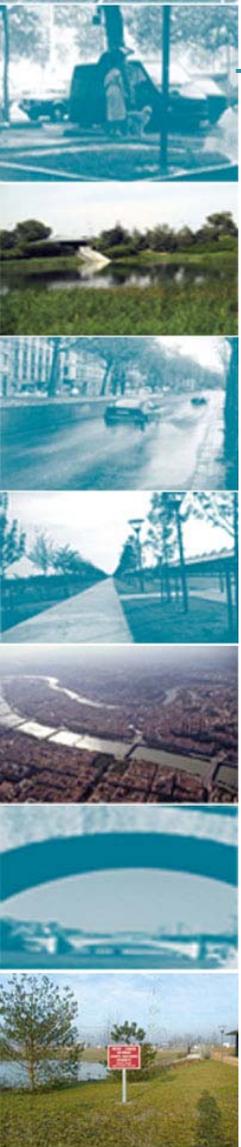


## Storage or infiltration basin

## Swale



# Decision support for sustainability



- **Environment**

- Floods and pollution prevention

- **Economics**

- Affordable costs (capital and operation)

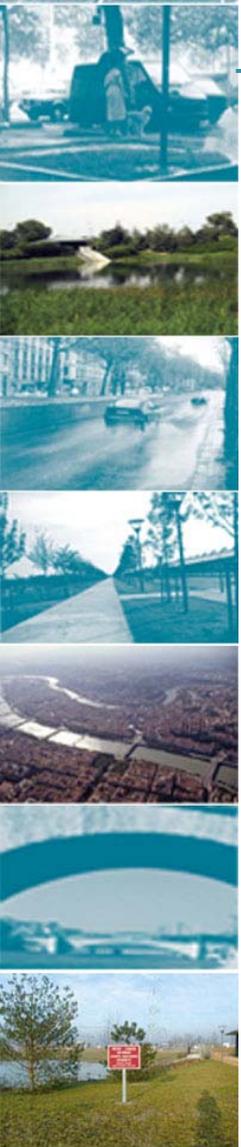
- **Social value**

- Quality of life
- Public acceptance of storm water source control, instead of common network system

- Research program **DayWater**
  - **European FP5 project** : December 2002 to November 2005
  - Production of a **prototype of Decision Support System (DSS)** freely accessible at :  
[www.daywater.org](http://www.daywater.org)
  - **Final publication**: IWA 2008 (280 p.)
  - **DayWater 2: French version** in Île-de-France province (since 2008)
    - By LEESU (Cereve) et SEPIA Conseils
    - Together with 3 counties, Marne Vive syndicate and Seine-Normandie water agency

- **1. DayWater 1: English version**
  - 1.1. Scientific partners
  - 1.2. Major patterns
- **2. DayWater 2: French version**
  - 2.1. Free browsing
  - 2.2. Guided tour
  - 2.3. Cooperation assistance
- **3. Conclusion**
- **Appendix**

# 1.1. DayWater : 10 teams within 8 countries



- and 14 teams of end-users deeply involved

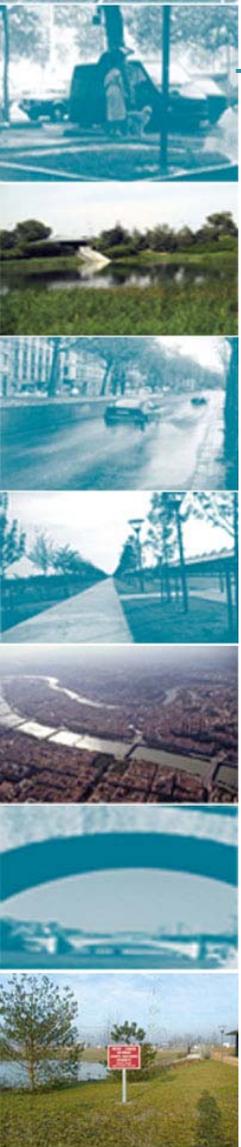


## 1.2. 4 DSS functions

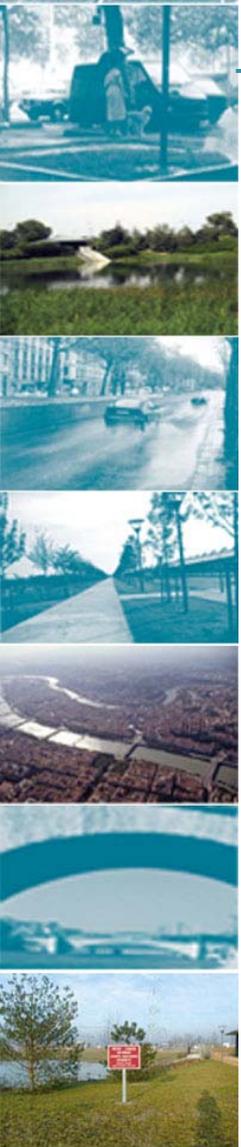
- **4 Functions** of any Decision Support System
  - **Documentary** : knowledge base
  - **Management** : assistance to construction et expression of a project, to selection of possible solutions
  - **Analysis** : water issue, consequences of selecting a solution, comparison of solutions
  - **Communication** : assistance to collaboration between actors

## 1.2. Adaptive tool

- **Spatial**
  - From land plot to district or county
- **Climatic**
  - From Sweden to Greece
- **Involved stakeholders**
  - From developer to land designer...
  - Including sanitation, road and park departments...
- **Project development phases**
  - From planning to *a posteriori* assessment



# 1.2. Best Management Practices catalogue 'BMP'



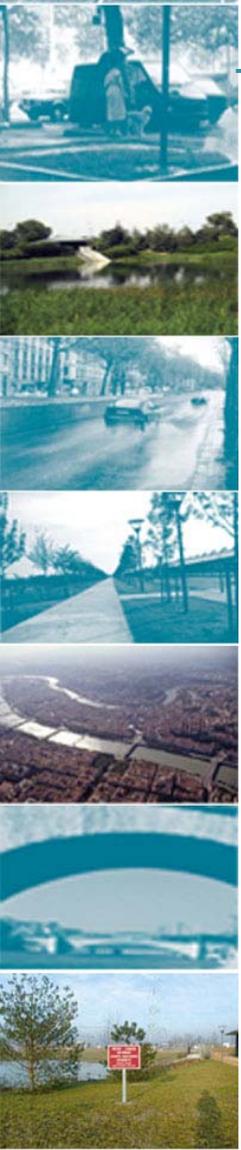
## ● Non structural

- Imperviousness control
- Education
- Pollutant use control
- Street cleaning
- Snow management

## ● Structural

- Storage
  - Artificial wetlands
  - Laguna
  - Reservoirs
  - Green roofs
- Infiltration
  - Swale, drains
  - Infiltration basins
- Porous surfaces
  - Roads, pavement...

# 1.2. Ecole des Ponts research leaflet n°8



- **Prepared by:**

- D. Thévenot
- J.-C. Deutsch
- J.-F. Deroubaix
- E. Chouli

- **Available in French**

- Ecole des Ponts communication direction (Feb. 2007)



Centre d'enseignement  
et de recherche sur l'eau,  
la ville et l'environnement,  
laboratoire commun  
École des ponts  
Université Paris 12  
AgroParisTech-ENGREF



[www.enpc.fr/cereve](http://www.enpc.fr/cereve)

**DOSSIER RECHERCHE** | 8  
de l'École des ponts

## CEREVE

**DayWater : une recherche européenne sur la gestion des eaux pluviales urbaines**  
Daniel Thévenot (coordonnateur), Jean-Claude Deutsch, José-Miguel Deroubaix et Beni Chouli

Pour résoudre les problèmes d'inondation et de pollution des eaux pluviales urbaines, la gestion à proximité immédiate de leur source (toitures, trottoirs, chaussées, parkings) apparaît aujourd'hui comme une solution efficace et durable. Cependant, le nombre élevé d'acteurs concernés rend complexe le processus de choix entre de multiples techniques alternatives (TA) au niveau d'aménagement.

L'objectif principal du programme européen de recherche DayWater était d'intégrer les connaissances sur la gestion à la source des eaux pluviales urbaines et d'aboutir à un système adaptatif d'aide à la décision (Adaptive Decision Support System ADSS) utile aux gestionnaires de tels projets d'aménagement urbain. Ce programme de recherche fructifère a rassemblé, de décembre 2003 à novembre 2006, 7 équipes publiques et 2 privées, constituées de chercheurs allemands, anglais, danois, français, grecs, néerlandais, suédois et tchèques (Fig. 1), ainsi que 14 utilisateurs professionnels. La coordination du programme a été assurée par le CEREVE à l'École des ponts.

À l'issue du programme DayWater, un prototype d'outil est utilisable simultanément par toutes les parties en présence. Ce système est adaptatif afin de pouvoir fonctionner aux différentes échelles de temps et d'espace pertinentes en hydrologie urbaine (échelles hydrologiques, administratives et d'aménagement ou de développement des villes). Il est aussi destiné à pouvoir répondre aux attentes de tous les acteurs concernés par un même projet urbain. Ce prototype a été testé sur différents projets en Europe et il est en cours d'utilisation par les Conseils Généraux de la région germanique.

**Fig. 1**  
Partenaires et utilisateurs de programme DayWater

CEREVE et CFC (France),  
Cologne (Alle) et CFC (Danemark),  
Copenhague (Danemark),  
Göteborg (Suède),  
Maastricht (Pays-Bas),  
München (Allemagne),  
Prague (Tchéquie),  
Stockholm (Suède),  
Tampere (Finlande).

# 1.2. DayWater final publication

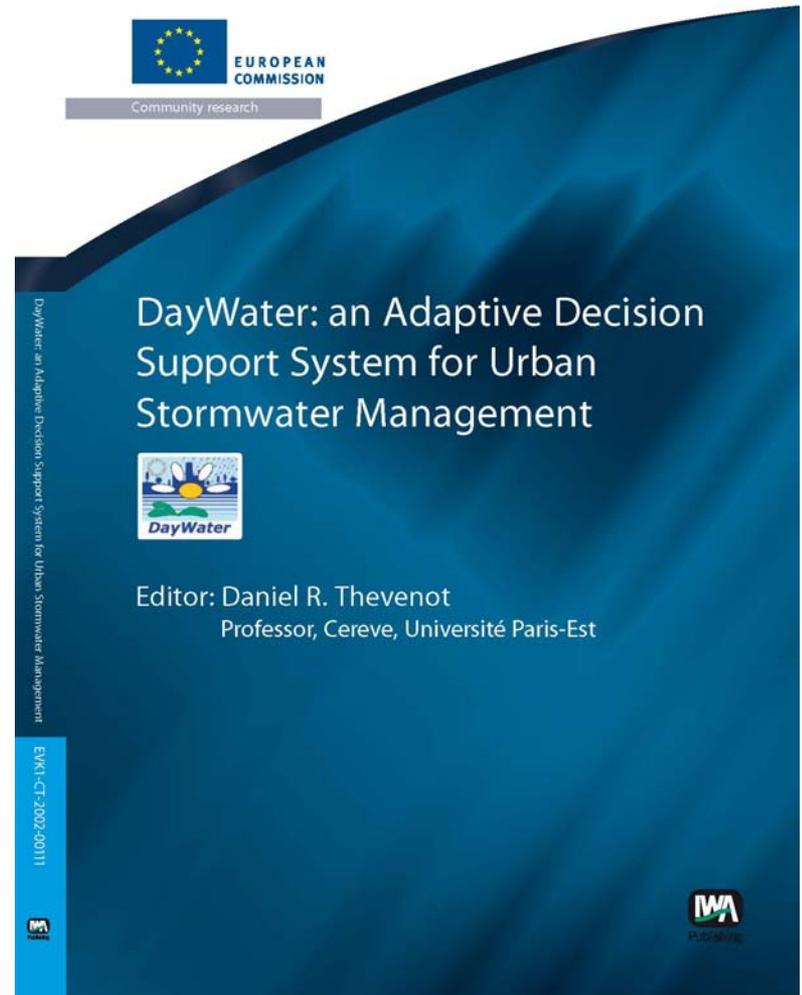
- **IWA publication**

- March 2008
- 280 p
- <http://www.iwapublishing.com/template.cfm?name=isbn1843391600>

- **content**

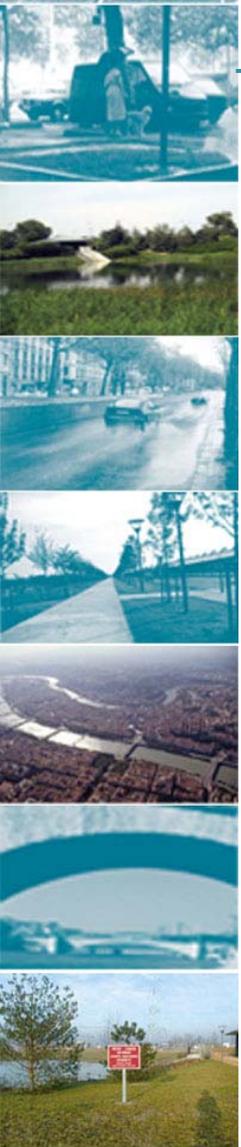
- Major results
- Case studies
- Contributions to the final conference (3-4 November 2005)

- **ISBN: 1843391600**



- **1. DayWater 1: English version**
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- **Appendix**

- Follow-up of the European project in the **Paris conurbation context**
- ADSS better adapted to taking decisions **with local Paris problems**
  - Public sanitation department within 2 counties: CG93 & CG94
  - Open actor games within stakeholders
  - Access to numerous regulations: tax, tax credit, sanitation zones → local urban planning, municipalities decisions
  - Shared expertise: case studies
  - Portal language: French translation of major dialogs and help menus



main menu

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- [Aide](#)
- [Paramètres](#)
- [Vos archives](#)
- [Nouvelles pages](#)
- [Partenaires](#)

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**Déconnexion**

A PROPOS DE DAYWATER

## Coordination de Daywater-IdF

Centre d'Enseignement et de Recherche sur l'Eau, la Ville et l'Environnement  
UMR MA 102

José-Frédéric Deroubaix / Guido Petrucci : guido.petrucci@cereve.enpc.fr  
 CEREVE, Centre d'Enseignement et de Recherche sur l'Eau, la Ville et l'Environnement  
 UMR MA 102  
 Laboratoire commun UPVM, ENPC, ENGREF  
 Ecole Nationale des Ponts et Chaussées (ENPC)  
 6-8 Avenue Blaise Pascal, Cite Descartes, Champs-sur-Marne  
 F-77455 Marne-La-Vallee Cedex 2 (France)  
 Téléphone: 33 (0)1 64 15 37 61; Fax: 33 (0)1 64 15 37 64

### Partenaires

Conseil général des Hauts-de-Seine

Conseil général des Hauts-de-Seine,  
2-16, boulevard Soufflot - 92000 Nanterre  
CONTACT?

Seine-Saint-Denis  
Conseil Général

Conseil général de la Seine-Saint-Denis,  
124, rue Carnot - 93000 Bobigny  
CONTACT?

Département  
du Val-de-Marne  
Conseil général

Conseil général du Val-de-Marne,  
avenue du Général De Gaulle - 94000 Créteil  
CONTACT?

Syndicat mixte  
Marne Vive

Syndicat mixte Marne Vive  
Hôtel de Ville, place Charles de Gaulle - 94100 SAINT-MAUR-DES-FOSSÉS  
CONTACT?

eau  
seine  
NORMANDIE

Agence de l'eau Seine-Normandie  
51, rue Salvador Allende - 92000 NANTERRE  
CONTACT?

Cereve  
now  
Leesu

CG 92

CG 93

CG 94

Marne  
vive

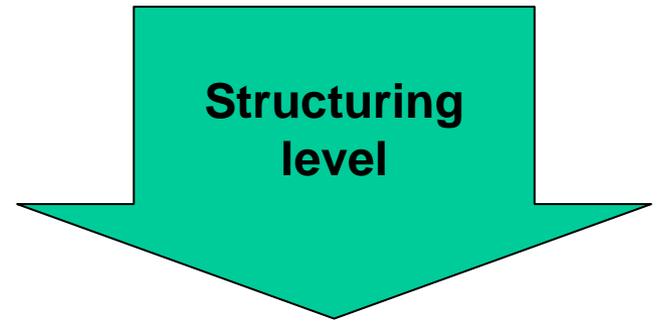
AESN

Intranet local

# Decision making : 3 pathways

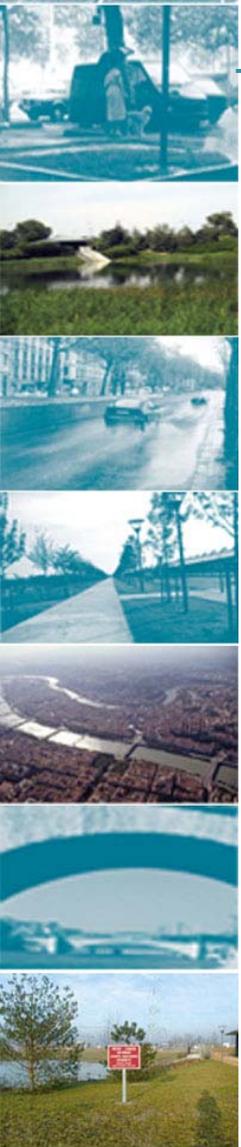
- More and more **structured pathways**

- Free browsing
- Guided tour
- Cooperation assistance



- **Free choice** by the user depending upon

- His/her knowledge level
- The project stage level
- The problem definition level



# Decision support system: 3 pathways

**Day Water 2**

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**Déconnexion**

**PAGE D'ACCUEIL**

<p><b>ADSS</b> Adaptive Decision Support System</p> <p><b>HYDROPOLIS</b></p> <p>Introduction à l'ADSS</p> <p>Plan du site</p>	<p><b>Free browsing</b></p> <p>Consultation libre</p> <p>Explorez les différents catalogues et bases de données de l'ADSS directement ou grâce à l'ensemble des outils de recherche libre</p>	<p><b>Bienvenue</b></p> <p>Ce site web est le produit du projet européen Daywater dont le développement est actuellement poursuivi en France.</p> <p>Il s'agit d'un ADSS, acronyme anglais de "Adaptive Decision Support System", Système Adaptatif d'Aide à la Décision. L'ADSS est un instrument informatique qui peut aider à la concertation et à la prise de décision dans la gestion durable des eaux pluviales. Ce système propose aux utilisateurs des "parcours" les aidant à trouver des solutions en fonction de leurs besoins et contraintes. Vous trouverez, en choisissant votre propre parcours dans l'ADSS, non seulement des informations sur les techniques alternatives, mais aussi des outils, des méthodes et des études de cas réelles. Bienvenue ...</p> <p>&gt;&gt;&gt;</p>
	<p><b>Guided tour</b></p> <p>Consultation guidée</p>	
	<p><b>Cooperation assistance</b></p> <p>Outil d'aide à la concertation</p>	

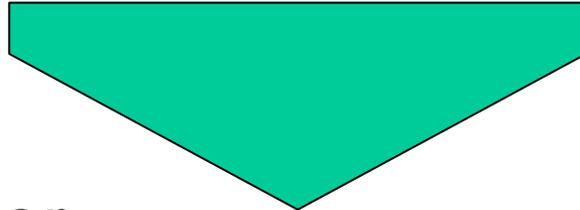
Interface DayWater v2.0, requirements: IE5.5+, min. resolution 1024x768; powered by php + mysql

http://localhost/index.php?p=navigationLibre

Intranet local

# What is the content of all ADSS pathways?

- Tools with 3 main **functions**
  1. Teaching
  2. Technical data
  3. Cooperation between involved stakeholders



- For
  - Scientific and technical education
  - Clarification of the possible alternatives between technical solutions
  - Win the support of all actors





# 2.1. Pathway 1 : Free browsing



**Day Water 2**

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**Déconnexion**

**Consultation libre**

Grâce à cet outil, vous pouvez explorer les bases de données contenues dans l'ADSS, ou effectuer des recherches.

**Catalogues disponibles**

- Techniques alternatives
- Etudes de cas
- Instruments de politiques publiques
- Acteurs du processus de décision
- Outil d'analyse de la vulnérabilité territoriale
- Autres outils (version anglaise)
- Mots-clés
- Critères de décision

Rechercher dans les catalogues

Interface DayWater v2.0, requirements: IE5.5+, min. resolution 1024x768; powered by php + mysql

- Source control techniques
- Case studies
- Public policy instruments
- Decision making stakeholders
- Territorial vulnerability analysis
- Other tools (in English)
- Key-terms
- Decision making criteria

Free browsing 1/4



# 2.1. Case studies catalogue

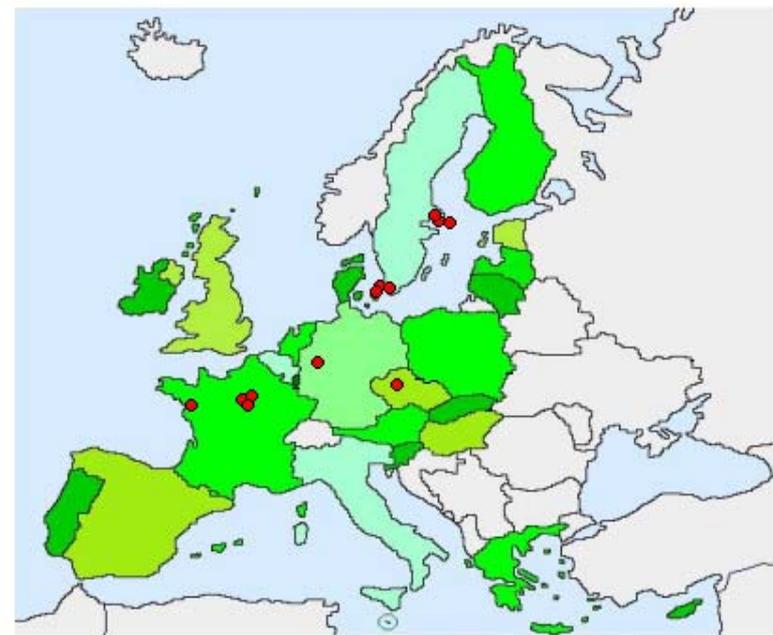


- Menu
- HYDROPOLIS
- Page d'accueil
- Mots-clés
- Ajouter au panier
- Panier

## CASE STUDIES

### CASE STUDIES

The purpose of this database is to tell the story of an USWM project based on technical, financial and urban context. Each case study reflects the point of view of its editor, one of the main stakeholders. Choose the case studies by clicking a point



In development for **Ile-de-France** province

The map is only a rough guide to the location of individual Case Studies. Note, that in some places, like Paris, several Case Studies may be located close to each other and the **red circles** symbolizing them may **overlap**. For a full list of all Case Studies in Hydropolis database use the link below:  
[List of Case Studies](#)

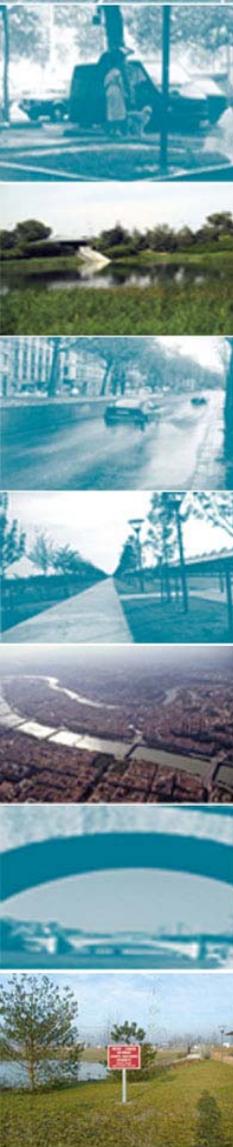
**Free browsing 2/4**

## 2.1. Case studies catalogue : example of a presentation file

- **Global data**
  - Val-de-Marne
  - Project owner: Bonneuil municipality (first project with BMP)
  - Project manager: Architect P. Lombard
- **Project**
  - Objective: **construction of a building for the technical services of Bonneuil municipality**
  - Dates: 2005 till 2008
  - Area: 16,000 m<sup>2</sup>
  - Cost: sustainable development (including BMP) 0.4 M€ / total 8 M€
  - Involved storm water source control techniques
    - Open storage
    - Plant remediation
    - Swale
    - Wind pump
    - Storm water reuse (maintenance vehicles cleaning)
    - Green roofs
    - Heat pump...

Free browsing 3/4

# 2.1. Case studies catalogue : example of a presentation file



**DIRECTION DES SERVICES TECHNIQUES - 94 - BONNEUIL-SUR-MARNE**

Contact - Monsieur Cottareau, directeur des services techniques

Réalisation d'un bâtiment qui accueille et réunit les services techniques municipaux de la commune de Bonneuil-sur-Marne

*myWater-2-Bonneuil-Cas-2009-09-24.doc*

Le projet de bâtiment abritant les services techniques constitue le premier projet de la commune de Bonneuil-sur-Marne répondant de cette manière à douze des quatorze cibles Haute Qualité Environnementale, dont la cible 5 « gestion de l'eau ».

Le concours pour la réalisation de ce bâtiment est lancé en 2005. Il comporte dès l'origine un cahier des charges extrêmement précis tant pour la forme que pour la réalisation du bâtiment. Le volet concernant la gestion des eaux pluviales constitue un élément moteur du projet du point de vue du développement durable. Le cahier des charges précise les différentes techniques imposées (stockage dépolluant, éolienne pour la pompe de relevage, silo de stockage...) jusqu'aux volumes d'eau à stocker. Outre ces aspects de grande précision quant aux techniques d'assainissement pluvial, le maître d'ouvrage précise également que le bâtiment s'attachera à répondre aux cibles HQE, et particulièrement celles qui concernent la phase chantier (gestion des déchets de chantier, utilisation de matériaux disponible à proximité...).

Du point de vue de la gestion des eaux pluviales, le projet est basé sur un principe de récupération et utilisation des eaux pluviales, et dans l'idéal d'un rejet nul au réseau.

Les eaux pluviales provenant de la surface du projet et du bâti (16.000 m<sup>2</sup> au total) sont collectées au sein d'un bassin d'agrément étanche qui permet la décantation et dépollution des eaux. Elles sont ensuite acheminées gravitairement par canalisation au pied d'une pompe de relevage éolienne. Les eaux sont ensuite stockées en hauteur dans un silo, en vue de servir pour l'alimentation et le lavage des véhicules municipaux d'entretien de la commune.

Les eaux de voirie sont collectées dans une noue disposant d'un dispositif de dépollution par phytoremédiation. Notons que la maîtrise d'ouvrage n'a pas accordé une totale confiance à ce type de dépollution, puisqu'elle a ajouté un séparateur à hydrocarbure à la sortie de cette noue. En effet, la maîtrise d'ouvrage souligne que si la phytoremédiation a été validée dans un contexte expérimental, il n'y a pour l'instant pas de réel retour sur expérience qui permette de valider le concept pour une exploitation réelle. Les eaux sont ensuite envoyées dans le bassin d'agrément, puis suivent le parcours évoqué précédemment.

Adresse - 3 avenue de l'Europe Bonneuil-sur-Marne  
Dates - 2005 / 2008  
MO - Commune de Bonneuil-sur-Marne → publique  
MOE - Pierre Lombard (architecte)

**Techniques mises en œuvre**  
Toitures terrasses  
Stockage à ciel ouvert  
Noues  
Phytoremédiation  
Pompe de relevage éolienne

Un cahier des clauses techniques particulières (CCTP) ou cahier des charges élaboré par la maîtrise d'œuvre extrêmement précis quant aux techniques à mettre en place sur le projet. Très peu de marge de manœuvre pour la réponse au concours d'architecture d'ingénierie.

Les moyens financiers de la commune sont importants, ce qui permet une relative liberté dans la conception du projet, puis dans le choix de la maîtrise d'œuvre.

Le caractère très poussé des techniques HQE mises en œuvre garantit une communication très favorable sur le projet. Cet aspect, associé à un soutien sans faille des élus locaux - qui bénéficient de la bonne image du projet - permet de mener le projet rapidement à son terme.

Les toitures terrasses végétalisées permettent une insertion paysagère parfaite, primée par le Prix de l'Environnement.  
La réutilisation des eaux pluviales et les techniques mises en œuvre permettent une économie de 70% sur l'ensemble des fluides.



Direction des Services Techniques - 09/02/2009

**Coupe transversale – Eaux de Pluie**



Direction des Services Techniques - 09/02/2009

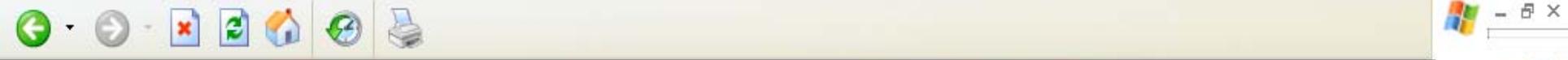
**Coupe transversale – Remontée des Eaux**



Free browsing 4/4



# 2.2. Pathway 2 : Guided tour



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- Partenaires

### Consultation guidée ?

En empruntant ce parcours, vous pouvez trier les contenus des catalogues de l'ADSS, selon les caractéristiques de votre situation.

**Attention: vous n'avez pas encore rempli le questionnaire qui permet au système de définir vos besoins et contraintes.**

**En répondant à ce questionnaire vous sélectionnez les mots-clés grâce auxquels le système effectue un tri dans les catalogues et une sélection des techniques alternatives les plus adaptées à vos besoins et contraintes. Pour poursuivre ce parcours, il est donc fortement conseillé de définir vos mots-clés.**

Si toutefois vous souhaitez accéder immédiatement aux catalogues sans tri préalable, vous pourriez revenir à cette page et définir les mots-clés dans un deuxième temps.

**Mon Hydropolis** - accéder aux catalogues de Hydropolis non-filtrés par les mots-clés

- Catalogue des **études de cas**
- Catalogue des **acteurs**
- Catalogue des instruments de politique publique
- Catalogue des outils de modélisation

**Choix multicritère**

Utiliser le "comparateur multicritère" (CMC) pour démarrer une réflexion sur les TA les plus adaptées

Interface DayWater v2.0, requirements: IE5.5+, min. resolution 1024x768; powered by php + mysql

Guided tour 1/2



# 2.2. Multi-Criteria Comparator of techniques (CMC)



Critères	Indicateurs	Swales	Filter strip	Filter drain	Soakaways	Infiltration trench	Infiltration basin	Settlement tank	Lagoon	Retention ponds	Detention basins	Extended detention basin	Constructed wetland	Porous asphalt	Porous paving	Green roofs	Poids	
																	Indicateurs	Critères
Technique	<a href="#">Contrôle des inondations</a>	2	2	2	2	3	4	4	5	5	5	5	4	1	3	1	<input type="text"/>	<input type="text"/>
	<a href="#">Contrôle de la pollution</a>	3	2	2	3	3	5	1	1	2	2	3	4	1	4	2	<input type="text"/>	<input type="text"/>
	<a href="#">Adaptabilité à la croissance urbaine</a>	3	2	1	2	3	4	2	2	5	5	4	5	1	3	3	<input type="text"/>	<input type="text"/>
Environnement	<a href="#">Impact sur le milieu récepteur - débit</a>	4	3	4	5	5	5	2	1	2	3	2	2	1	4	4	<input type="text"/>	<input type="text"/>
	<a href="#">Impact sur le milieu récepteur - qualité de l'eau</a>	4	3	2	2	3	4	1	2	5	4	4	5	1	5	3	<input type="text"/>	<input type="text"/>
	<a href="#">Impact écologique</a>	3	2	1	1	2	3	1	3	4	3	4	5	1	2	1	<input type="text"/>	<input type="text"/>
Maintenance	<a href="#">Nécessités de maintenance</a>	3	4	5	4	4	4	4	3	2	3	2	1	5	3	4	<input type="text"/>	<input type="text"/>
	<a href="#">Fiabilité et durabilité du système</a>	4	2	2	3	4	4	1	2	5	4	3	3	1	3	3	<input type="text"/>	<input type="text"/>
Société et communauté urbaine	<a href="#">Risques de santé publique</a>	3	5	5	5	5	3	2	2	1	2	3	1	4	4	5	<input type="text"/>	<input type="text"/>
	<a href="#">Développement durable</a>	3	4	2	2	2	2	2	3	4	4	5	5	1	2	2	<input type="text"/>	<input type="text"/>
	<a href="#">Information et prise de</a>	2	2	1	0	1	3	1	3	4	4	4	5	0			<input type="text"/>	<input type="text"/>



Guided tour 2/2

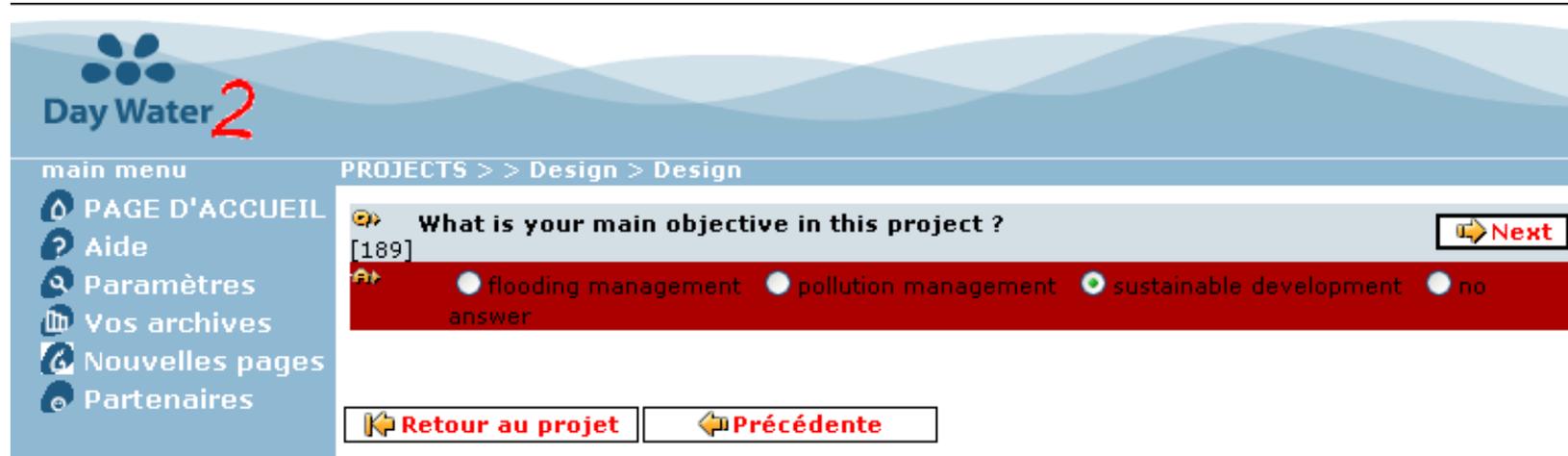
## 2.3. Pathway 3 : Cooperation assistance

- A **structured tool**
  - Tree and node questionnaires
  - For involving stakeholders into the decision making process
- A tool for **project management**
  - Project manager may develop a specific tree and node template specific to the project
  - Make explicit the convergence and divergence issues: matrix of alternatives

Cooperation assistance 1/5

## 2.3. Tree and nodes questionnaire

- ADSS section still in English!



**Day Water 2**

main menu

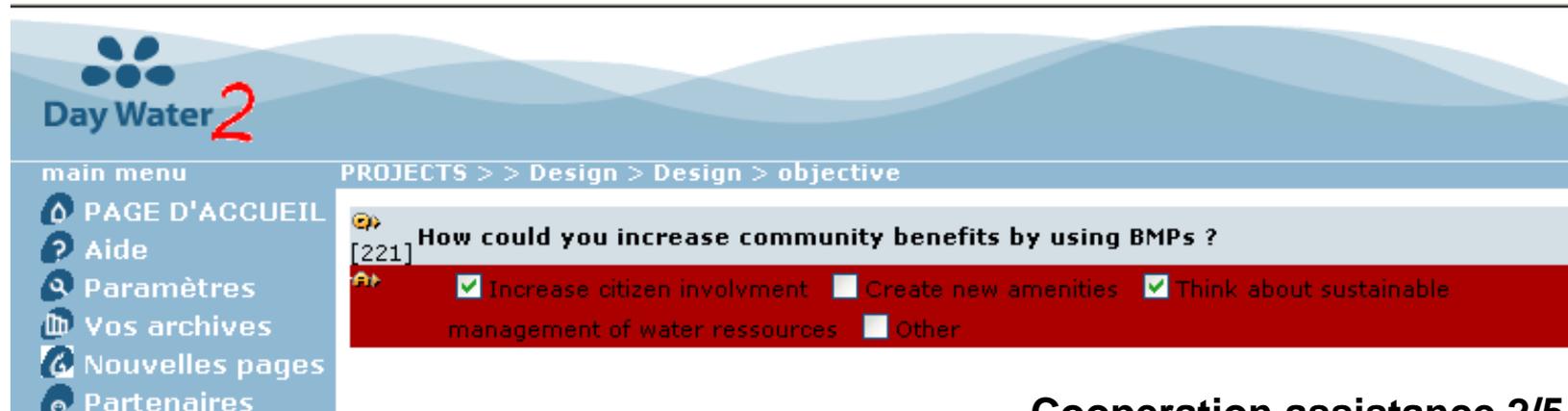
- PAGE D'ACCUEIL
- Aide
- Paramètres
- Vos archives
- Nouvelles pages
- Partenaires

PROJECTS >> Design > Design

What is your main objective in this project ? [189] [Next](#)

flooding management
  pollution management
  sustainable development
  no answer

[Retour au projet](#)
[Précédente](#)



**Day Water 2**

main menu

- PAGE D'ACCUEIL
- Aide
- Paramètres
- Vos archives
- Nouvelles pages
- Partenaires

PROJECTS >> Design > Design > objective

How could you increase community benefits by using BMPs ? [221]

Increase citizen involvement
  Create new amenities
  Think about sustainable management of water resources
  Other

Cooperation assistance 2/5

## 2.3. Cooperation assistance: free definitions of complex solutions

- **Possible association** of several techniques or uses
  - Speed ramp
  - Runoff infiltration
  - Drainage of non infiltrated runoff
    - Towards a creek
  - *Hoppegarten* (Berlin residential suburb)

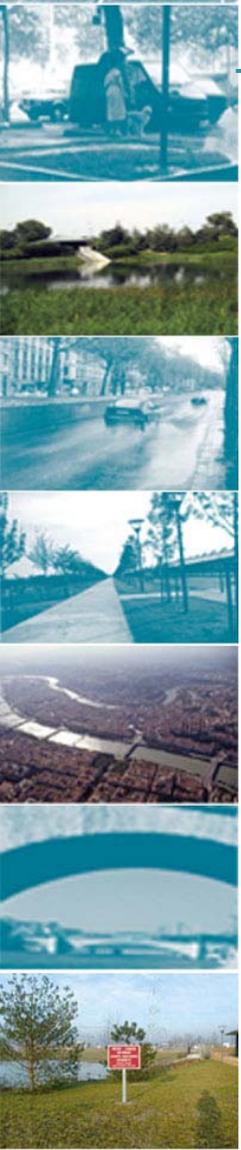


## 2.3. Matrix for solution comparison: negotiation

- **Each stakeholder** of the project (ADSS user) suggests
  - Possible alternatives (either single or combined techniques)
  - Significant indicators for comparing them
- When a **collective agreement** is achieved on such lists of solutions and criteria
- Each stakeholder gives **scores (1-5) to each indicator**
  - Subjective score
  - Use of quantitative data
    - Ex: *Annual visitor number* for assessing the indicator: *Recreation area*
- Each stakeholder **weights (0-100%) each indicator**
- Resulting **priority list** for each stakeholder is compared
  - → collective discussion
  - → collective withdrawal of some solutions

Cooperation assistance 4/5

## 2.3. Matrix for solution comparison: Oxford example



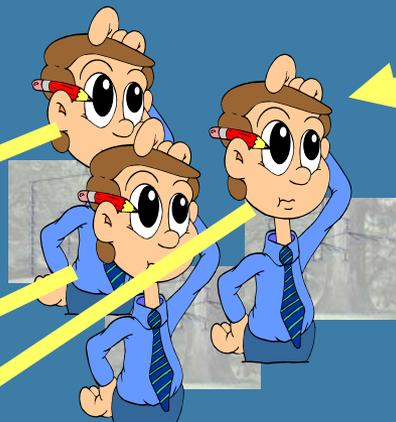
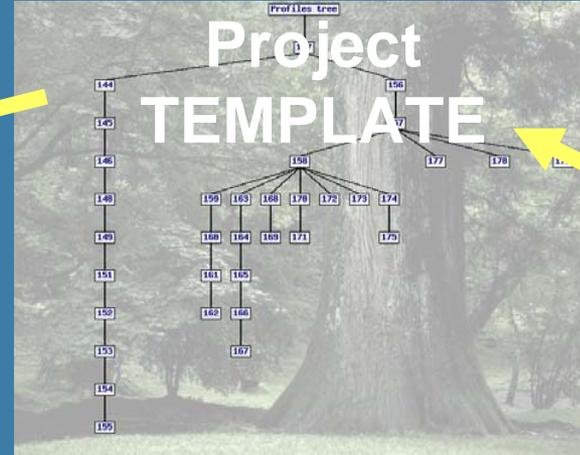
Indicator	Convent. drainage	Infiltr. trench	Swale	Wetland	Weight
Flood control	3	2	3	3	15
Pollution control	1	2	2	3	15
Environ. impact	2	2	3	4	25
Amenity & aesthetics	0	1	2	4	20
Public hygiene and security	2	2	2	2	15
Costs	2	1	1	1	10
<b>Σ score x weight</b>	<b>160</b>	<b>170</b>	<b>230</b>	<b>310</b>	
<b>Priority list</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	

# ADSS negotiation scheme

Stakeholders

Manager

Stakeholder matrices



Matrix of Alternatives

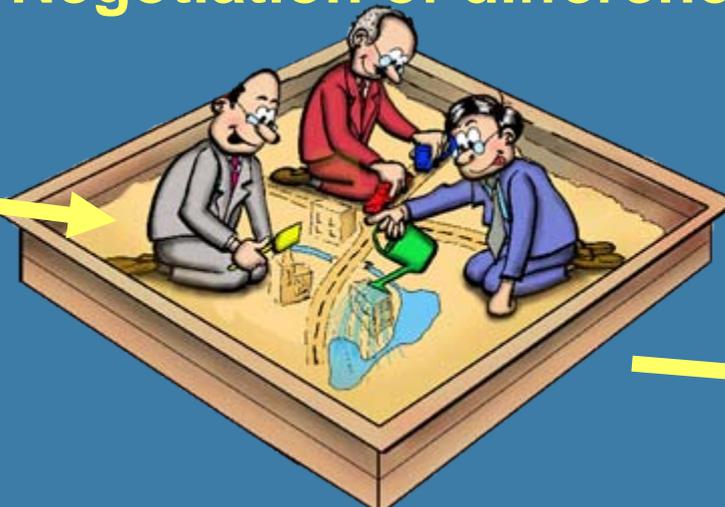
Variants	Indicators			
	1	2	3	...
V1	+	4.7	bad	har
V2	++			

Matrix of Alternatives

Variants	Indicators			
	1	2	3	...
V1	+	4.7	bad	har
V2	--	1.3	mea	har
V3	++	2.5	gbo	eas

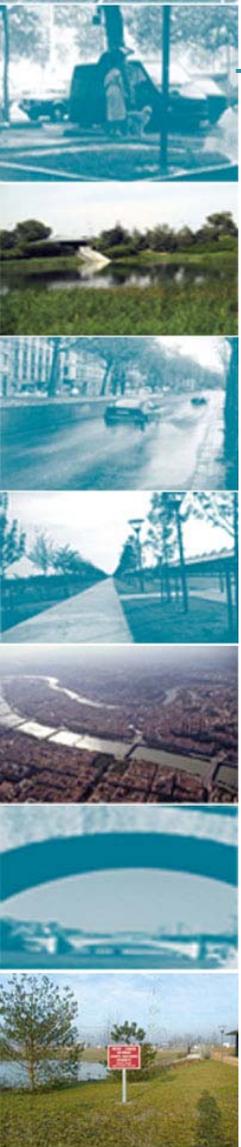
Negotiation of differences



Solution



- **1. DayWater 1: English version**
  - 1.1. Scientific partners
  - 1.2. Major patterns
- **2. DayWater 2: French version**
  - 2.1. Free browsing
  - 2.2. Guided tour
  - 2.3. Cooperation assistance
- **3. Conclusion**
- **Appendix**



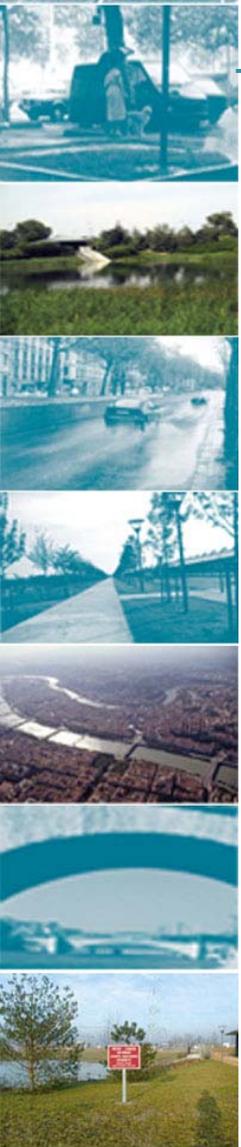
- **Ile-de-France development** of the European DayWater initial project
  - Heavy involvement of end-user practitioner
  - Administrative and regulatory context
- Attempt to solve the **contradiction** between
  - Urban storm water source control standardization
  - Needs to take into account the site specific patterns (plot, municipality)

- Translation into **French** of the ADSS Web-based tool (in progress)
  - Dialogue screens, questionnaires
  - Links with on-line documents
  - Included ADSS tools
- **Free access** to the ADSS portal
  - Login & password: 'guest'
  - Message to D. Thévenot for a specific account (*project manager*)

Examine : [www.daywater.org](http://www.daywater.org)

# Conclusion

- Questions ?



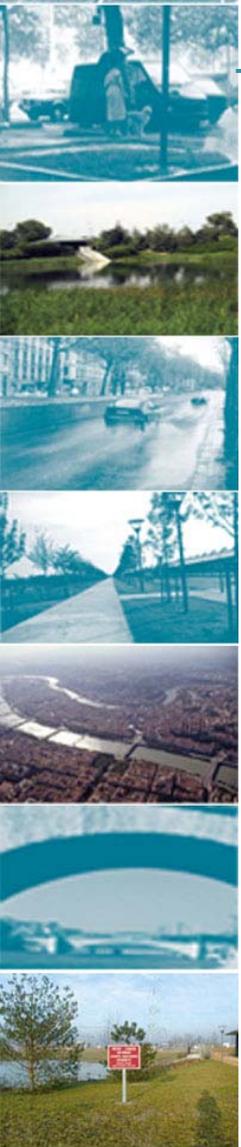
[thevenot@cereve.enpc.fr](mailto:thevenot@cereve.enpc.fr)



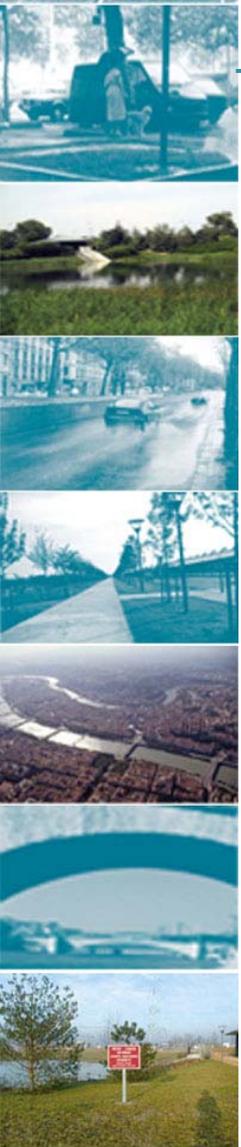
Consult : <http://www.daywater.org/>

# Appendix

- A. DayWater 1 : presentation
- B. DayWater 1 : English version
  - B.1. Free browsing
  - B.2. Guided tour
  - B.3. Cooperation assistance
- C. Return to presentation outline



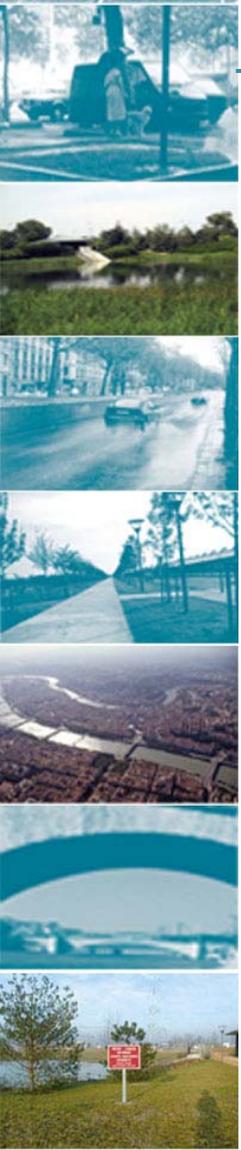
# A. Research context



- **Sanitation network** and **detention basins**
  - **Conventional infrastructures** for urban runoff
    - Requires a large part of local resources
    - Renovation & maintenance ⇒ capital costs ↗
  - Big works with **single use**
- Urban storm water **source control**
  - Complex interaction with **urban dynamics**
  - Allows **cost reduction**
    - Reduction of the hydraulic peak flow
  - Allows the promotion of **urban water**
    - ‘*day lightning*’ ⇒ values attached to water!

# A. Research context

- Challenge of selecting the **best solution**
  - **Dissemination** of knowledge on storm water source control techniques
  - **Integration** of water in the city
    - ➔ Numerous stakeholders involved!
    - ➔ Various knowledge levels and interest!
- European research program
  - « **DayWater** » = 'rain water' in Swedish
  - Adaptive Decision Support System (**ADSS** or **S2AD** in French)



# A. Research context: climatic conditions...

- From northern Europe...
  - Norway during the first rain after winter
    - Frozen sewers
    - Rain
    - Melting of contaminated snow





# A. Research context: climatic conditions...



- To summer storms in western Europe  
- Montreuil



**Internet call:  
2001-07-27 storm**



**Département de la  
Seine-Saint-Denis**  
CONSEIL GENERAL





TAUW, Netherlands  
(**G. Geldof**)

Middlesex University,  
United Kingdom  
(**M. Revitt**)

ENPC, France  
(**D. Thévenot**)

Laboratoire Central  
des Ponts et Chaussées,  
France (**M. Legret**)

# A. Scientific partners

Technical University  
of Denmark  
(**P.S. Mikkelsen**)



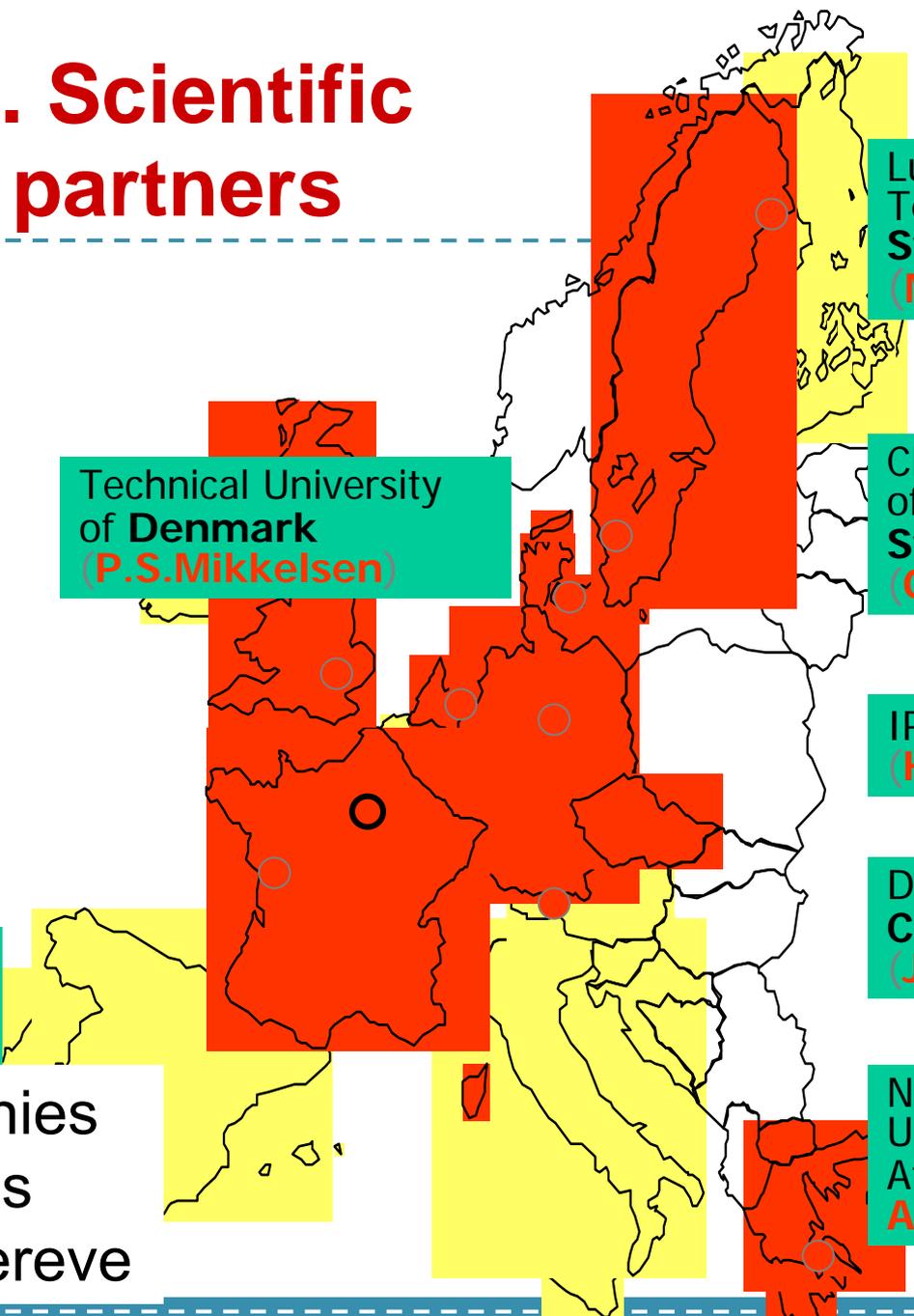
Luleå Univ. of  
Technology  
Sweden  
(**M. Viklander**)

Chalmers University  
of Technology,  
Sweden  
(**G. Svensson**)

IPS, Germany  
(**H. Sieker**)

DHI Hydroinform  
Czech Republic  
(**J. Krejčík**)

National Technical  
University  
Athens, Greece (**E.  
Aftias**)



- 3 private companies & 7 academic teams
- **Coordinator: Cereve**



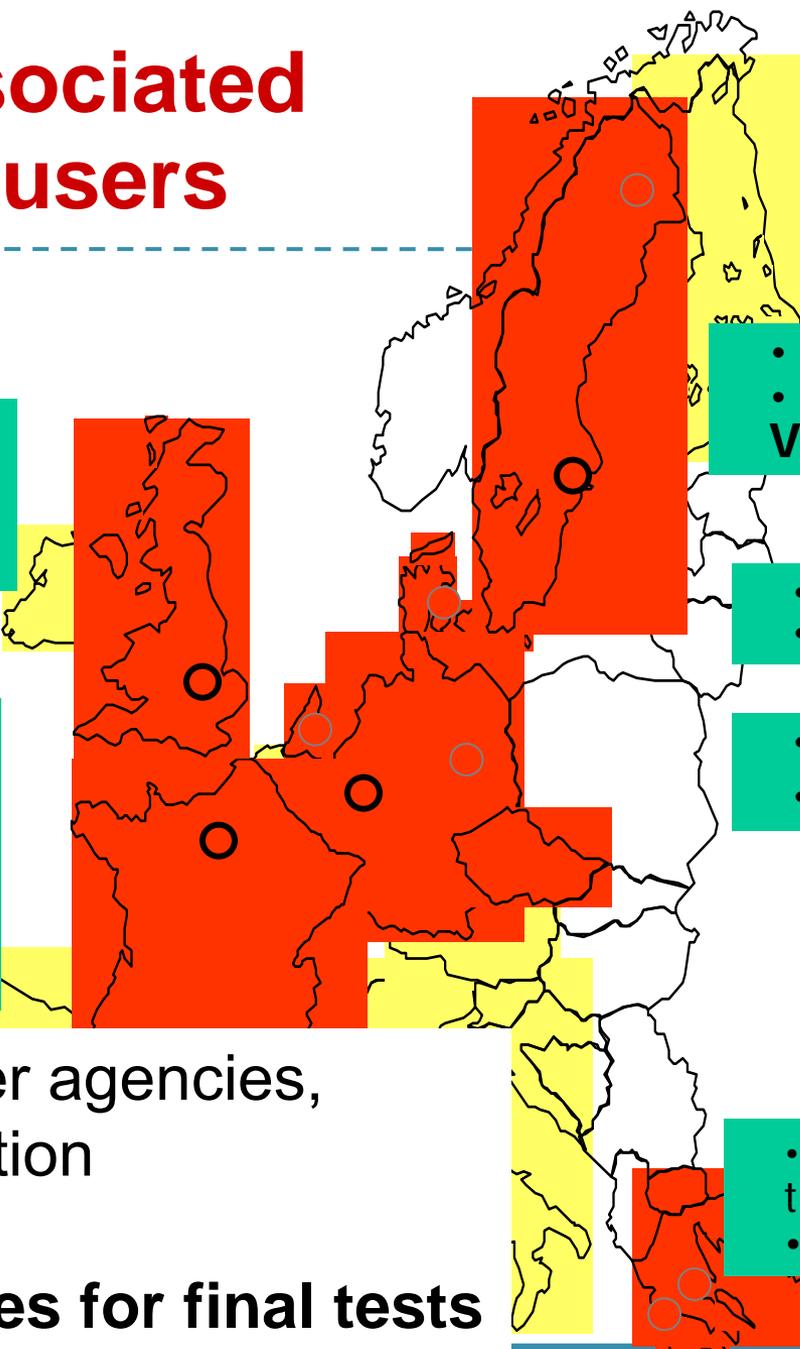
# A. Associated end-users



- **Countryside Strategic Projects plc**
- London Borrow of Harrow Engineering Services

- City of Nijmegen

- Water Authority for the Seine-Normandy Basin
- **Seine Saint-Denis County Water Authority**
- Syndicat "Marne Vive"



- City of Luleå
- **Stockholm Vatten AB**

- Copenhagen Energy
- Karlebo Municipality

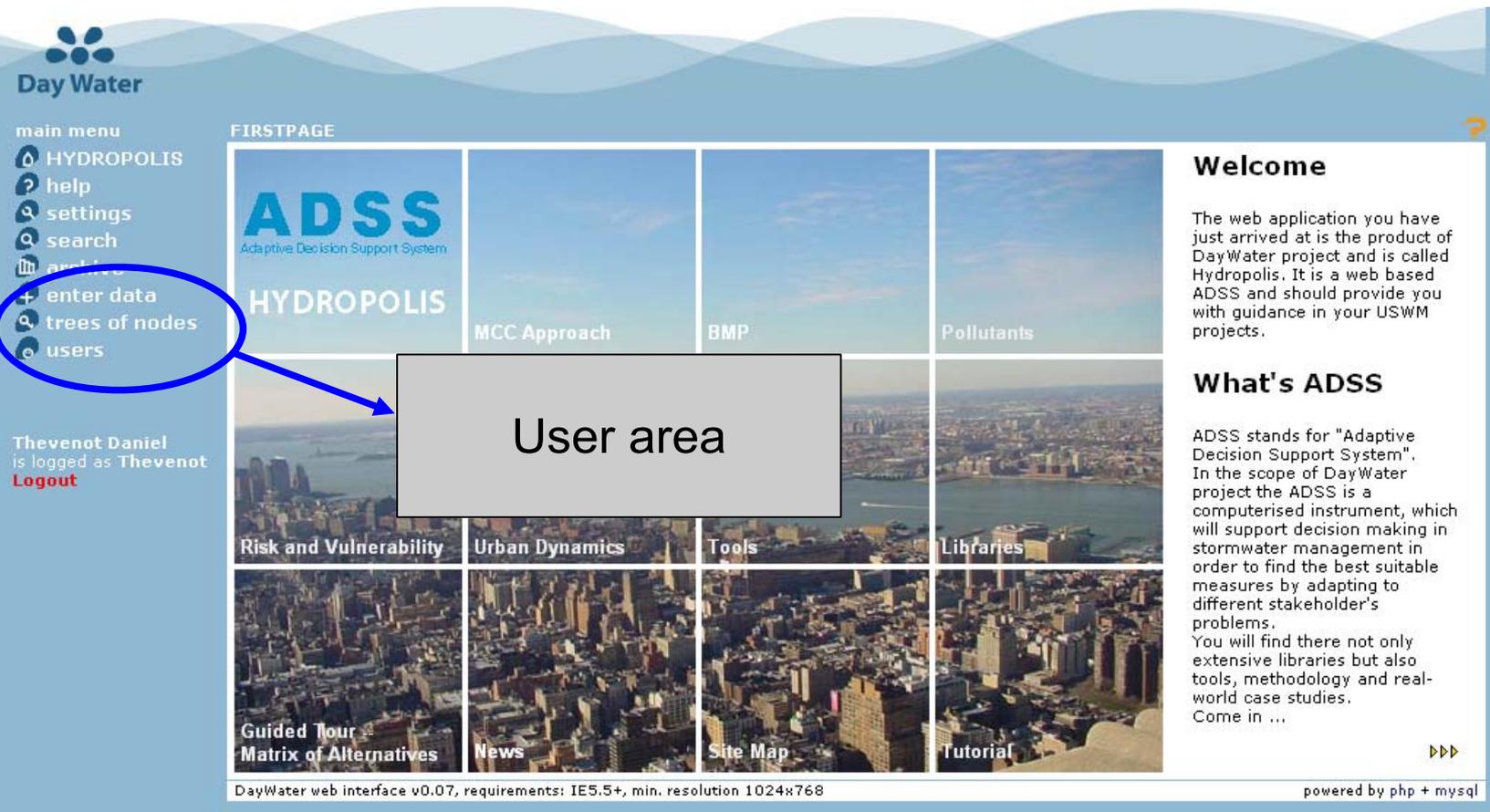
- Stadt Dresden
- **Wupperverband**

- Greek Ministry of the Environment
- City of Patras

- Municipalities, water agencies, design office, association
- Public or private
- **4 practitioners/sites for final tests**



## ● Front page: **HYDROPOLIS**



**Day Water**

main menu

- HYDROPOLIS
- help
- settings
- search
- archive
- enter data
- trees of nodes
- users

Thevenot Daniel is logged as Thevenot **Logout**

**FIRSTPAGE**

**ADSS**  
Adaptive Decision Support System

**HYDROPOLIS**

MCC Approach    BMP    Pollutants

**User area**

Risk and Vulnerability    Urban Dynamics    Tools    Libraries

Guided Tour    Matrix of Alternatives    News    Site Map    Tutorial

**Welcome**

The web application you have just arrived at is the product of DayWater project and is called Hydropolis. It is a web based ADSS and should provide you with guidance in your USWM projects.

**What's ADSS**

ADSS stands for "Adaptive Decision Support System". In the scope of DayWater project the ADSS is a computerised instrument, which will support decision making in stormwater management in order to find the best suitable measures by adapting to different stakeholder's problems. You will find there not only extensive libraries but also tools, methodology and real-world case studies. Come in ...

DayWater web interface v0.07, requirements: IE5.5+, min. resolution 1024x768

powered by php + mysql

# A. ADSS access

- **Access to the portal**  
**[www.daywater.org](http://www.daywater.org)**
  - Visitors (free access)
    - ‘Login’ & password = ‘guest’
  - User
    - Inviter by a user manager
    - With a given ‘Login’ & password
  - User manager (project manager)
    - Invited by a user manager
    - With a given ‘Login’ & pass word
    - Allowed to invite users

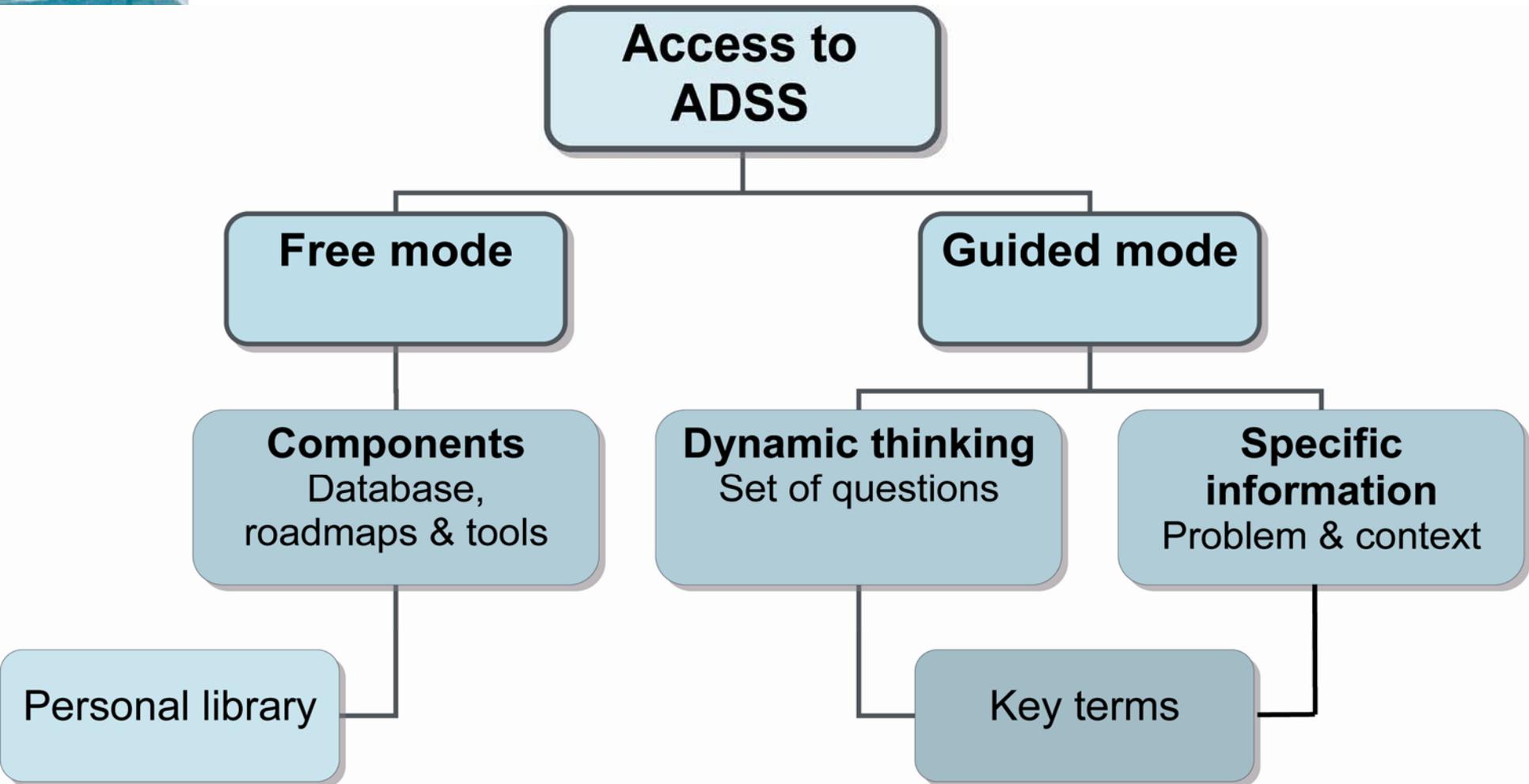


## A. ADSS specific patterns: user modes

- **2 user modes** of the portal
    - **Free browsing** within components: documentary portal, road map, tools
      - Learning process
      - Assistance to project development
    - **Guided tour** through questions/answers or response selection
      - Assistance to **project development** and to the **comparison** of solutions
      - Suggestion of **relevant data**
      - Suggestion of **relevant tools**
- ⇒ *The good data at the good time!*



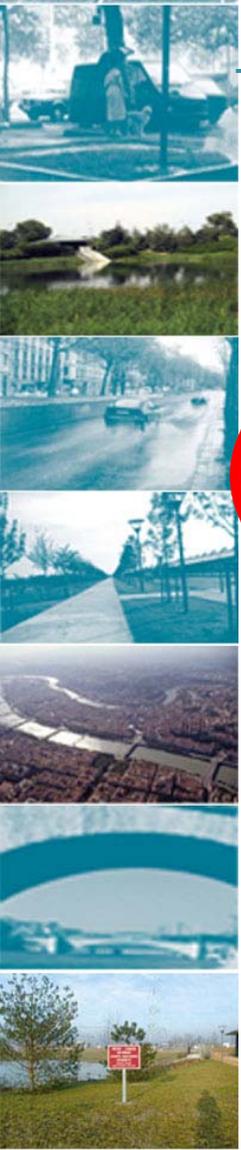
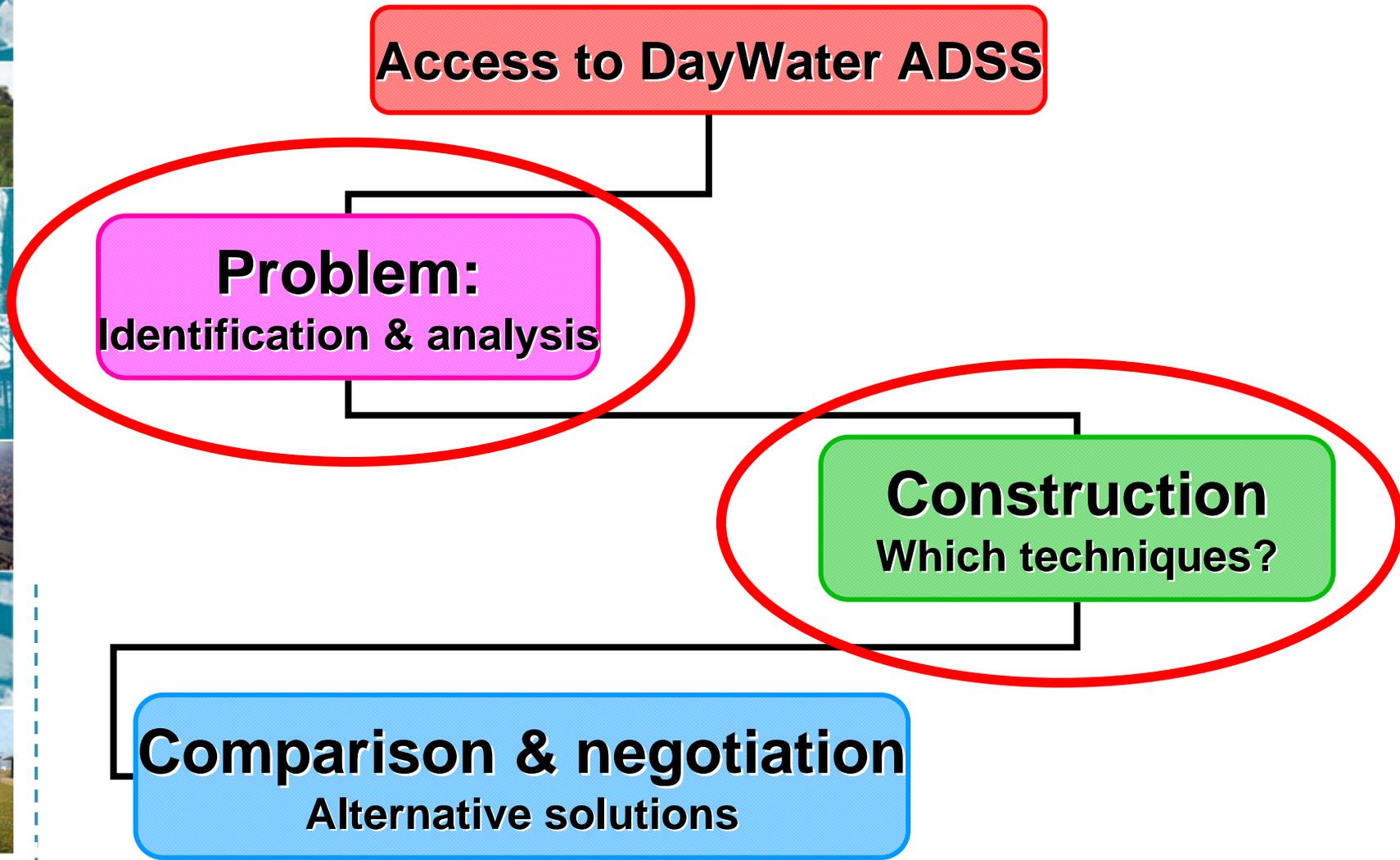
# A. ADSS specific patterns: user modes



# Appendix

- A. DayWater 1 : presentation
- B. DayWater 1 : English version
  - B.1. Free browsing
  - B.2. Guided tour
  - B.3. Cooperation assistance
- C. Return to presentation outline

## B. Decision making process: 4 stages



## B.1. Help in project construction: free browsing

- Data bases easily reachable with the graphic interface **Hydropolis**
  - **Best management Practice (BMP) catalogue techniques alternatives (TA in French)**
  - **Catalogue of urban runoff pollutants** leading to chemical risks
  - Different **use** and **values** of water: awareness building, guidance
  - Different involved **stakeholders** and instruments for **public policy**
  - **Case studies**: finished or ongoing projects

# B.1. Help in project construction: free browsing

- Databases & assistance / guidance

**Day Water**

main menu

- HYDROPOLIS
- help
- settings
- search
- archive
- enter data
- trees of nodes
- users

Thevenot Daniel is logged as **Thevenot** [Logout](#)

**FIRSTPAGE**

 <b>ADSS</b> Adaptive Decision Support System <b>HYDROPOLIS</b>	 <b>BMP</b> comparison on MCC Approach	 <b>BMP</b> catalogue BMP	 <b>Chemical</b> pollutants Pollutants
 <b>Risks &amp;</b> <b>vulnerability</b> Risk and Vulnerability	 <b>Urban</b> dynamics Urban Dynamics	 <b>Tools</b> Tools	 <b>Libraries</b> Libraries
 <b>Guided</b> <b>tour</b> Guided Tour Matrix of Alternatives	 <b>News</b> News	 <b>Site</b> Site Map	 <b>Help</b> Tutorial

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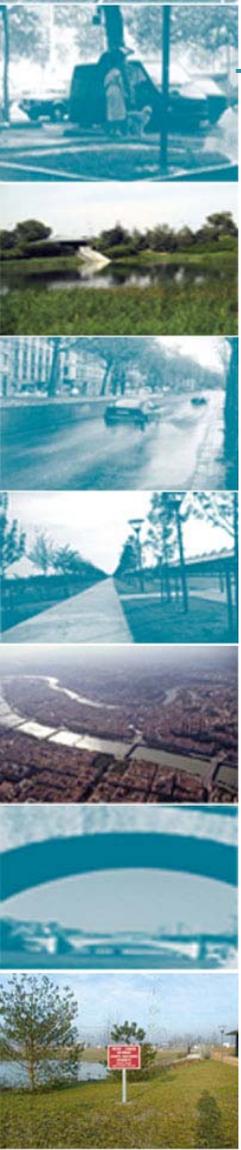
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DayWater web interface v0.07, requirements: IE5.5+, min. resolution 1024x768

powered by php + mysql

# B.1. Help in project construction: free browsing



- **Databases**

- BMPs
- Cases
- Stakeholders...

- **Help, guidance**

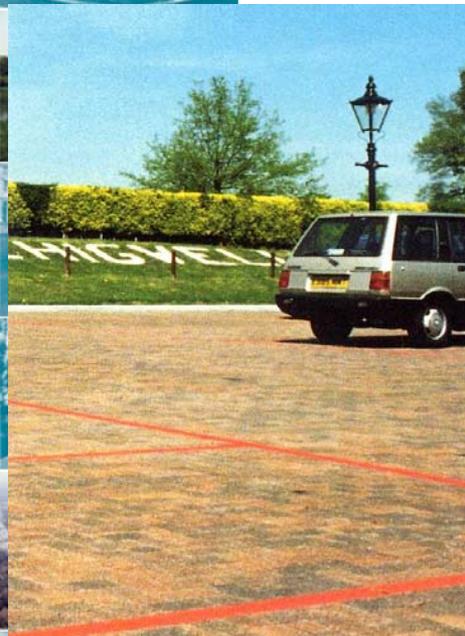
- Water values
- Risks

- **Tools**



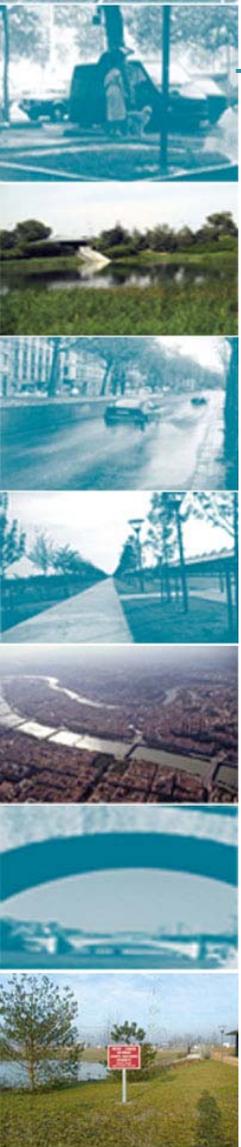


# B.1. Urban storm water source control techniques (BMPs)



**J.B Ellis, MU, 2001**

**C. Cogeze, CG 93, 2002**



- **Characteristics** of storm water source control techniques
  - Pictures
  - Hydraulic & pollution control performance
  - Operation & maintenance
  - Case studies
  - Sources et flux of water and pollutants
  - Cost assessment
  - Design

# B.1. BMP catalogue

## BMP CATALOGUE

SUSTAINABLE URBAN DRAINAGE

### The Design Approach at Oxford

The Design Approach maintains the natural drainage pattern of the site with an existing ditch being the principal route for the discharge of rainfall runoff.

There are a number of 'key elements' to the drainage approach.

- The Amenity Building and Lodge roofwater drains to water features around the buildings, with top-up water provided by recycled wastewater from an on-site lagoon and reedbed treatment system.
- Porous paving for the car park stores and cleans water before discharge to wetland areas lower down the site.
- Impervious blacktop for the HGV parking area, collects water via lined 'french drains' to wetland areas.
- Control points are provided where water quality can be monitored.
- A 'first flush' storage pond, with a shut-off facility, will contain spillages.
- A wetland provides further treatment for pollutants.
- A balancing pond provides shortfall attenuation storage and an emergency environmental 'buffer'.

## Oxford MSA M40 Source Control Design Overview

### Key

- LANDSCAPE CHARACTER
-  Woodland Planting
  -  Boundary Hedgerow
  -  Buildings
  -  Slopes
  -  Grassland
  -  Water

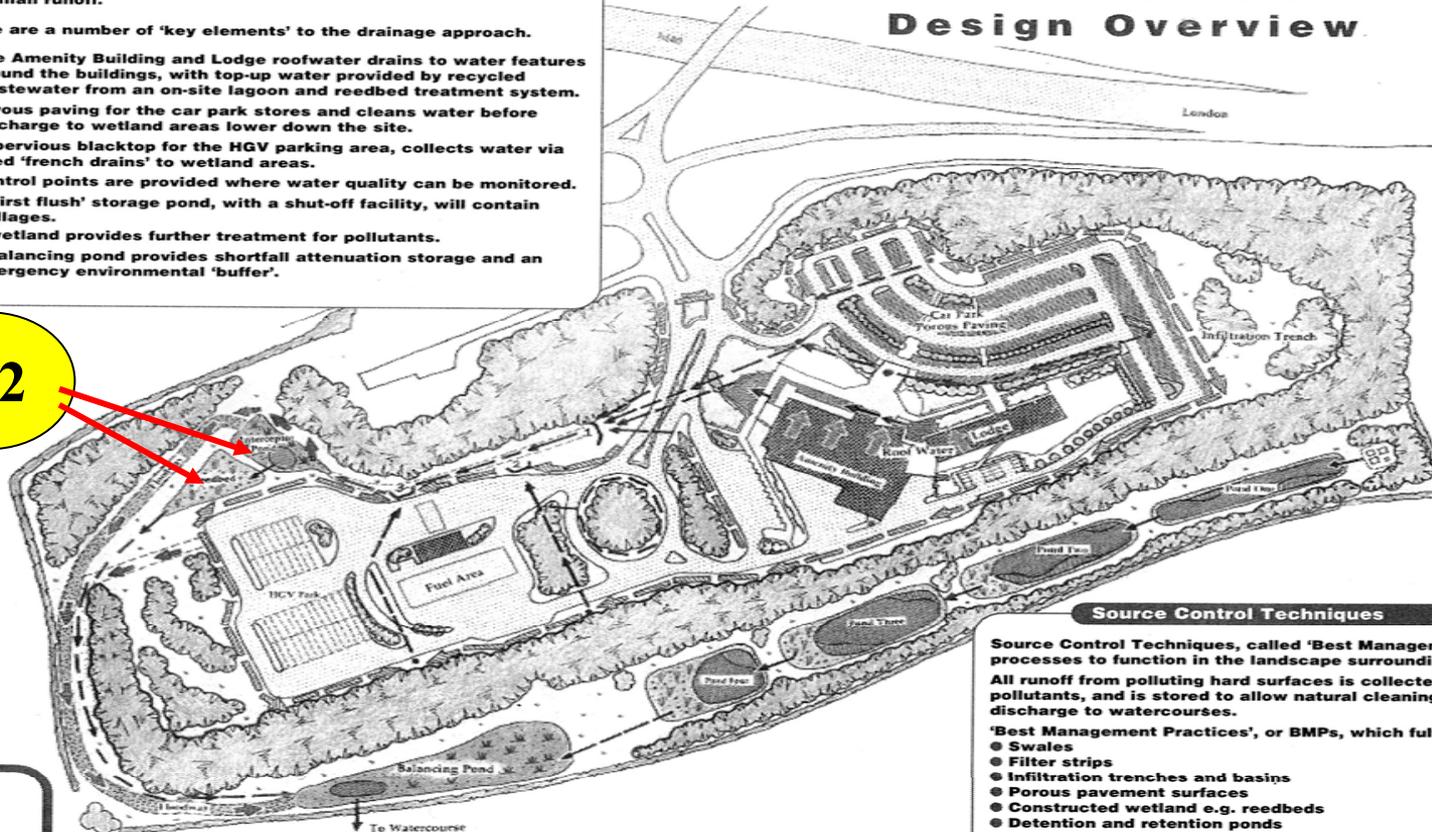
### SOURCE CONTROL ELEMENTS

-  Porous Paving
-  Tarmac
-  Infiltration/Collector Trench
-  Roof Water
-  Wetland
-  Reedbed
-  Floodway

### SOURCE CONTROL PROCESS

-  Direction of Water Flow
-  Storm Overflow
-  Headwalls and Monitoring Sites

1/2



### Source Control Techniques

Source Control Techniques, called 'Best Management Practices', allow natural processes to function in the landscape surrounding development.

All runoff from polluting hard surfaces is collected to remove sediments, which trap pollutants, and is stored to allow natural cleaning of water prior to infiltration or discharge to watercourses.

'Best Management Practices', or BMPs, which fulfil this requirement include:

- Swales
- Filter strips
- Infiltration trenches and basins
- Porous pavement surfaces
- Constructed wetland e.g. reedbeds
- Detention and retention ponds

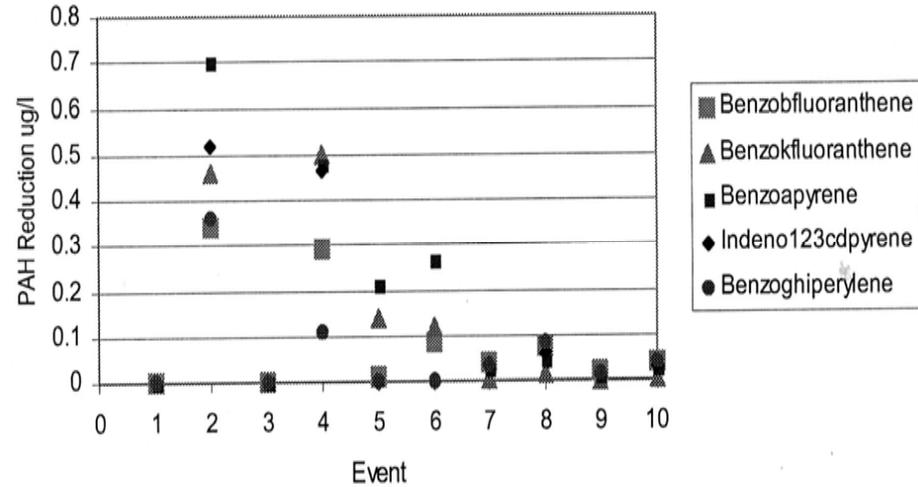
The M40 Motorway Service Area at Oxford demonstrates a 'suite' of BMP techniques to collect, clean and release water slowly to a receiving watercourse.

Telephone: 01453 764885 Fax: 01453 765545



# B.1. BMP catalogue

BMP  
CATALOGUE

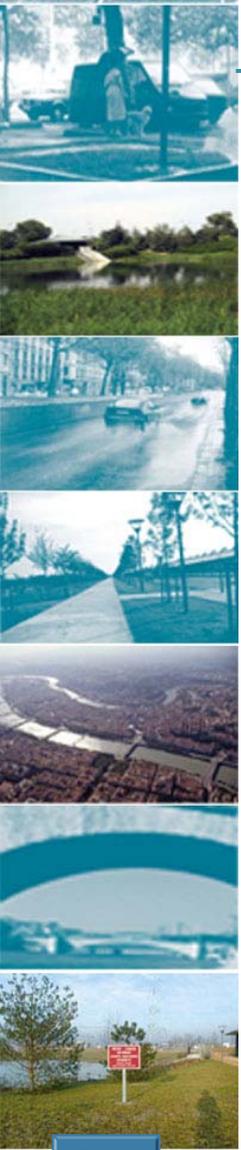


M40  
Oxford  
Service  
Station



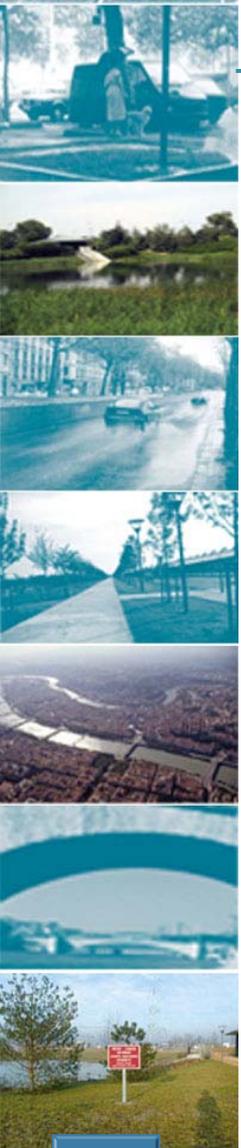
# B.1. Chemical risk catalogue 'CHIAT'

- **Major chemical pollutants** present in urban runoff
  - **Pollutant** selection according to their physic-chemical properties, toxicity, stability, attachment to particles...
  - **Common concentrations**
  - Necessary **pollution treatment** according to the receiving water body
  - In connection to the **chemical priority pollutants** (resulting from risk assessment)

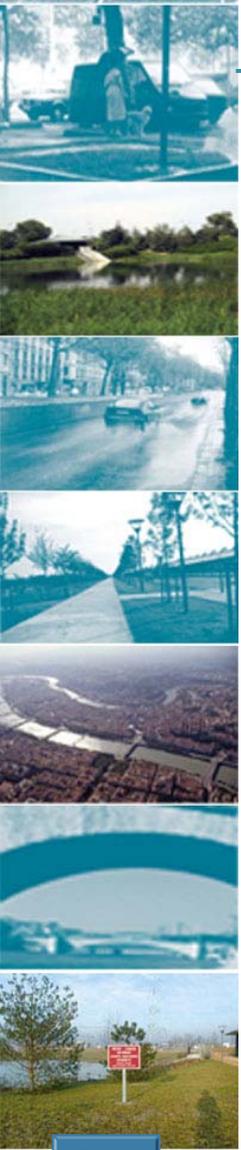


# B.1. Multi-criteria comparison 'MCC'

- Comparison of **all types of BMPs**
  - Using a predefined **set of criteria and indicators**
    - Objective values (or assessed by the user)
    - User defines the weight of each criteria
    - Yielding a priority list
  - Allows a **first classification** of possible techniques
    - Before they are possibly associated
    - Before their design → solutions
    - Before their comparison & negotiation



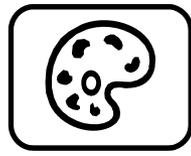
# B.1. Different uses and values of water 'Aspects'



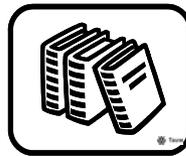
- Presentation of the **values of water** 'Water aspects'
    - **Examples** and illustration for each type
    - Suggestion of **indicators** for each type
- ⇒ For taking into account **urban dynamics**



morale



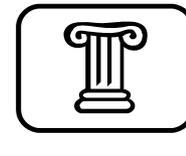
esthétique



légale



économique



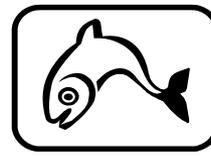
culturelle



sociale



psychologique



écologique



scientifique



technique

## B.1. Stakeholder database 'Stakeholders'

- **List of 18 categories** of stakeholders involved in storm water source control
  - From the project manager to the land designer...
  - Including water, road and park services ...
  - Depending upon the project development phase!
- In association with **real stakeholders**
  - Using **case studies**
- **Links** with other databases

# B.1. Stakeholder database 'Stakeholders'

- **18 categories**
  - 3 languages: English, French, Czech



**Land owner**  
Propriétaire foncier (Fr)  
Vlastník pozemku (Cz)



**Equipment owner**  
Propriétaire de l'ouvrage (Fr)  
Majitel zařízení (Cz)



**Local government**  
Collectivités territoriales (Fr)  
Místní vláda (Cz)



**Developer**  
Aménageur (Fr)  
Developer (Cz)



**Project owner - Contracting authority**  
Maitre d'ouvrage (Fr)  
Projektant (Cz)



**Regulatory bodies**  
Structures publiques intervenant dans l:  
Řídicí orgány (Cz)



**Consulting companies**  
Bureau d'étude (Fr)  
Konzultant (Cz)



**Contractor**  
Maître d'oeuvre (Fr)  
Smluvní partner (Cz)



**Territory association**  
Association pour la qualité du cadre de vie (Fr)  
Oblastní organizace (Cz)



**Environmental association**  
Association pour la défense de l'environnement (Fr)  
Organizace pro životní prostředí (Cz)



**Architect**  
Architecte (Fr)  
Architekt (Cz)



**Landscape architect**  
Architecte paysagiste (Fr)  
Architekt krajinař (Cz)



**Sewer manager**  
Gestionnaire du réseau (Fr)  
Správce kanalizace (Cz)



**Sewer office**  
Service d'assainissement (Fr)  
Úřad pro kanalizaci (Cz)



**Road office**  
Services de la voirie (Fr)  
Správce komunikací (Cz)



**Open spaces office**  
Services des espaces verts (Fr)  
Správce otevřených prostranství (Cz)



**Environment office**  
Services de l'environnement (Fr)  
Úřad pro životní prostředí (Cz)

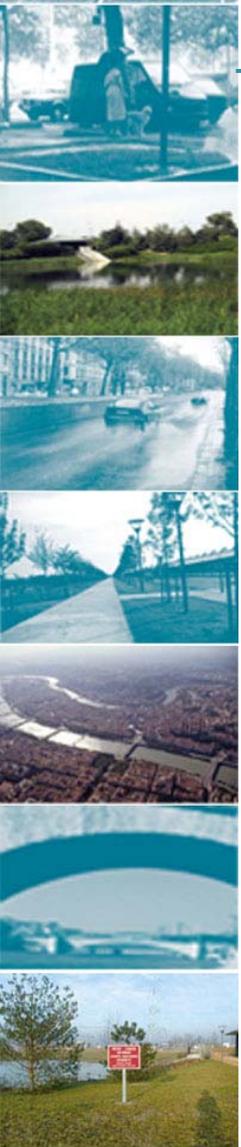


**Urban planner**  
Services de l'urbanisme (Fr)  
Uzemní plánování (Cz)



**Researcher**  
Chercheurs-laboratoires de recherche (Fr)  
Výzkum (Cz)

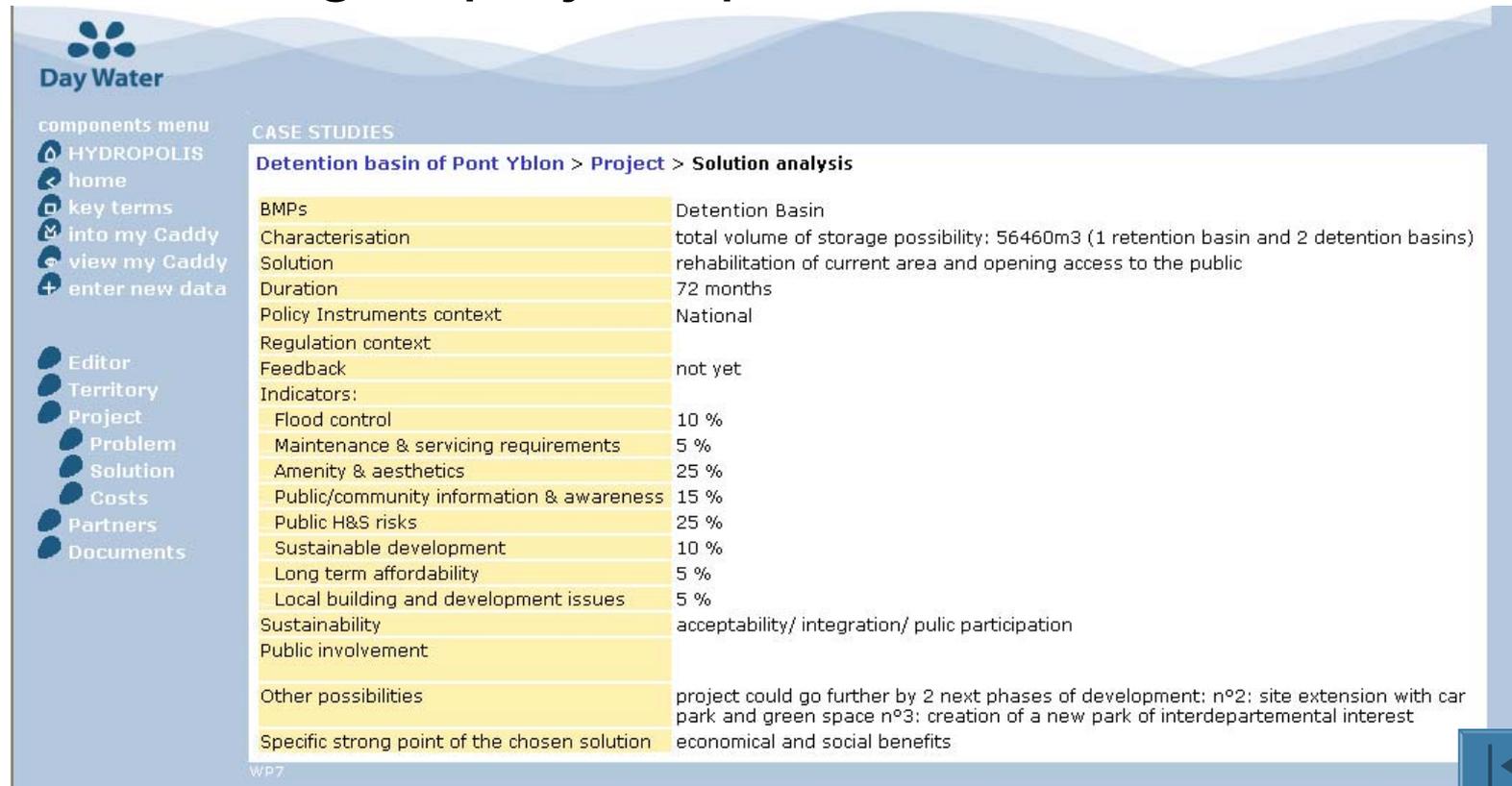
# B.1. Case studies database 'Case studies'



- **Description of real cases**
  - Problem, solution, cost
  - Geographical, climatic, administrative context
- **Indexation** by country or project type
- **Possible addition** of case studies by ADSS users : *in development!*
- **Links** with other databases (with key-terms)

# B.1. Case studies database 'Case studies'

- French case study: **Pont Yblon**
  - Manager, project, partners, texts...



**Day Water**

components menu

- HYDROPOLIS
- home
- key terms
- into my Caddy
- view my Caddy
- enter new data

Editor

- Territory
- Project
- Problem
- Solution
- Costs
- Partners
- Documents

**CASE STUDIES**

**Detention basin of Pont Yblon > Project > Solution analysis**

BMPs	Detention Basin
Characterisation	total volume of storage possibility: 56460m3 (1 retention basin and 2 detention basins)
Solution	rehabilitation of current area and opening access to the public
Duration	72 months
Policy Instruments context	National
Regulation context	
Feedback	not yet
Indicators:	
Flood control	10 %
Maintenance & servicing requirements	5 %
Amenity & aesthetics	25 %
Public/community information & awareness	15 %
Public H&S risks	25 %
Sustainable development	10 %
Long term affordability	5 %
Local building and development issues	5 %
Sustainability	acceptability/ integration/ public participation
Public involvement	
Other possibilities	project could go further by 2 next phases of development: n°2: site extension with car park and green space n°3: creation of a new park of interdepartmental interest
Specific strong point of the chosen solution	economical and social benefits

WP7



# B.1. Policy instrument information database 'PII'



- Menu
- HYDROPOLIS
- Page d'accueil
- Mots-clés
- Ajouter au panier
- Panier

- Methodology
- Examples

## POLICY INSTRUMENTS INFORMATION

### Financial incentives for environmental protection

#### France

##### National

Recently in France some funds have been attributed to storm water management. Some Water Agencies co-fund USWM projects if these projects also assure the pollution abatement. See exemple of Agences de l'eau Saine-Normandie and Rhin-Meuse Some Departments (Conseils g n raux) fund USWM either from their own budget either from the national budget for the infrastructure. Still these financial aids cover only small percentages of the projects and the main funding has to be provided from the municipal budgets and water and sewer fees. However these financial incentives is a good start Stormwater managers wait for new funding to be allocated either by special stormwater fees either from the national budget in the near future. The next law  son water will apparently allow the municipalities to establish a fee for "services provided" which includes stormwater management.

[www.eau-rhin-meuse.fr/agence/aides/aides08.htm](http://www.eau-rhin-meuse.fr/agence/aides/aides08.htm)

[www.eau-seine-normandie.fr/scripts/2\\_mission/2.htm](http://www.eau-seine-normandie.fr/scripts/2_mission/2.htm)

WP7



# Appendix

- **A. DayWater 1 : presentation**
- **B. DayWater 1 : English version**
  - B.1. Free browsing
  - B.2. Guided tour
  - B.3. Cooperation assistance
- **C. Return to presentation outline**

# B.2. Assistance to project construction: guided tour

- Use of a **questionnaire**

**Day Water**

main menu

- HYDROPOLIS
- help
- settings
- search
- archive
- enter data
- trees of nodes
- users

Thevenot Daniel is logged as **Thevenot Logout**

**FIRSTPAGE**

<p><b>ADSS</b> Adaptive Decision Support System</p> <p>HYDROPOLIS</p>	<p><b>BMP</b> comparison</p> <p>MCC Approach</p>	<p><b>BMP</b> catalogue</p> <p>BMP</p>	<p><b>Chemical</b> pollutants</p> <p>Pollutants</p>
<p><b>Risks &amp; vulnerab</b> dynamics</p> <p>Risk and Vulnerability</p>	<p><b>Urban</b> dynamics</p> <p>Urban Dynamics</p>	<p><b>Tools</b></p> <p>Tools</p>	<p><b>Libraries</b></p> <p>Libraries</p>
<p><b>Guided</b> tour</p> <p>Guided Tour Matrix of Alternatives</p>	<p><b>News</b></p> <p>News</p>	<p><b>Site</b></p> <p>Site Map</p>	<p><b>Help</b></p> <p>Tutorial</p>

**Welcome**

The web application you have just arrived at is the product of DayWater project and is called Hydropolis. It is a web based ADSS and should provide you with guidance in your USWM projects.

**What's ADSS**

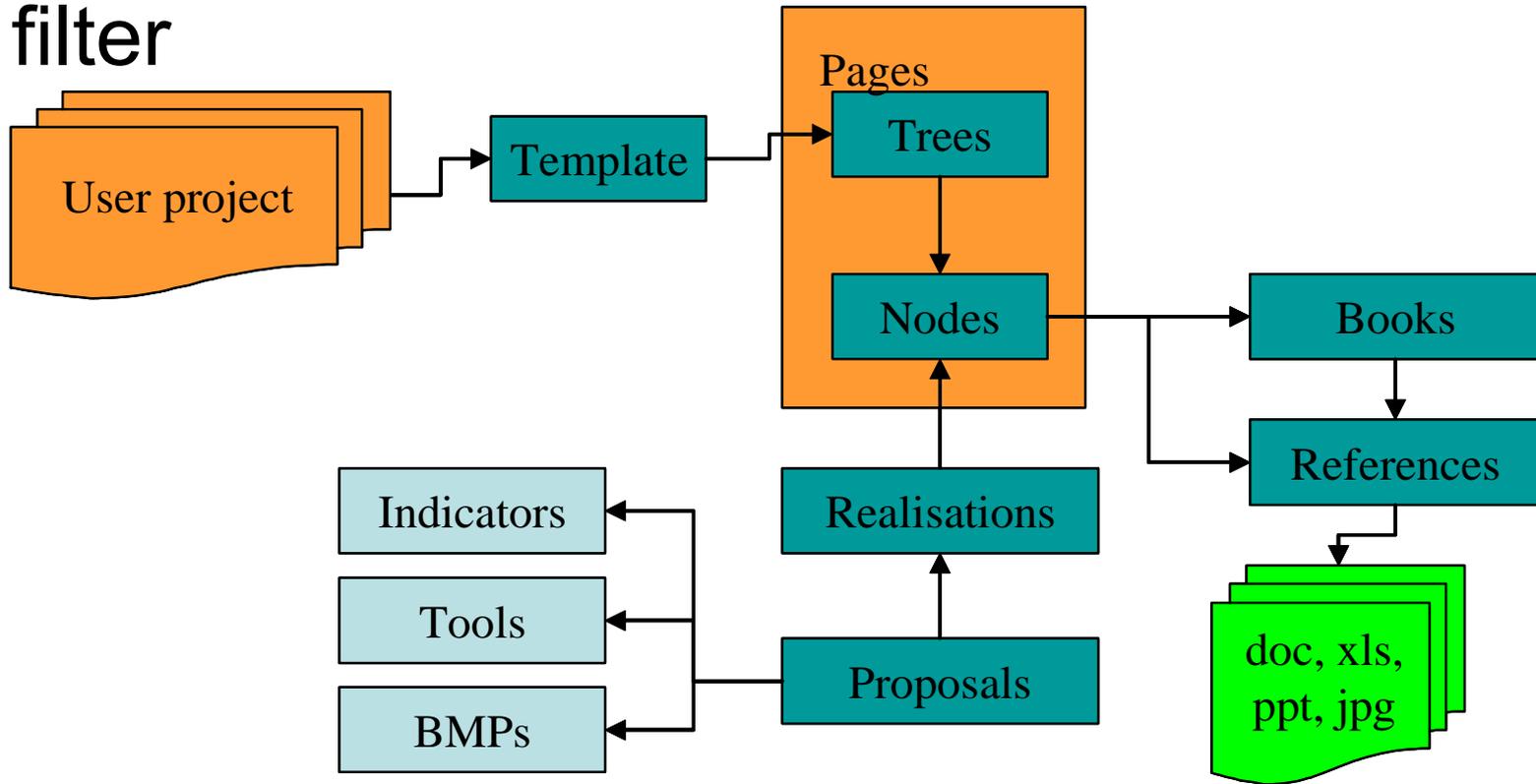
ADSS stands for "Adaptive Decision Support System". In the scope of DayWater project the ADSS is a computerised instrument, which will support decision making in stormwater management in order to find the best suitable measures by adapting to different stakeholder's problems. You will find there not only extensive libraries but also tools, methodology and real-world case studies. Come in ...

DayWater web interface v0.07, requirements: IE5.5+, min. resolution 1024x768

powered by php + mysql

## B.2. Assistance to project construction: guided tour

- Answers to **questions** related to the project & user → key-terms → smart filter





# B.2. Knowledge tree: help menu



- main menu
- PAGE D'ACCUEIL
- Aide
- Paramètres
- Vos archives
- Nouvelles pages
- Partenaires

Guest  
connecté en tant que  
guest  
**Déconnexion**

PROJECTS  
Retour à l  
**Project P**  
Shortcut:  
Name:  
Comment  
Document  
**Question**  
Pla  
This  
and  
Interface D

http://localhost/index.php?p=projectreport&id=249 - Microsoft Internet Expl...

- **Comment:**

### Urbanisation

- **Question:** What are the types of land uses on your territory?
- **Answer type:** Options set [radio]
- **Answer:** Do not know
- **Comment:**

### Other restriction / Go to next page

- **Question:** Is there any other specific restriction in your territory that you have to take into account in your project
- **Answer type:** Single text
- **Answer:** You can add here any comments concerning these restrictions.
- **Comment:**

### Capacity

- **Question:** In term of capacity, do you have:
- **Answer type:** Options set [check]
- **Answer:**
- **Comment:**

### Vulnerability assessment

- **Question:** How do you estimate the vulnerability of your territory ?
- **Answer type:** Options set [radio]

?

or your planning assessment

**Save as**

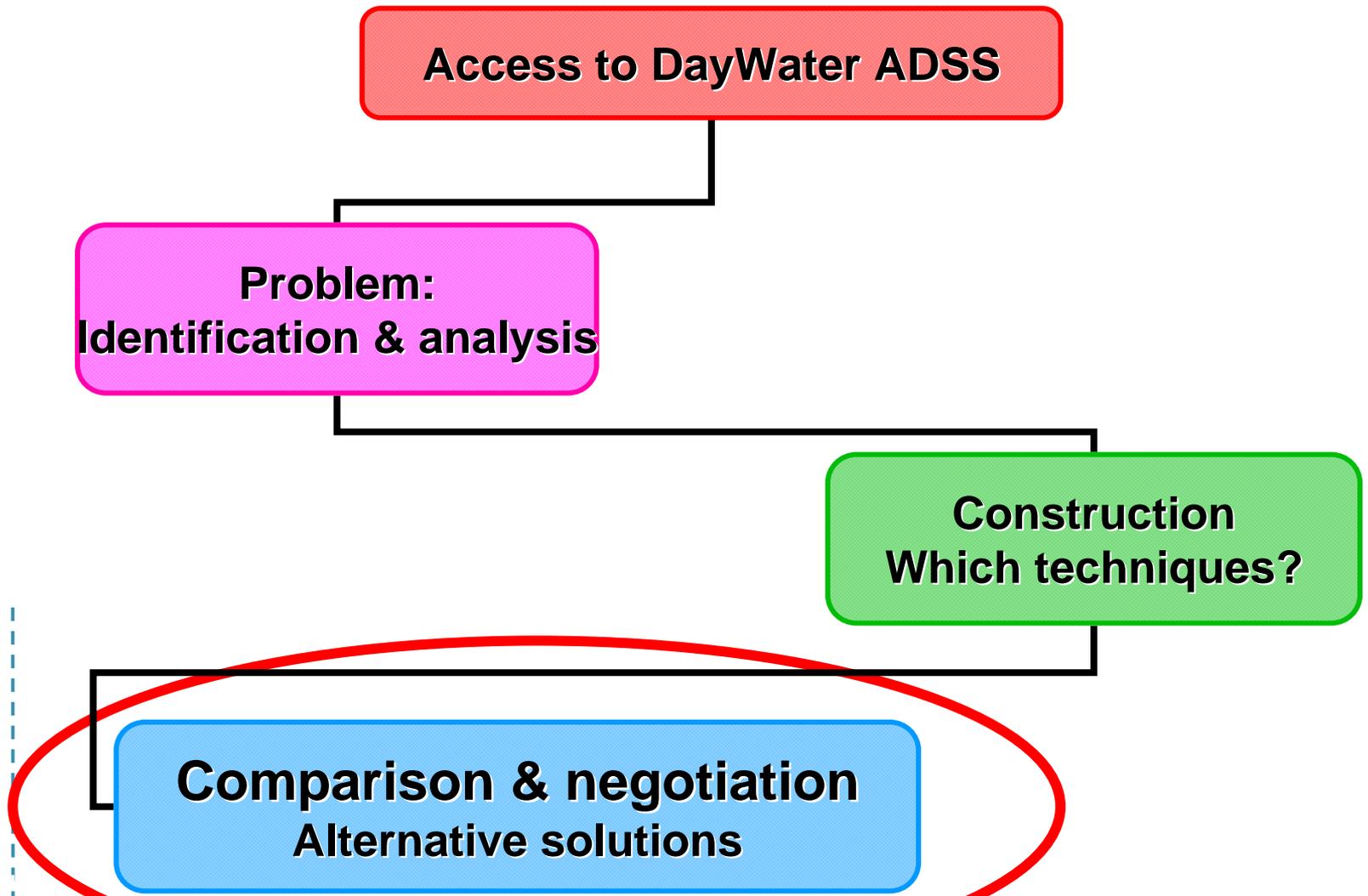
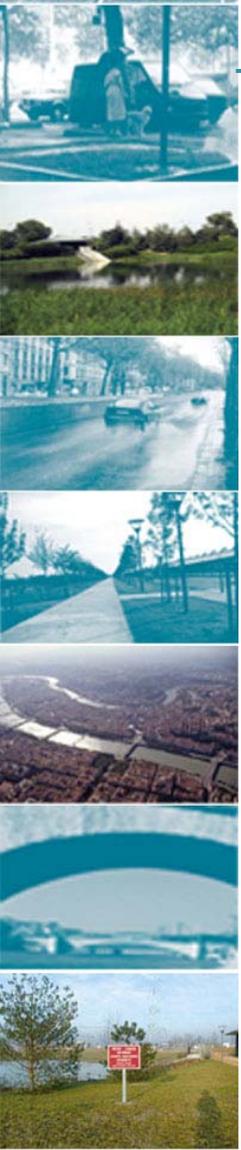
# Appendix

- A. DayWater 1 : presentation
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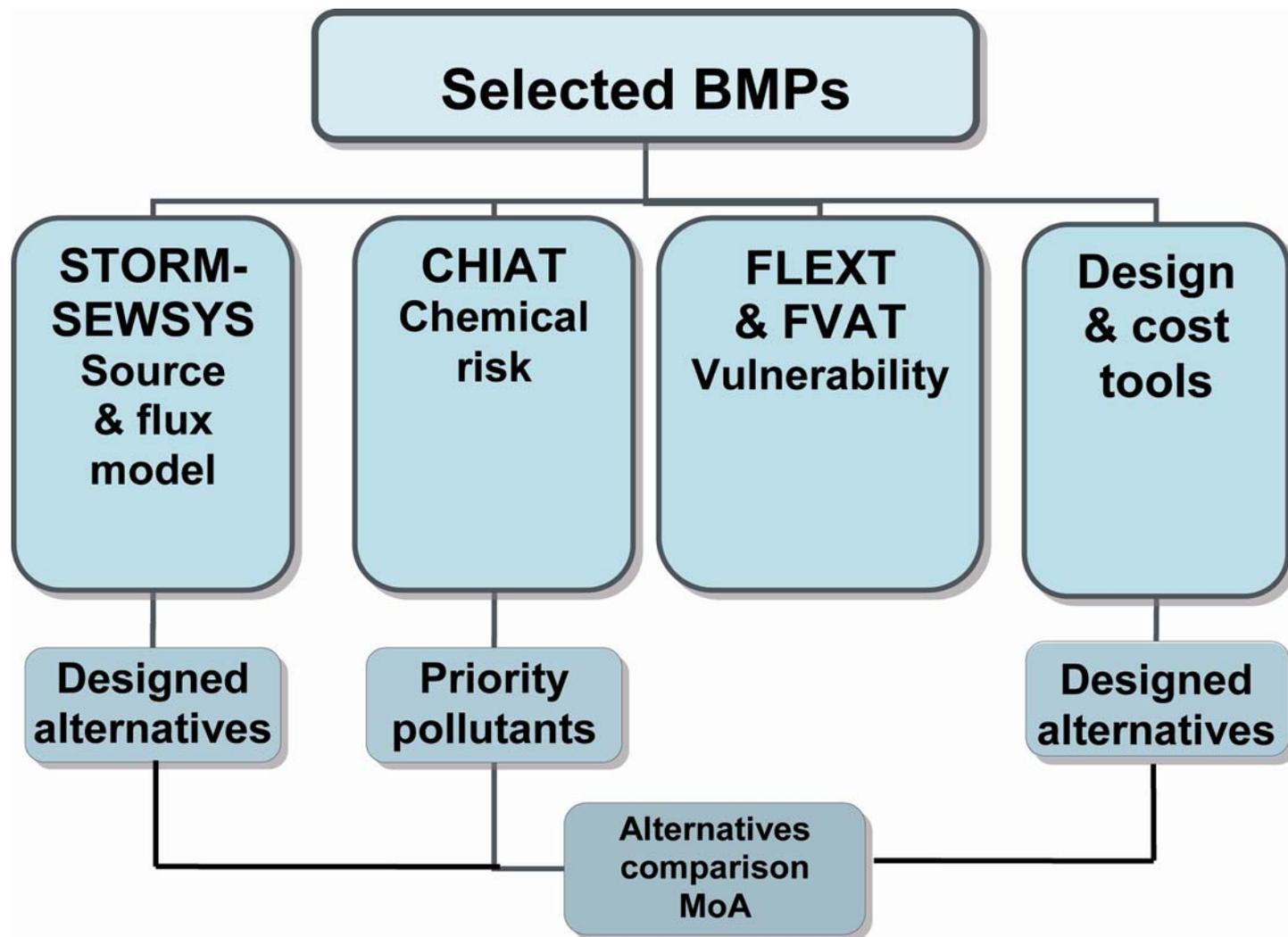
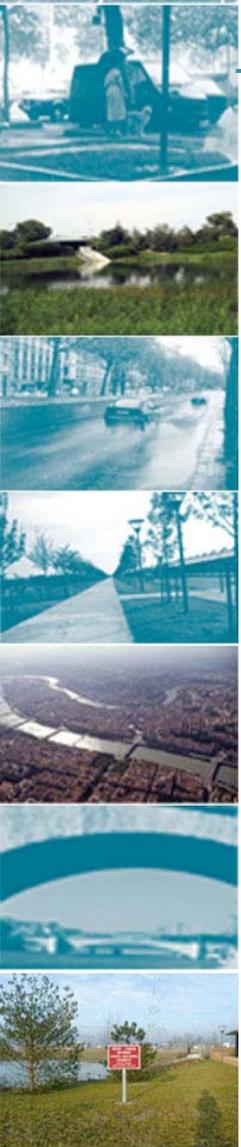
## B.3. Cooperation assistance

- Use of an initial set of **questions**
  - Project characteristics
    - System, context, problem
  - ADSS user characteristics
    - Knowledge level, main interest...
  - Gives automatically values to key-terms
  - Key-terms used to suggest to the user
    - Techniques (BMPs)
    - Illustrations
    - Tools → **relevant information at the appropriate time!**

# B.3. Cooperation assistance

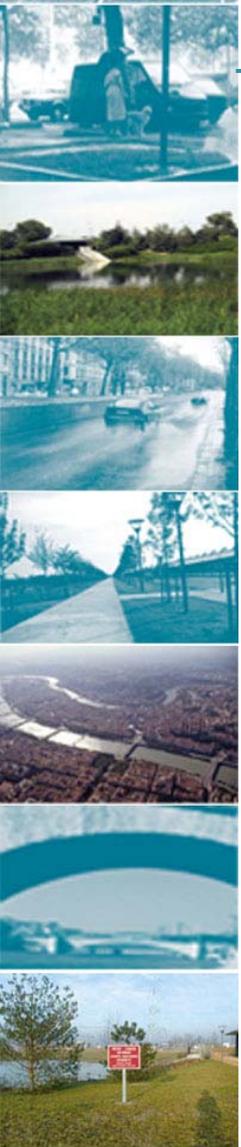


# B.3. Cooperation assistance



## B.3. Cooperation assistance: comparison of solutions

- Last step in the **decision making**
- **Possible association** of several BMP techniques or uses
- **Design** of the selected techniques
  - Construction of solutions: ‘Alternatives’
- **Comparison of these solutions** by each involved stakeholder ‘Matrix of alternatives’
  - Negotiation between stakeholders



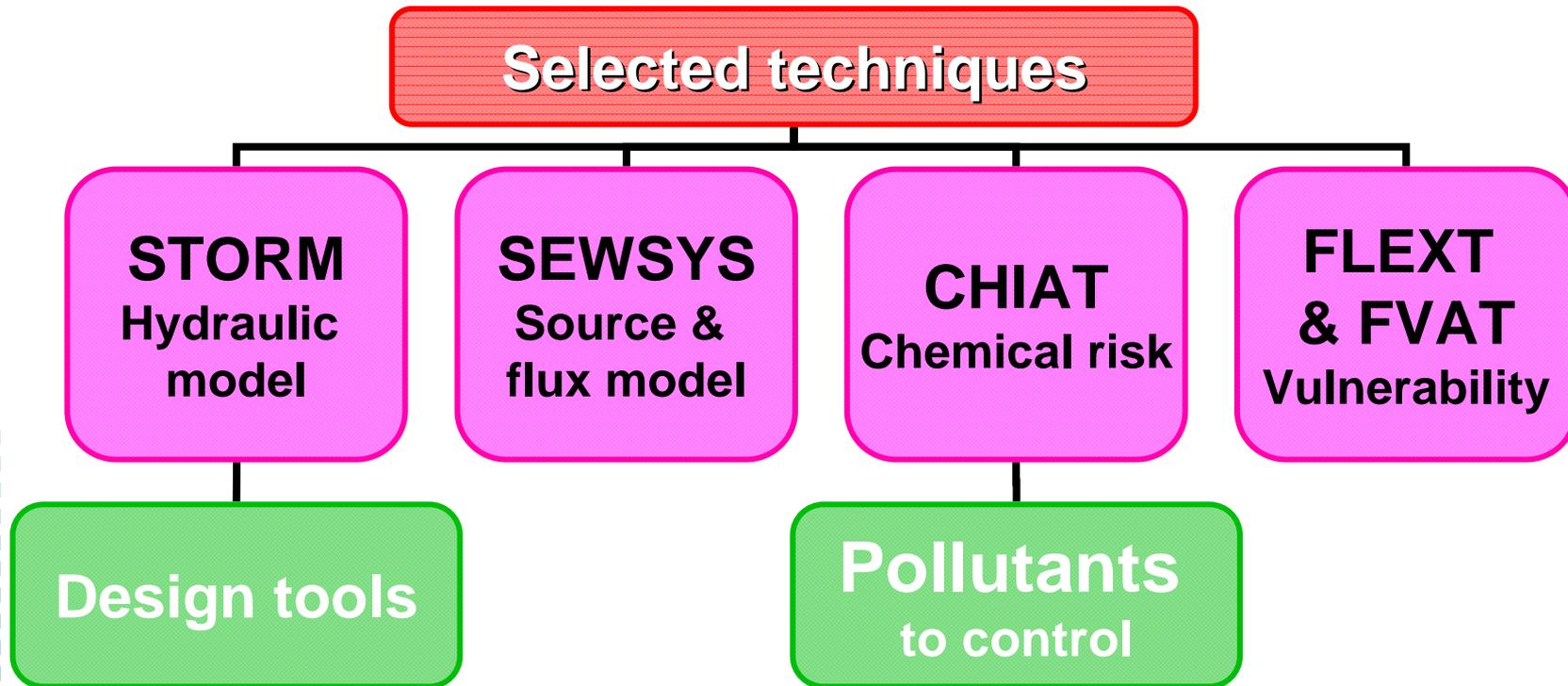
## B.3. Decision support: solution definition

- **Association** of several BMP uses in a **dense urban district (Clichy-sous-Bois)**
  - Athletic field & runoff storage (Maurice Audin)



## B.3. Decision support: solution definition

- **Dimensionnement** des techniques



## B.3. Decision support: solution definition

- **ADSS external tools**

- **Versatility** given to the user to use his/her **common tools**
- **XML interfaces** with the ADSS for easy dialogs
- **Developed** by partners on their own Internet sites
  - Continuous development and enrichment (after the end of the European programme)
  - Links from the ADSS

## B.3. Matrix for solution comparison

- **Aim: solution selection** by stakeholders involved in the project
  - Selection of possible **source control techniques**
  - Selection of the **planning** scenario
  - **Indicators** used for assessment and comparison
  - Using the « indicators » database



