EXPERIENCES IN IDENTIFYING AND INVOLVING STAKEHOLDERS AND END-USERS IN THE FLOODRISK PLANNING

Sala Vivaldi, Centro Don Orione Artigianelli

VENICE – 13 of september 2010

26th OF SEPTEMBER 2007:

THE VENICE FLOOD

POST EVENT COMMISSIONER ACTIVITY

Eng. Mariano Carraro

Deputy Commissioner for the emergency concerning the 26th of September 2007 extreme meteorological event that affected part of the territory of Veneto Region

Commissario Delegato per l'emergenza concernente gli eccezionali eventi meteorologici del 26 settembre 2007 che hanno colpito parte del territorio della Regione Veneto

Presidenza del Consiglio dei Ministri
Dipartimento della Protezione Civile

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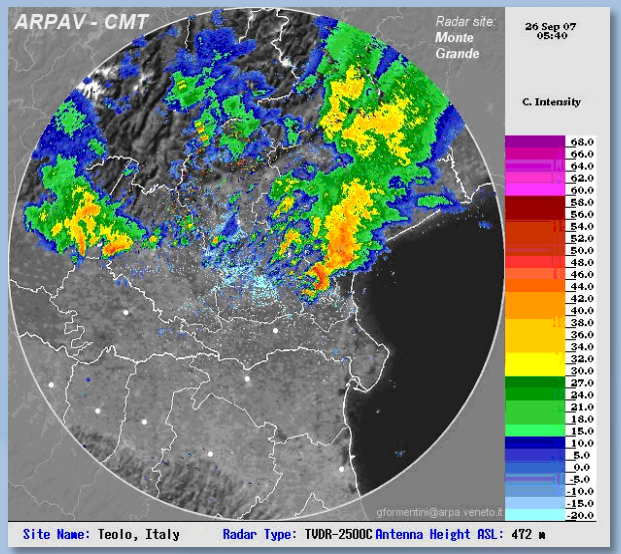
METHEOROLOGICAL SETTING:

The extreme events in the Venetian area.

The 26th of September 2007, early in the morning, an intense thunderstorm affected the coastal area of Veneto Region; the thunderstorm was focused on the surroundings of Venice, undermining sewerage and urban draining system.

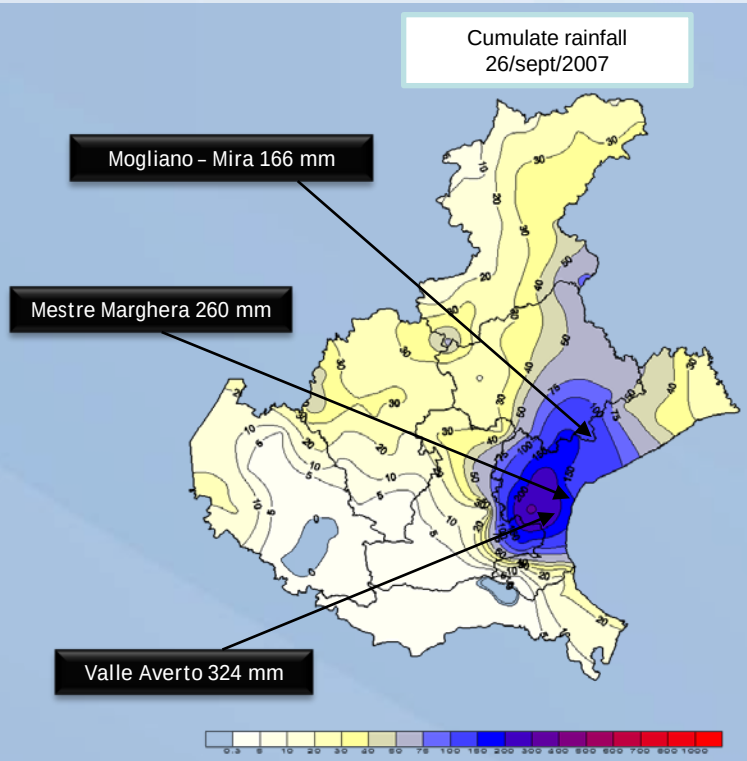
The Venetian coastal area is characterized by the possibility to be affected by extreme meteorological events, in fact, a similar thunderstorm affected the same area in September 2006, causing damages at houses and infrastructures. A similar event interested the same area in August 2010



The intense rainfall was concentrated on a small area.

At the end of the event, in the area most affected by the thunderstorm the rain-gauges recorded as cumulate rainfall:

Valle Averto (VE): **324** mm
Mestre (VE): **260** mm
Mogliano (TV) - Mira (VE): **166** mm
Codevigo (PD): **160** mm
Roncade (TV): **128** mm
Cavallino Tre Porti (VE): **123** mm
Venezia: **119** mm

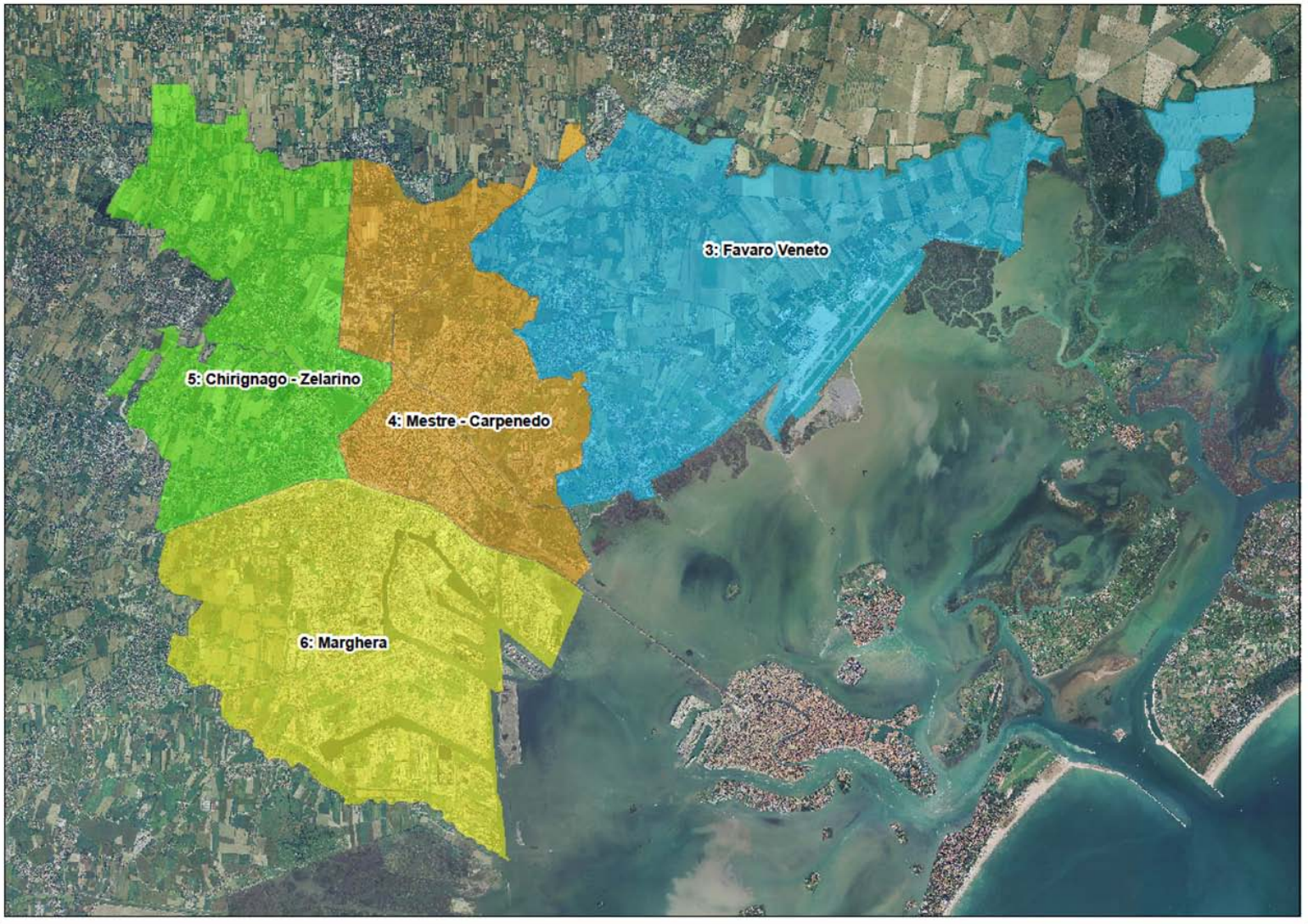


The event was concentrated in the space of 6 hours especially between 4:00 AM – 5:00 AM UTC

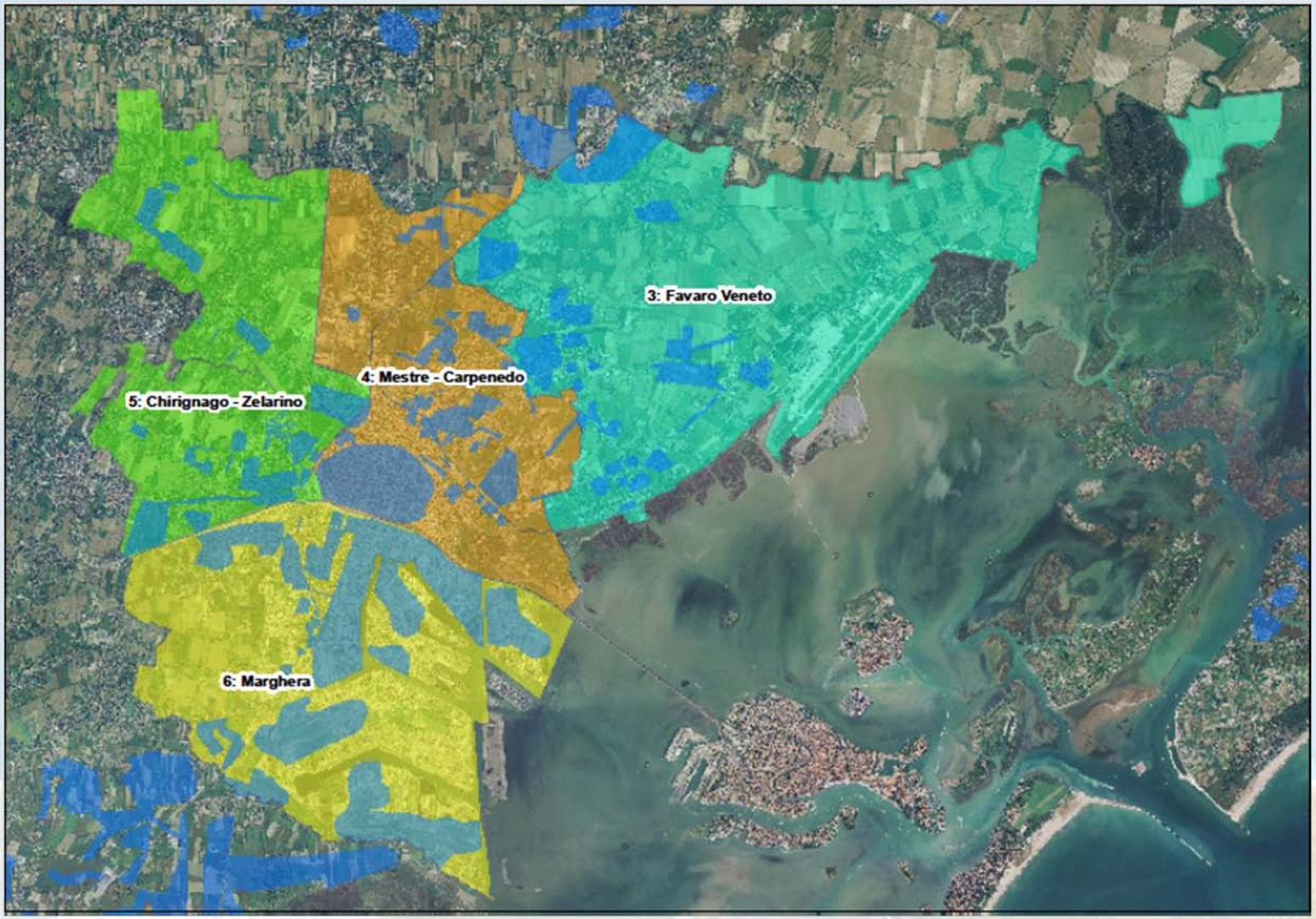
Stazione	Prec. (mm) 5 minutes	Prec. (mm) 30 minutes	Prec. (mm) 1 hour	Prec. (mm) 3 hours	Prec. (mm) 6 hours
Mestre-Marghera	24	90	125	200	250
Valle Averto	17	75	105	250	300
cloudburst:		40	60	80	

Average annual precipitation for the area ≅ 1000 mm.

VENETIAN MAINLAND MUNICIPALITIES



VENETIAN MAINLAND MUNICIPALITIES – flooded areas (blue color)



EFFECTS:

Flood caused damages at:

- Infrastructures;
- Houses;
- Agriculture;
- Partially blocked commercial and emergency traffic

HUMAN ACTIVITIES, ESPECIALLY THOSE RELATED TO WIDESPREAD URBANIZATION THAT HAS AFFECTED LARGE PART OF FORMERLY AGRICULTURAL AREAS .

- **increasing of the impermeable surfaces;**
- **strong reduction of the secondary drainage;**
- **urban sewerage underestimated relating to the increasing of urban areas;**
- **less general attention to the issue of water drainage**

This has led to frequent flooding (even three or four times a year) of areas inhabited by long time, which, until few years ago, had never suffered the effects of these phenomena.

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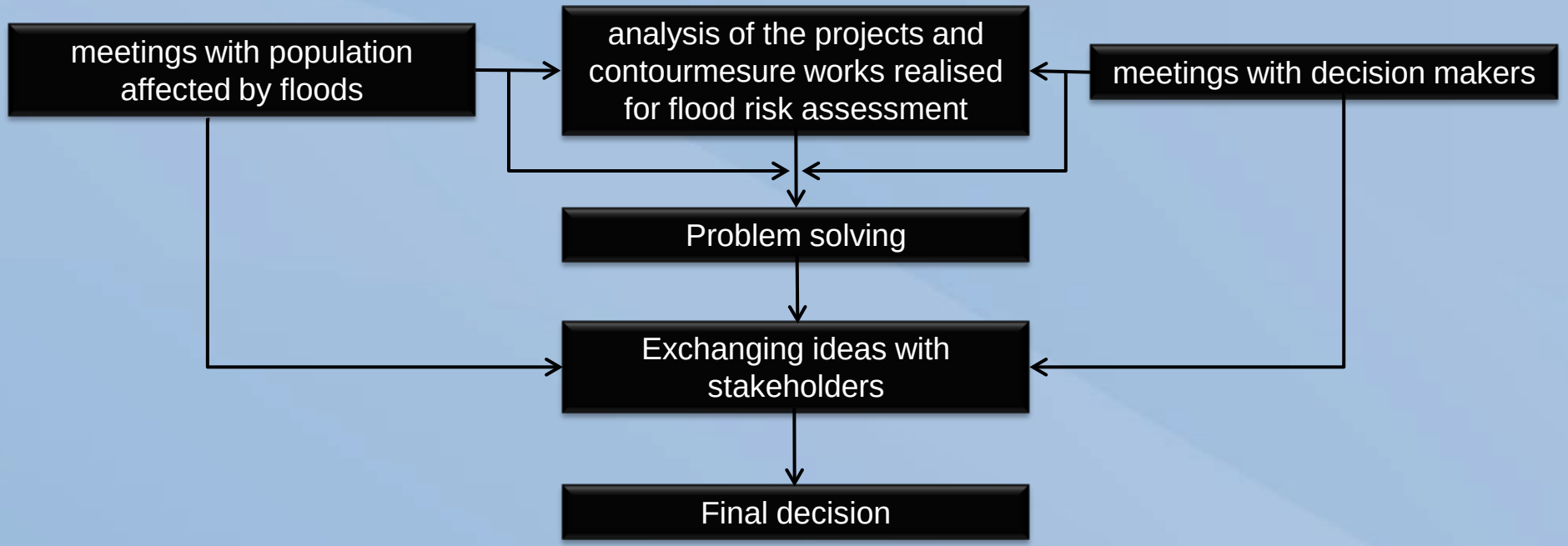
POST EVENT ACTIVITY:

The commissioner activity was especially focused on reduce the inconvenience resulting from exceptional heavy rainfall, and in particular:

- **General overview of all the hydraulic infrastructures projected, in study or under approval by appropriate offices;**
- **Classify the projects on the basis of importance and possibility to be achieved;**
- **Immediate action to promote ditches maintenance;**
- **Involve all the decision makers that operate on the area in order to reach common and shared objectives.**

The commissioner priority was to involve those stakeholders, that normally do not cooperate together, in every steps of the decision making following the scheme:



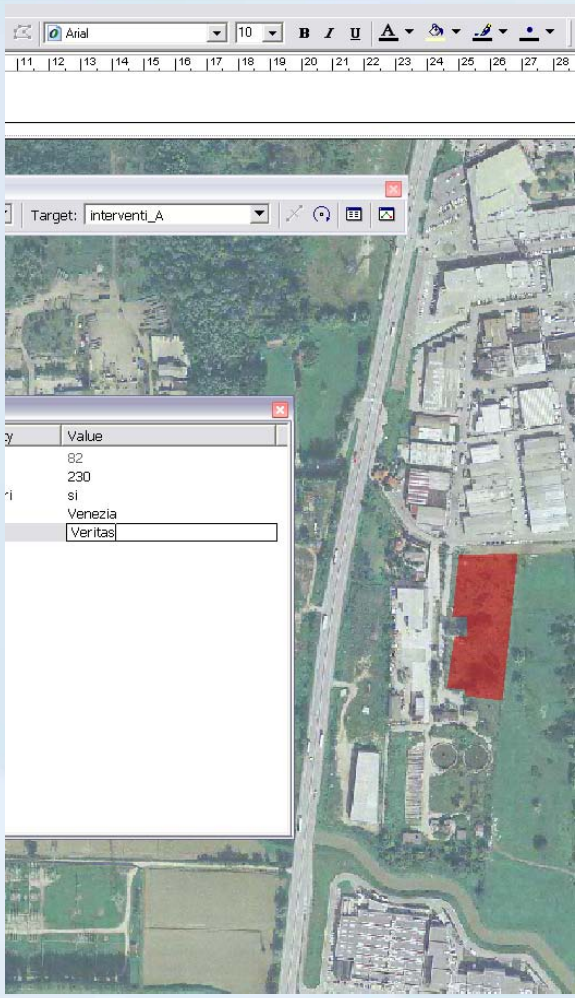
GIS and WEBGIS:

Constitution of a Geographic Information System in order to allow the localization, visualization and analysis of the interventions aimed at flood risk mitigation

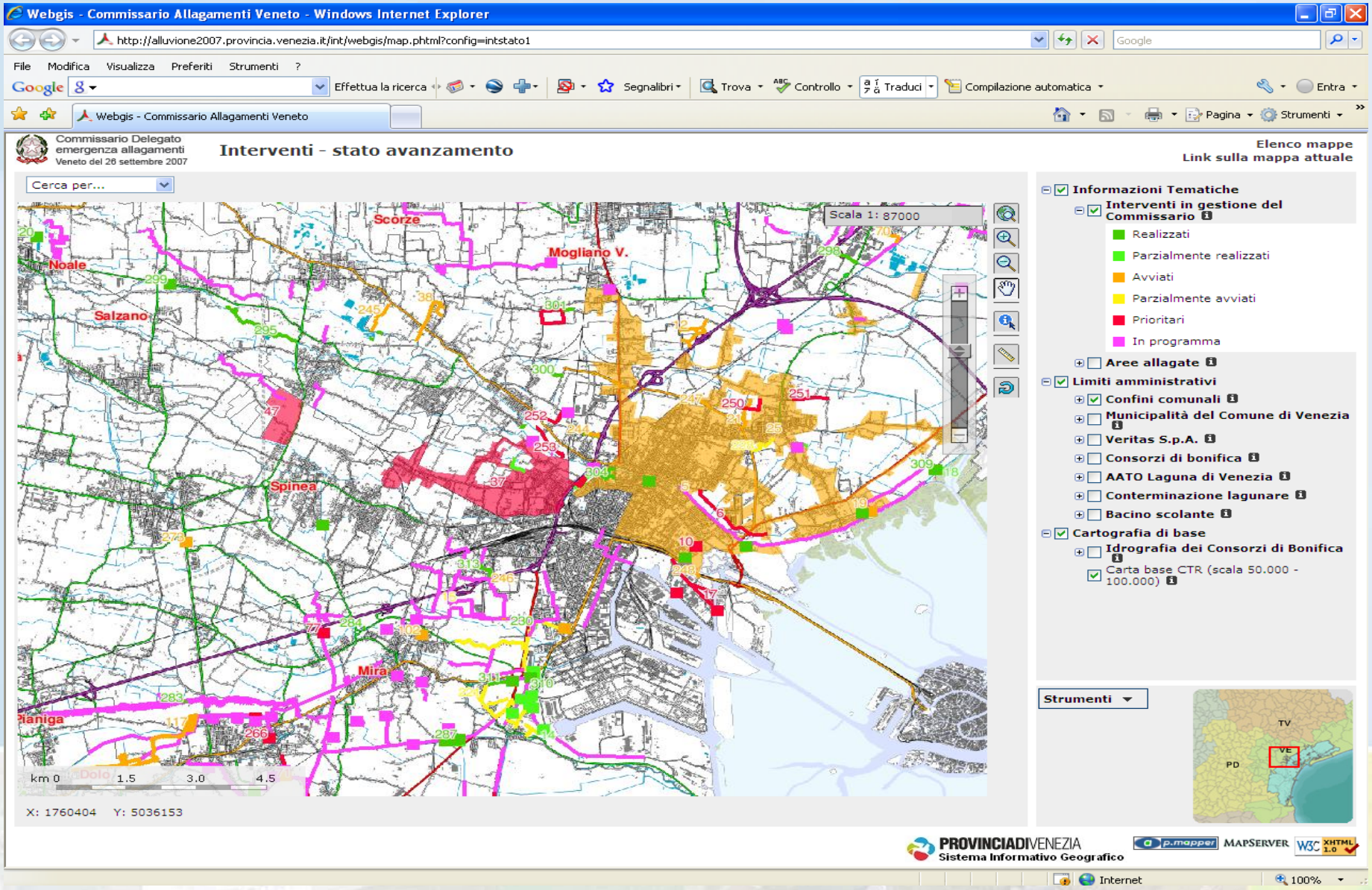
The information contained in the database will be used for future urban planning

The WebGIS will allow anyone to visualize, in addition to localization, even the status of implementation of each programmed interventions

http://alluvione2007.provincia.venezia.it/int/webgis/map.phtml?config=intstato1



WEB GIS – GEOGRAPHIC INFORMATION SYSTEM



Number of actions-interventions

	N°	Cost (million €)	Funding (million €)
Programmed before the event	321	367	224.6
In emergency	59	53.6	5
TOTAL	380		
Realised	131	22.3	22.3
Concretely started	33	57.5	54.8
Started	56	106	103.3
Priority	24	57.8	57.8

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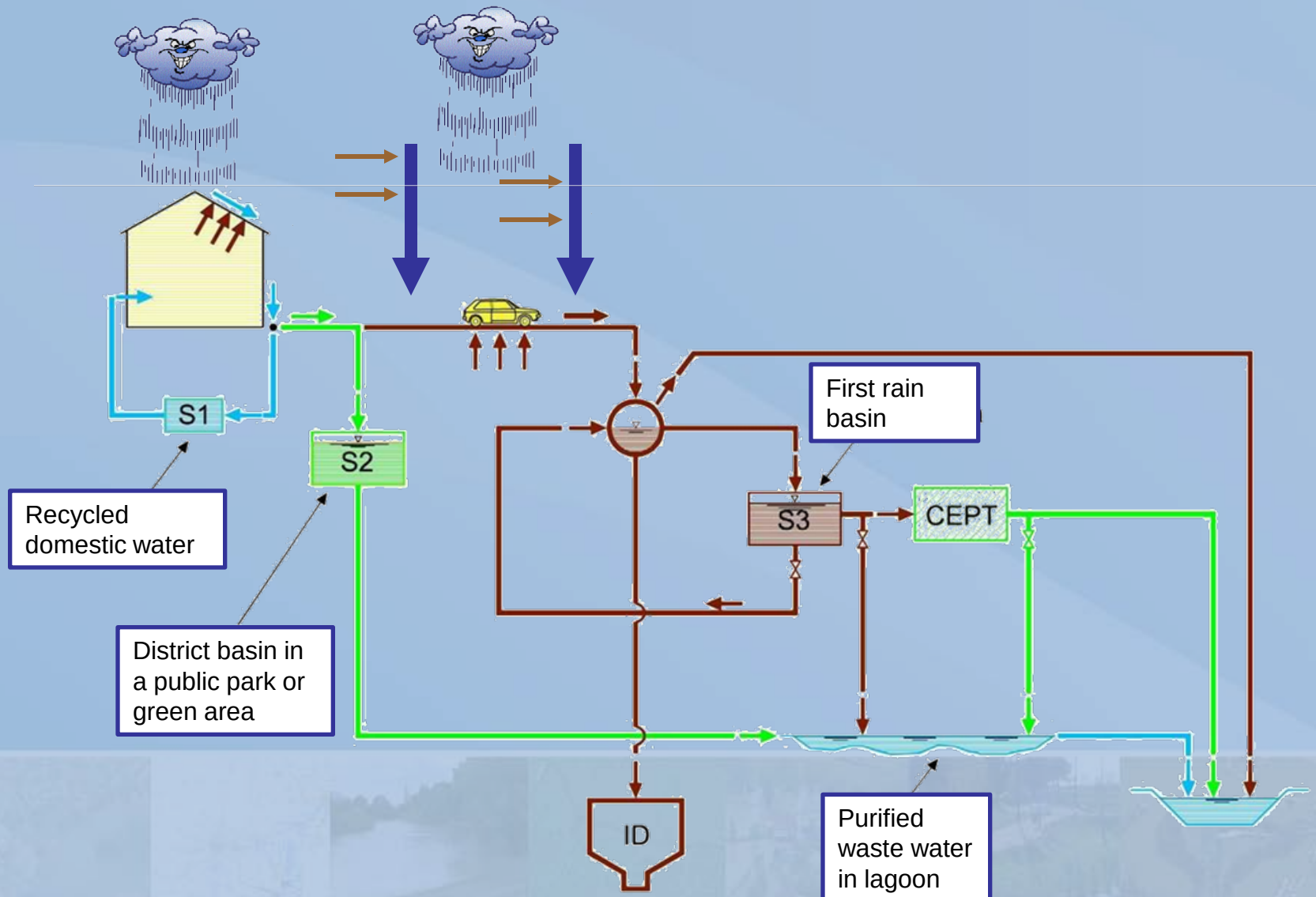
URBAN TRANSFORMATION

CURRENT SITUATION OF URBAN AREAS: typical runoff composition

	Fraction occupied (P)	Inflow rate (K)	contribution (P x K)	Runoff volume (rain intensity 50 mm/hr (m^3/ha h)
Pubblic parks	0.10	0.20	0.02	**10**
Roads and parking	0.30	0.50–0.80	0.15–0.24	**95**
Roofs	0.30	0.90	**0.27**	**135**
Private areas	0.30	0.30–0.70	0.09–0.21	**75**
TOTAL	**1.00**		**0.53–0.74**	**315**

IDEAL DIAGRAM FOR WATER DISPOSAL

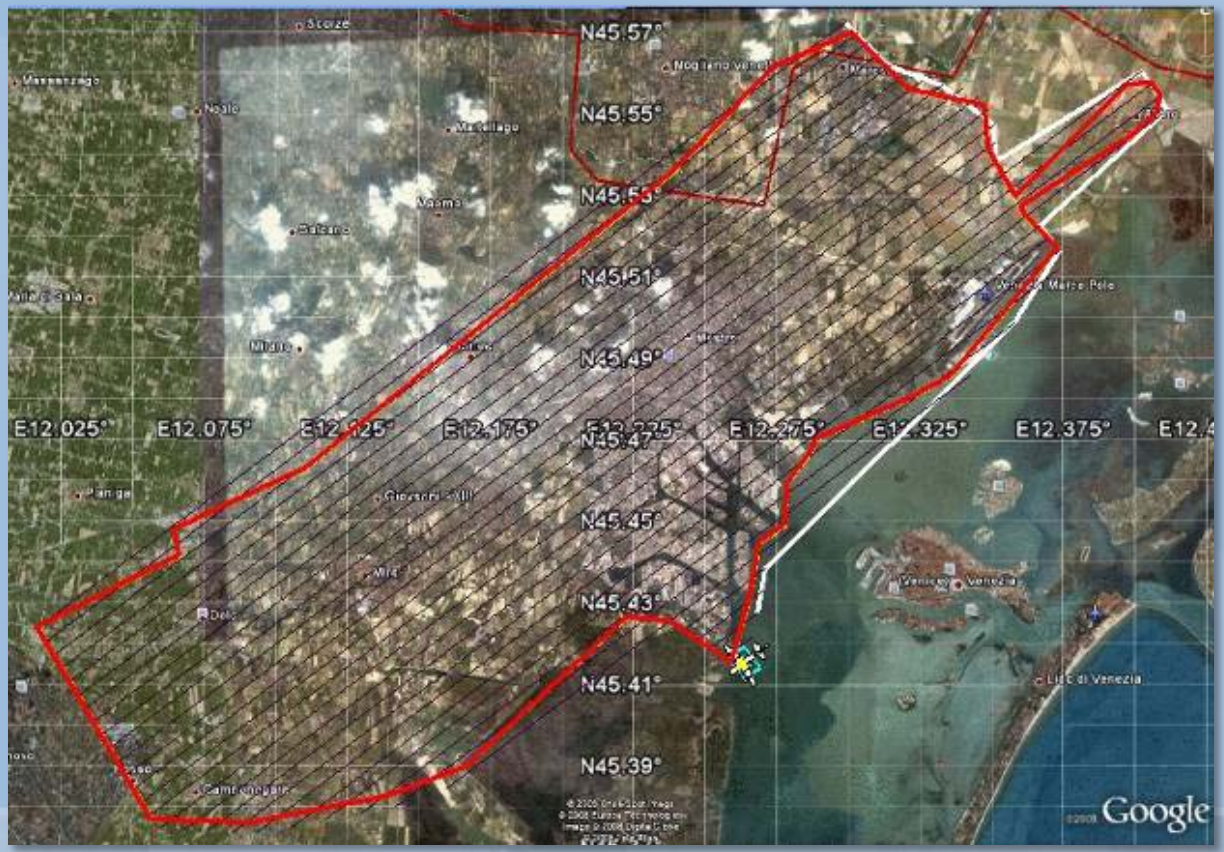


MAIN AIM: **urban transformation within the principle to do not cause a worsening of the flood peak discharge**

Within the activity planned by Deputy Commissioner three specific measures concerning this topic have been carried out :

- **Ordinance n. 2 -** ***Provisions regarding the hydraulic efficiency of buildings projected and approved by appropriate offices but not yet started***
- **Ordinance n. 3 –** ***Provisions regarding new urban grants***
- **Ordinance n. 4 –** ***Provisions regarding sewerage connections***

LASER SCANNER OF VENETIAN LANDFORM



Surface scanned by LIDAR

The High Resolution DEM, based on LIDAR data, has been made to support decision makers and to run hydraulic models to better evaluate the runoff of the area.

The scan performed on a flight altitude of about 900 m, has provided data with a density of 3.33 points per meter

The commissioner activity was also focused on make aware public administrators, private companies and citizens about the effects of meteorological extreme events in the venetian landforms

To do that 2 different Guidelines have been drown up:

- *EVALUATION OF HYDRAULIC COMPATIBILITY*

- *FLOOD RISK ASSESSMENT AND MITIGATION OF THE EFFECTS*

Urban area

- Manhole cover
- Inadequate draining system
- Bridges and admittances

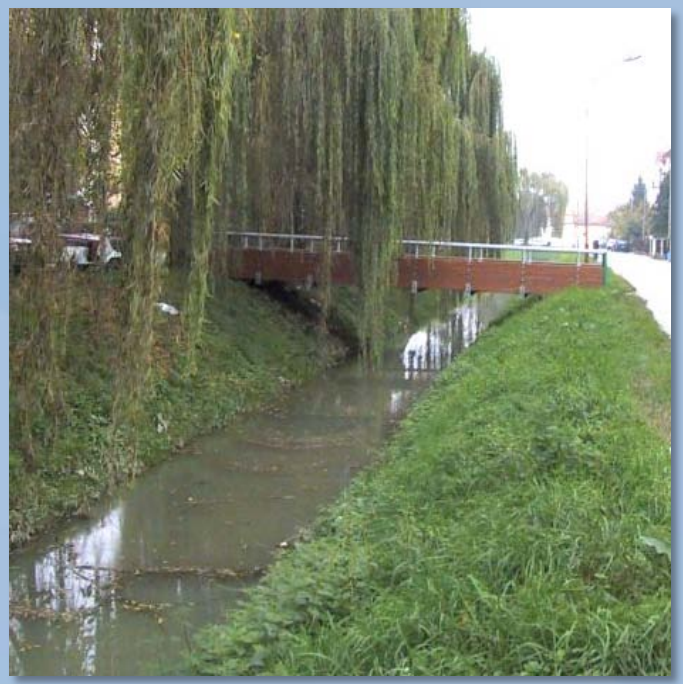
Manhole and ditch cover

Ditch cover = loss of drainage capacity

Ditch open = maintenance of drainage capacity

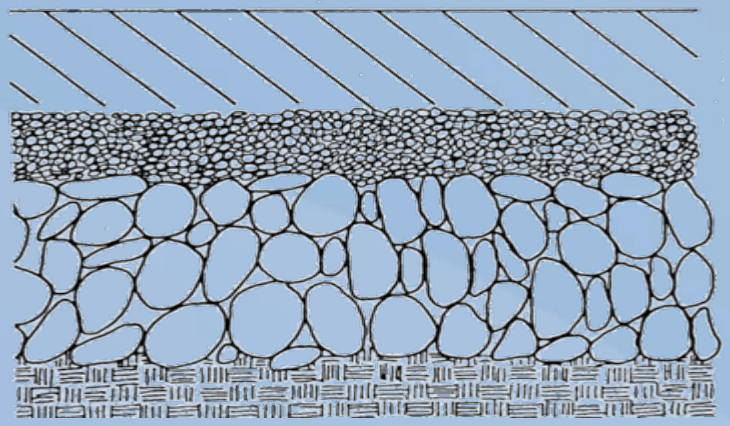
Bridges and admittances

With pipes = section reduction – drainage problems



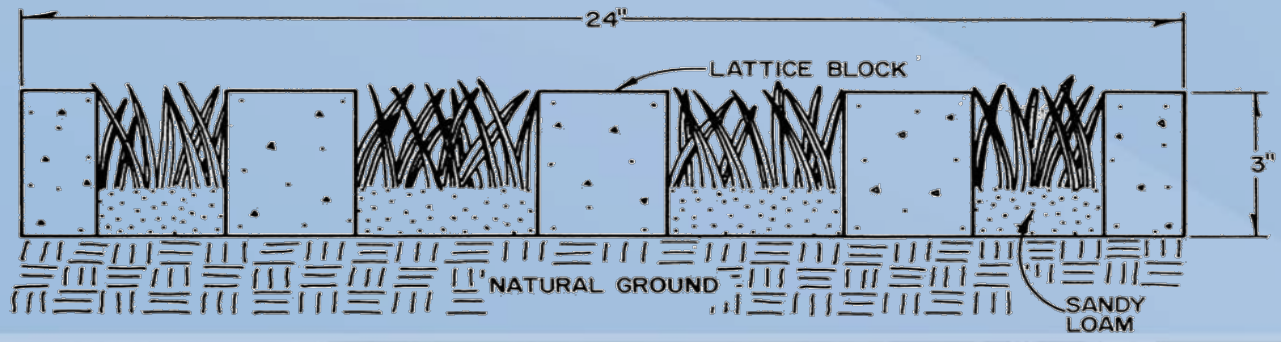
Net bridge = maintenance of hydraulic section

HIGH PERMEABLE PAVING



	Rain Volume 50 mm in 1hr (m^3/ha h)
Pubb. Parks.	10
Road and parking	95
Roofs	135
Private areas	75
TOTAL	315

"sponging" road



HIGH PERMEABLE CAR PARK

HIGH PERMEABLE PAVING

Impermeable surface = increasing of peak discharge

Permeable surfaces = better drainage

Lamination areas - Martellago

Lamination areas - Cavergnago

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CONCLUSIONS

System effectiveness

THE MOST IMPORTANT ISSUE IS TO ENSURE THE EFFECTIVENESS OF ACTIONS OF SUCH A LARGE NUMBER OF DIFFERENT SUBJECTS

TO DO THIS, SEVERAL CONDITIONS MUST BE ACHIEVED:

FIRST CONDITION

each stakeholder has the same dignity and importance because each of them plays a key role in the system

SECOND CONDITION

the different roles of the various components must be clear and recognized by everybody

THIRD CONDITION

each component of the system has mutual knowledge and awareness of the previous two conditions

THANK YOU FOR ATTENTION

For more information:

http://www.commissarioallagamenti.veneto.it/

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