



## **Annex 6**

### **Local Implementation Framework - Rotterdam**

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# 1 Rotterdam

## 1.1 Physical Implementation Framework

Three criteria were to determine initial demonstration areas. The first criterion is to select hot spot areas for traffic volume and traffic related air pollution, since it is in these areas that threshold values are most likely to be surpassed. The second criterion is that a both a national highway and an urban road should be included. This criterion is based on the fact that different organisations are responsible for traffic measures. The Ministry of Transport (Rijkswaterstaat) is responsible for the national highways, while the Rotterdam Traffic Department is responsible for the urban roads. The third criterion is availability of an infrastructure for the collection of real time traffic data. The real time traffic data are necessary for the model validation and the (real time) environmental information platform developed in the HEAVEN project.

From these criteria two areas were selected as demonstration area for the monitoring and modelling application. The HEAVEN real-time DSS will initially be tuned to the situation in these two demonstration areas. It then has to be considered how the results for the demonstration areas can be transferred to other roads in the Rotterdam region. The TEC is directed at the total municipal and regional road network. The real time system will only operate for roads where real time traffic data is gathered.

The first demonstration area for monitoring and modelling is the Overschie district. This area is the major hotspot in the Rotterdam region for traffic related pollution. The traffic volumes on the national highway that crosses the district are among the highest in the region and the first line of dwellings are at less than 30 metres from the road. Local, regional and national policy makers are looking for possible measures to reduce the number of people that are affected by traffic related pollution in this area. The HEAVEN DSS will be a useful tool in this process. On the A13 national highway loops are present to gather the necessary traffic data, as well as a VMS to inform road users.

The second demonstration area for monitoring and modelling is the Vaanweg/Pleinweg/Maastunnel corridor. This urban road is one of the corridors with the highest urban traffic volumes. On this corridor the city department for Traffic and Transport gathers real time traffic data. The Maastunnel, which is also on this corridor, makes it possible to have tunnel-based emission measurements. The corridor is, up to now, one of the two urban roads that are equipped with a VMS.

In the figure below a description of the traffic volumes for the demonstration areas is given. Two national highways cross the Overschie area. The north south directed national highway A13 intersects with the east west directed A20 within the Overschie district. In the figure we can see that on these highways the average traffic volume in twelve-hour periods amounts to more than 20.000 vehicles in both directions. During the morning and afternoon peak-hours both the A13 and A20 highways are congested. The first line of dwellings is very close on both sides of the A13. During the year 2000 sound barriers are being built between the highway and the dwellings.

The Pleinweg/Vaanweg corridor connects the national highways in the south of the region with the city centre on the north bank of the river Maas. The Maastunnel at the north end of the corridor, is one of the three points in the city centre where the river Maas can be crossed. Commuters from the southern parts of the Rijnmond region to reach the city centre use the corridor. It can also serve as an alternative route for traffic travelling further north, since it the northern extension of the corridor connects to the A20/A13 national highways. The corridor is congested during morning and afternoon

peak hours. The first part of the Pleinweg/Vaanweg corridor, to be specific the Vaanweg, crosses a park area. After the corridor passes the Zuidplein, and becomes the Pleinweg, the built environment changes. Here we can find a real street canyon, with four to five story high apartment buildings on both sides. This

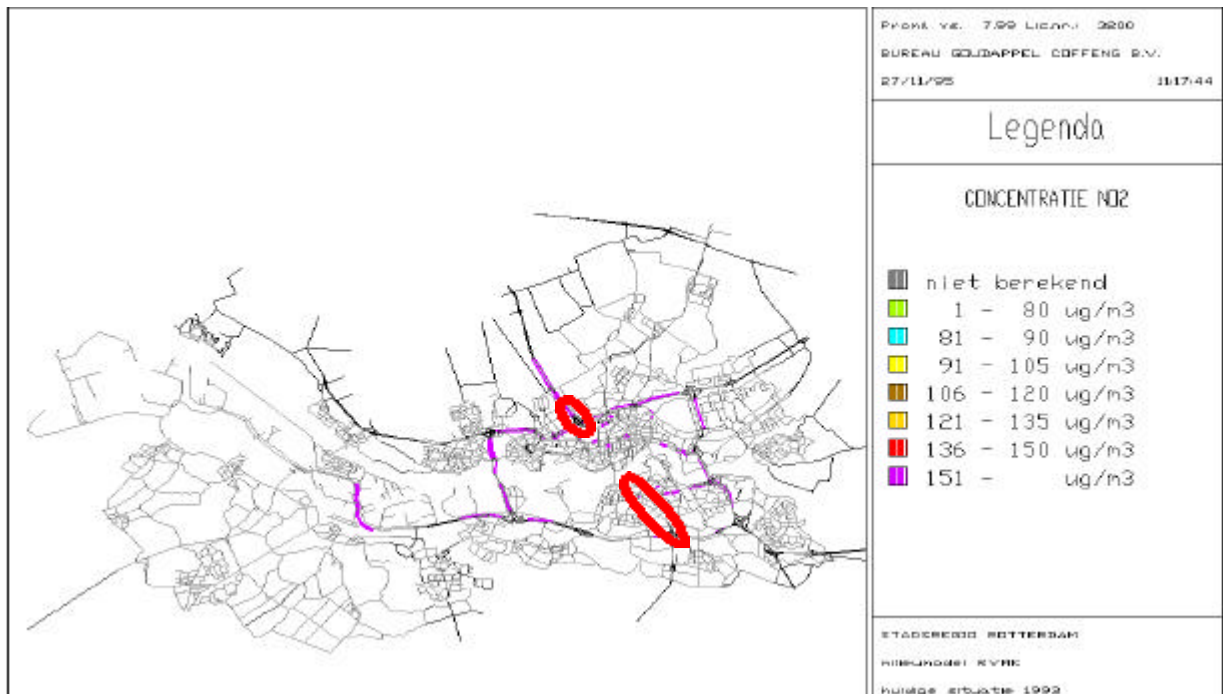


situation continues until the entrance of the Maastunnel. The city district crossed by the Pleinweg is called Charlois.

Figure 1: Traffic volumes in Rotterdam demonstration areas Overschie (upper circle) and Pleinweg-Vaanweg (lower circle)



In the figure below the air quality situation in the Rotterdam region is given for NO<sub>2</sub>. The Overschie district and the Pleinweg/Vaanweg corridor have been highlighted.



**Figure 2: Rotterdam TEC 1997 N02 concentrations**

The main function of Overschie and Charlois is to provide housing to the Rotterdam population. Because of their location they have to deal with major traffic flows through residential areas. The industrial district „Spaanse Polder“ is located next to Overschie. Spaanse Polder is the largest industrial district in Rotterdam outside the port-area. In the table below we give an overview of demographics in the City of Rotterdam and for the districts of Overschie and Charlois.

**Table 1: Population of Rotterdam, Overschie and Charlois**

Population on 1-1-1999	City of Rotterdam		District Overschie		District Charlois	
	Number	% of Total	Number	% of Total	Number	% of Total
Men	289 837	49%	8004	48%	32 356	49%
Women	302 760	51%	8768	52%	33 520	51%
Total	592 597	100%	16772	100%	65 876	100%

With 16 772 inhabitants Overschie accounts for 3% of the total Rotterdam population. In the district of Charlois 65 876 or 11% of the total Rotterdam population is located.

The maps below show the road structure of the Overschie district and the area around the Pleinweg/Vaanweg corridor.

**Figure 3: Overschie and Vaanweg-Pleinweg demonstration area**



The Rotterdam Transport and Traffic policy has two main goals:

- To ensure accessibility of the region;

To ensure liveability in the region.

The pollution related to road traffic in the Rotterdam region is described in the 1999 policy paper Deltaplan Wegverkeer (Road Traffic Deltaplan). It is concluded that targets for reducing traffic related pollution are not being met and more actions are necessary. In this plan short, medium and long term solutions to combat air and noise pollution because of road traffic are presented. Possible short term measures mentioned in the paper are: road pricing, enlarge P&R facilities, promote clean vehicles, promote bicycle use, corridor policy combined with 30km zones.

The Overschie district has been selected for a national programme called „ (environment). The programme looks at the possibility of combining various policy measures in city districts to combat accumulative environmental pressures. As a consequence of the Stad en Milieu programme the National ministry for Environment (VROM) has an increased interest in implementing (traffic) measures to improve the air quality in Overschie.

**Table 2: City Descriptor Rotterdam**

			Remarks
<b>City</b>			
Area	304,24	Km <sup>2</sup>	City of Rotterdam, 2000
Population	592.660	Pers.	City of Rotterdam, 2000
Population density	2.841	Pers./Km <sup>2</sup>	City of Rotterdam, 2000
<b>Road infrastructure</b>			
Total road network	2240	Km	
Urban roads	2200	Km	
Highways	40	Km	This are the highways directly surrounding Rotterdam (the Ringroad)
Traffic sensors	26	No.	including 6 bicycle traffic sensors Additionally 5000 sensors are connected to the 250 Traffic Controllers in the city.
<b>Public transport network</b>			
-Rail	-	Km	
-Tram	99,9	Km	
-Underground	72,9	Km	
-Bus	372,6	Km	
<b>Total Emission/Energy*</b>			For CO, PM and Energy only estimates can be calculated. This would take very much time.
CO		T/a	
NOx	60430	T/a	for Rotterdam region
SO <sub>2</sub>	55515	T/a	for Rotterdam region
HC	32000	T/a	for Rotterdam region
PM	-	T/a	
Energy	-	Mj/a	
<b>Share of Emissions/ Energy from vehicle traffic</b>			
CO	-	%	
NOx	17	%	for Rotterdam region
SO <sub>2</sub>	1	%	for Rotterdam region
HC	20	%	for Rotterdam region

PM	-	%	
Energy	-	%	
<b>Vehicle fleet composition</b>			(based on national vehicle fleet composition)
Passenger cars, with catalyst	69	%	
Passenger cars, without catalyst	11	%	
Diesel	10	%	Diesel passenger cars
Light duty vehicles	8	%	
Heavy duty vehicles	2	%	
Buses	0,1	%	
<b>Air quality monitoring</b>			
Stations	17	No.	
Pollutants measured	SO <sub>2</sub> , NO <sub>x</sub> , CO, O <sub>3</sub> , Benzene (BTX), PM <sub>10</sub> , Black Smoke, B(a)P, TSP, Pb/Cd/Fe		

\* Reference year: 1998, 2000

## 1.2 Legal and Institutional Framework

The main actors of relevance for HEAVEN, in the **traffic** field, are:

- DS+V, Transport and Traffic department of the City of Rotterdam, responsible for the urban roads.
- Stadsregio Rotterdam, a co-operative body of municipalities in the Rotterdam region (including the city of Rotterdam).
- Rijkswaterstaat Zuid Holland, branche of the National Ministry. Responsible for the national highways in the Province Zuid Holland.
- Province Zuid Holland, responsible for a (small) number of provincial roads in the Rotterdam region.

The Stadsregio and Rijkswaterstaat are co-operating within the Fileplan organisation. In several Fileplan working groups also the Province Zuid Holland is included.

The main actors for HEAVEN, when **air quality** is concerned are:

- Gemeentewerken Milieubeleid Rotterdam (GW-MR), the department of the city of Rotterdam that is responsible for the Rotterdam environmental policy.
- DCMR, the regional authority that carries out air quality monitoring for municipalities and the Province Zuid Holland.
- Stadsregio Rotterdam, a co-operative body of municipalities in the Rotterdam region (including the city of Rotterdam). The Stadsregio is responsible for the Transport Environment Chart.
- Province Zuid Holland, responsible for the air quality along provincial roads. In practice the province has also taken up the task to describe the air quality along the national highways in the Rotterdam region.

All of the above organisations with responsibilities for environmental policy are, together with a number of national ministries, co-operating in the ROM Rijnmond programme. The objective of the ROM Rijnmond is to encourage a sustainable development of the Rotterdam Port Area. The HEAVEN project is candidate to be included in the ROM Rijnmond Programme.

The main actor for HEAVEN, when **health** is concerned is:

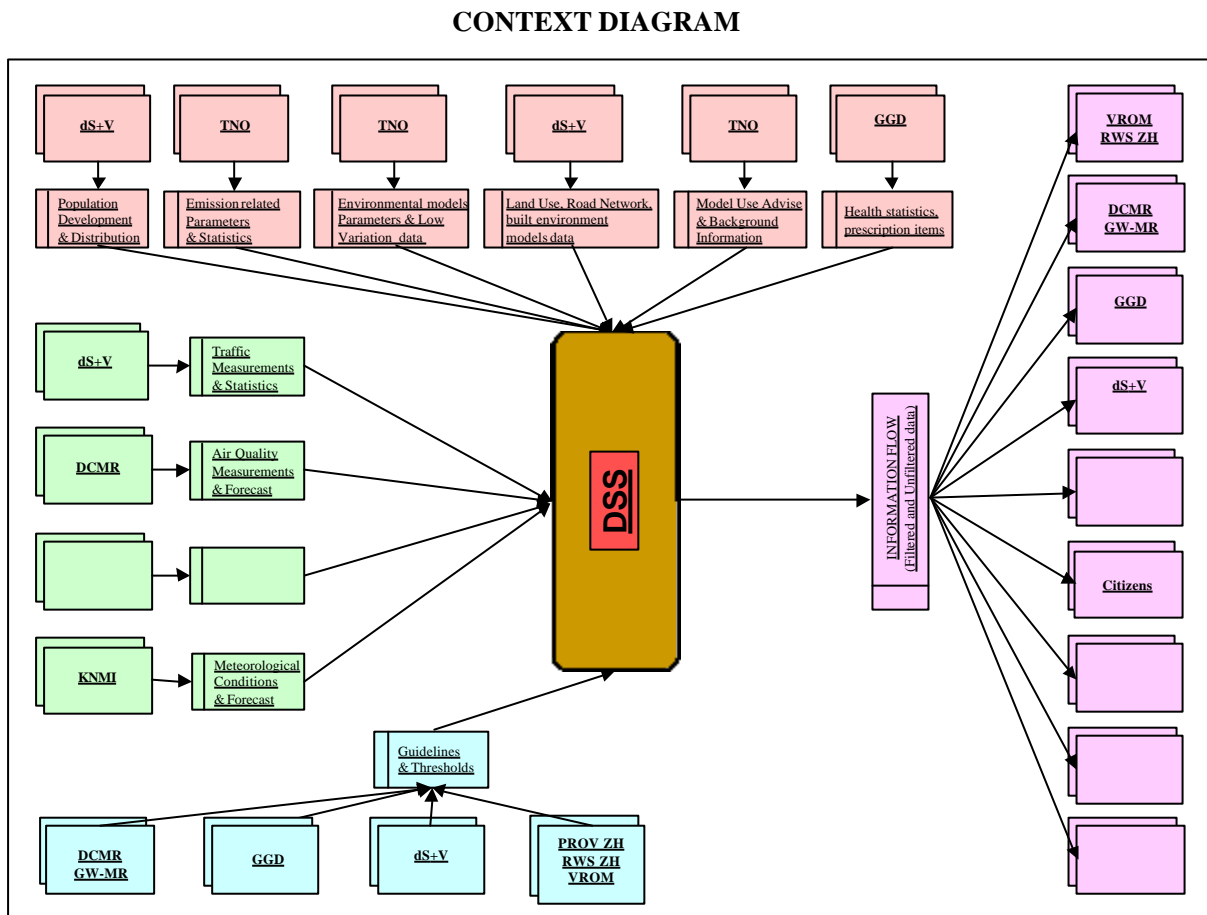
- GGD, The Rotterdam city department for Health and Health Care. The GGD also has regional tasks.

Until the start of the HEAVEN project there was no organisational framework in which the different institutions with task on traffic related air pollution, were meeting on a regular basis. The local HEAVEN steering committee is composed of representatives of: dS+V, GW-MR, GGD, Stadsregio Rotterdam, Rijkswaterstaat Zuid Holland, Provincie Zuid Holland en DCMR.

At the moment there are no mechanisms that generate (short term) traffic measures based on air quality measurements. Presently the so-called smog alarm only has consequences for industry in the region. Within the HEAVEN project, possible policy measures for traffic are being considered. The HEAVEN project will contribute to the discussion on what organisations will have to take up the responsibility for the respective measures.

The figure below describes the organisations that provide information to the HEAVEN Decision Support System.

Figure 4: Organisations providing information to HEAVEN Decision Support System



At the moment the public can receive information on air quality and noise in the yearly reports by the DCMR. Additional information can be obtained from other occasional studies. Citizens can also directly contact DCMR or the health department for questions/complaints about pollution. The general public and the media will benefit from HEAVEN because of the availability of real time information on traffic related air pollution for a number of roads in the region. The presentation of yearly figures on traffic related air pollution, which are produced by the Traffic Environment Chart, will be improved by a better description of dispersion.

### 1.3 Technical Framework

For the different HEAVEN applications hardware is needed in the fields of environmental- and traffic- data.

The existing fixed hardware for *air quality measuring* in the region is operated by the Regional Environmental Protection Agency (DCMR). The table below gives an overview of the existing measurement points.

**Table 3: Existing air quality measuring points in the Rotterdam region (DCMR)**

Component	Method	Instrument	Measuring points	Area type
SO <sub>2</sub>	UV Fluorescence	Automatic TECO 43W	9	Industrial
NO <sub>x</sub>	Chemoluminiscense	Automatic TECO 42W	3	Industrial/city
CO	infrared system	Automatic TECO 48	1	Mobile
O <sub>3</sub>	UV absorption	Automatic ML 8810	3	Industrial/city
Benzene (BTX)	FID	Automatic GC CP7001	3	Industrial/city
PM <sub>10</sub>	Gravimetical	Automatic TEOM 1400	1	City
Black Smoke	reflection method	semi-automatic	2	City
B(a)P	GC-MS		1	City
TSP	Gravimetical	semi-automatic Digital	5	Industrial/city
Pb/Cd/Fe	HPLC	semi-automatic	5	Industrial/city

An extensive measuring network for air quality in the region exists. The measuring points, however, are not specifically directed at measuring road traffic related air pollution. Therefore, for the monitoring and modelling application of the HEAVEN project new measuring stations have to be equipped. Three measuring stations are needed for the national highway A13 crossing the Overschie area. An additional measuring station is needed for the Pleinweg/Vaanweg corridor. The existing measuring points can be used to determine the background pollution levels.

For the new measuring stations the following equipment is required:

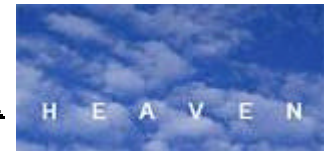
- Three highway stations A1-A3 (06-12/2000 A13; 01-12/2001 Overschie)
  - A3 (**DCMR**: TEOM-PM10 monitor, Nox-monitor and BTX-monitor, including data-acquisition equipment); (**TNO**: O<sub>3</sub>-monitor, CO-monitor, meteo-equipment and sampling control for PM10, PM2.5, black smoke and EC/OC-sampling, including Campbell data-logger);
  - A1 (**DCMR**: TEOM-PM10 monitor, Nox-monitor, CO-monitor and BTX-monitor, including data-acquisition equipment); (**TNO**: meteo-equipment at two heights and sampling control for PM10, PM2.5, black smoke and EC/OC-sampling, including Campbell data-logger);
  - A2 (**DCMR**: TEOM-PM10 monitor, Nox-monitor, O<sub>3</sub>-monitor, 2D-sonic anemometer and BTX-monitor, including data-acquisition equipment); (**TNO**: meteo-equipment, 3D-sonic anemometer and sampling control for PM10, PM2.5, black smoke and EC/OC-sampling, including Campbell data-logger);
- One street canyon station (01-12/2001 Pleinweg)
  - **TNO** (TEOM-PM10 monitor, Nox-monitor and BTX-monitor, including meteo-equipment at rooftop)
  - **DCMR** (data acquisition and CO-monitor).

The hardware needed for traffic related data are inductive loops and Variable Message Signs. On both the A13 and the Pleinweg/Vaanweg corridor, inductive loops are available. On the Pleinweg one additional loop is required and will be placed in the southern direction to have a total picture of both directions at the air quality measuring point. On both routes a VMS is available for the traffic entering the city.

## 1.4 Appraisal Groups

Table 4: Names and institutions of HEAVEN users in Rotterdam

HEAVEN User Category	Names of User Organisations	Names of Key Individuals in Organisations
<b>Authorities as (in)Direct HEAVEN Users</b>		
<b>Traffic/ Transport Departments</b>		
- City of Rotterdam	- Dienst Stedebouw en Volkshuisvesting	- Marcel van Lieshout - Will Clerx
- Regional	- Rijkswaterstaat Zuid Holland	- Theo van de Gazelle
<b>Environmental Departments</b>		
- City of Rotterdam	- Gemeentewerken Milieubeleid Rotterdam	- Jan Willem Stoop - Dick Ouwekerk
- Regional	- Provincie Zuid Holland	- Hans Kruyt
- Regional	- DCMR	- Leo Hermans
- Regional	- Stadsregio	- Hugo de Bruijn
<b>Health Departments</b>		
- City/regional	- GGD	- Reind van Doorn
<b>Urban Planning Departments</b>		
- City of Rotterdam	- Ontwikkelingsbedrijf Rotterdam	- Jeroen Laven
- City of Rotterdam	- Dienst Stedebouw en Volkshuisvesting	- Fiona Wieland
- City of Rotterdam	- Gemeentelijk Havenbedrijf Rotterdam	- Paul van Eijk
<b>Decision Makers (via administration) as Indirect HEAVEN Users</b>	Via administration	
<b>Public &amp; Interest Groups as Other Stakeholders</b>		
<b>Residents of "Hot Spot" Areas</b>	Bewonerspanel Overschie	Annie van Ee
	Deelgemeente Overschie	Peter Hertog
	Stad en Milie Overschie	Erik Hoeflaak
<b>Research Institutions</b>		
- National	- RIVM	- Ton Dassen



HEAVEN User Category	Names of User Organisations	Names of Key Individuals in Organisations
- National	- TNO	- Menno Keuken
- National Ministry	- Ministerie van VROM	- Marc Alessi

## 1.5 Institutions Responsible for HEAVEN Implementation

The responsible institutions for the implementation of the improved long-term system, the transport Environment Chart (TEC), are the Stadsregio Rotterdam and the Rotterdam city departments for Environment and Transport. The Stadsregio represents the neighbouring municipalities. The Rotterdam city departments for Environment and Transport provide the Stadsregio with technical advice regarding the TEC. The departments have two main criteria for accepting the improved TEC. The first is technical, namely it is expected that the TEC produces outcomes in zones instead of lines. The second criterion concerns the user friendliness. The improved TEC is expected to have at least the same level of user-friendliness as the existing TEC.

For the real time Environmental Information Platform the main responsible institutions for implementation are the Environment department of the City of Rotterdam and the Regional Environmental Protection Authority (DCMR). The most important criterion for continuation of the system is the consensus among the main stakeholders about reliability of the data. The main challenge, however, is the generation of (real time) traffic measures based on air quality data. At the moment there are no mechanisms that generate these kind of traffic measures. Presently a smog alarm only has consequences for industry in the region. The responsible institutions for traffic measures are Rijkswaterstaat Zuid Holland (for the national highways), the Province of Zuid Holland (regional roads) and the Transport and Traffic department of the city of Rotterdam (urban roads).