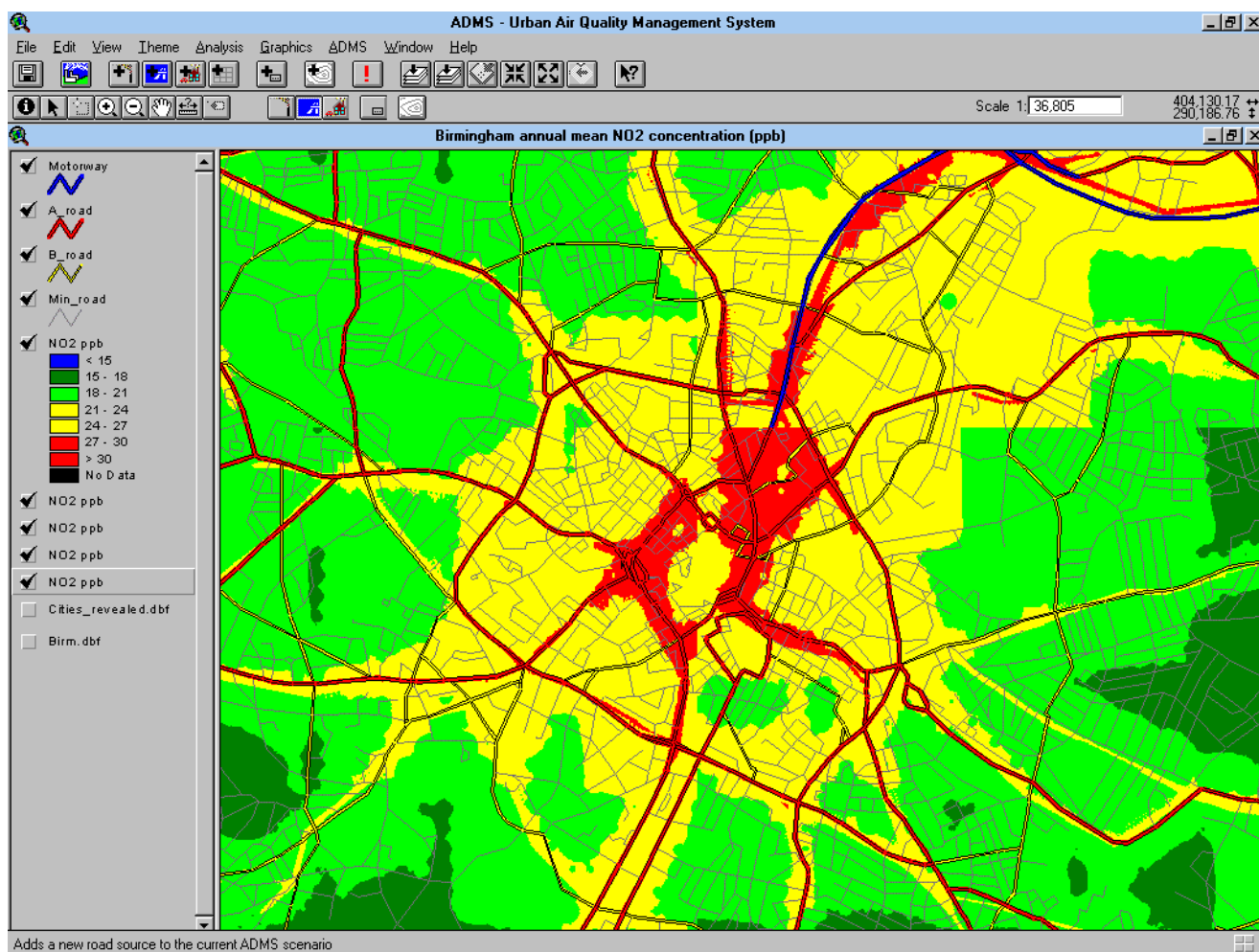


# ADMS

Urban Air Quality  
Management  
System

## *Air Quality Management*

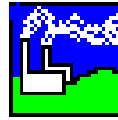


Reproduced from the Ordnance Survey 1:50000 map with permission on behalf of the Controller of Her Majesty's Stationery Office (c) Crown Copyright

- ◆ *Advanced Dispersion Model*
- ◆ *Desktop GIS*
- ◆ *Emissions Inventory Database*

**CERC**  
Environmental  
Software

# ADMS Urban



## *Versatile*

- ◆ Air Quality Review and Assessment
- ◆ Comparisons with air quality limits, guidelines and objectives
- ◆ “What if ?” scenarios
- ◆ Traffic planning
- ◆ Environmental Impact Assessment
- ◆ IPC, IPPC and local authority Part B applications
- ◆ Future projections
- ◆ Emergency planning

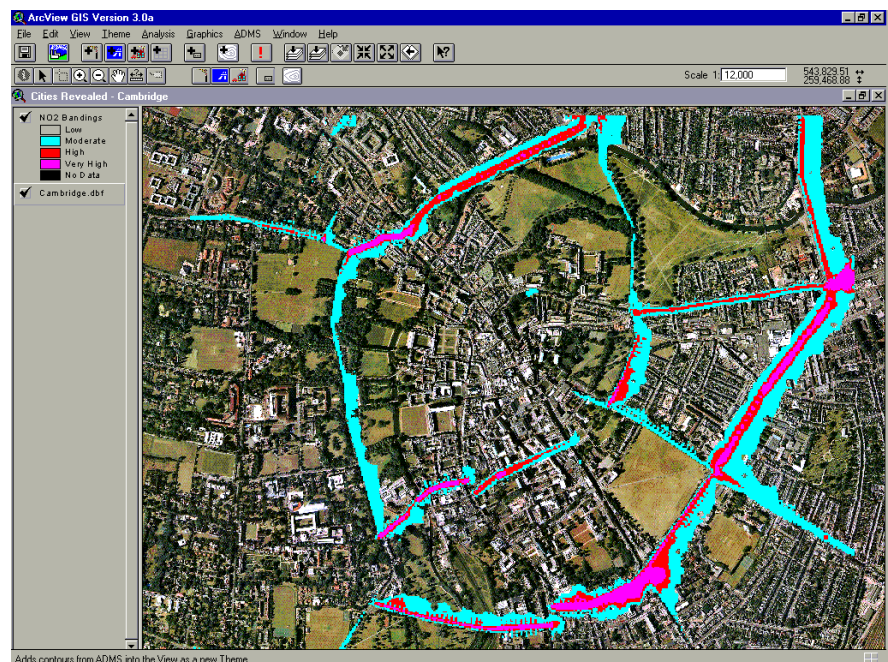


# ADMS Urban



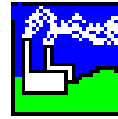
## *Easy to Use*

- ◆ Interactive GIS interface
- ◆ Direct link to Emissions Inventory database
- ◆ Accepts Met Office and users' own meteorological data
- ◆ Runs under Windows NT and Windows 95





# ADMS Urban



## Output

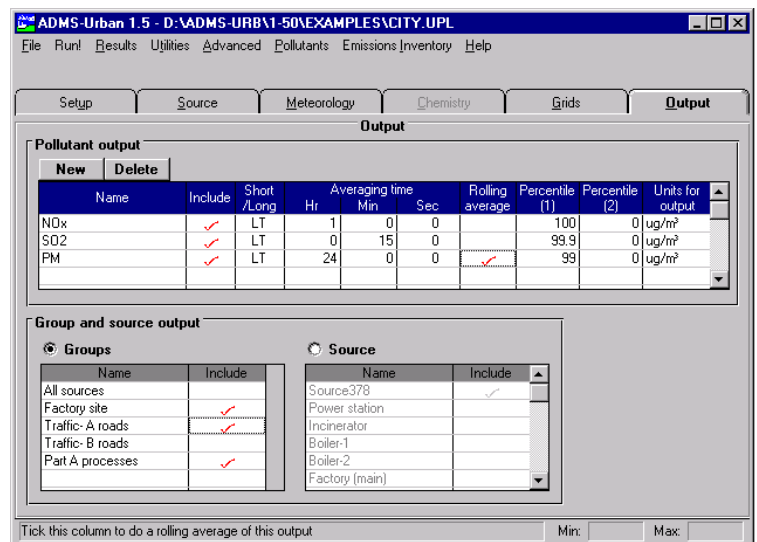
- ◆ Calculates concentrations of all major pollutants
- ◆ High resolution contours of concentration via GIS for analysis of model predictions
- ◆ Simultaneous display of monitored time series concentrations with model predictions
- ◆ Calculates short-term and long-term averages e.g. 15min average for SO<sub>2</sub>, 24hr average for particulates, 98<sup>th</sup>, 99.8<sup>th</sup> percentiles for NO<sub>2</sub>, and annual averages

# ADMS Urban



## Model Features

- ◆ Full range of source types – up to 4100 point, line, area, grid, volume and road sources
- ◆ Dispersion is based on an up-to-date understanding of the atmospheric boundary layer
- ◆ Calculates pollutant emissions from traffic flow data
- ◆ Integrated street canyon model
- ◆ Advanced treatment of the effect of buildings
- ◆ Realistic calculation of flow over complex terrain
- ◆ More extensively validated than any other model
- ◆ Models chemical reactions involving NO, NO<sub>2</sub> and Ozone





## Model Development

- ◆ Based on ADMS industrial dispersion model.
- ◆ Sponsors of ADMS include the Environment Agency and HSE.

## Sources

- ◆ ADMS-Urban allows up to 4100 point, road, area, grid and volume sources.
- ◆ ADMS-Urban models continuous and time-varying releases.
- ◆ The model calculates concentrations of multiple pollutants simultaneously

## Emissions

- ◆ ADMS-Urban calculates pollutant emissions from traffic count data using a database of emission factors.
- ◆ ADMS-Urban includes an emission inventory compilation system which takes account of diurnal variation in emissions.
- ◆ Model the effect of changes in traffic flow and vehicle fleet composition.

## Street Canyons

- ◆ ADMS calculates the effects of street canyons on dispersion.

## Chemistry

- ◆ ADMS models chemical reactions involving NO, NO<sub>2</sub> and Ozone using the GRS scheme or measured correlations.

## Complex Effects

- ◆ Complex terrain may have a significant effect on the value and location of the maximum surface concentration typically where there are slopes greater than 1:10.
- ◆ ADMS calculates the effect of changes in terrain and roughness on air flow and hence dispersion using CERC's advanced airflow model, FLOWSTAR.
- ◆ Buildings may have a profound effect on the concentration distribution - changing the concentration sometimes by a factor of ten.

- ◆ ADMS explicitly calculates changes in mean flow and turbulence over the building and its effects on the dispersion.

## Dispersion

- ◆ Advanced algorithms allow for the height dependence of wind speed, turbulence and stability.
- ◆ The dispersion model includes a high resolution (~10m) dispersion module for areas where detail is required and a regional scale grid-based dispersion module.
- ◆ ADMS takes account of the buoyancy and momentum of sources.

## Meteorological Input

- ◆ A meteorological preprocessor allows flexible input, either basic data such as cloud cover, wind speed and direction, or boundary layer data such as surface heat flux and boundary layer height.
- ◆ Worldwide data specifically for use in ADMS is available from the UK Meteorological Office, or users may enter their own data.

## Boundary Layer Structure

- ◆ ADMS is based on an up to date understanding of the structure of the atmospheric boundary layer.
- ◆ This contrasts strongly with the simplistic surface based approach used by older models such as CALINE, ISC and R91.

## Output

- ◆ Calculates concentrations corresponding to the objectives of the UK National Air Quality Strategy and other standards and limits.
- ◆ Pollutants that can be modelled include NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, VOC's.
- ◆ ADMS includes explicit calculation of percentiles (not surrogate statistics) and rolling averages.
- ◆ ADMS takes account of background concentrations.

## Validation

Comprehensive validation includes:

- ◆ Validation conducted as part of local authority air quality review and assessment.
- ◆ Comparisons with data from Automatic Urban Network (AUN) and local authority sites.
- ◆ Comparisons with standard field, laboratory and numerical data sets.
- ◆ Participation in EU workshops on short range dispersion models.
- ◆ Comparison with archived LIDAR data in a study sponsored by the Environment Agency.

## GIS

- ◆ ADMS interacts with ArcView GIS for entering source data and displaying model predictions as contour plots superimposed on maps. Links are also available with other GIS systems.
- ◆ This allows geographical analysis of model results to calculate population exposure and determine environmental impact.

## Minimum System Recommendations

- ◆ Windows NT workstation with an installation of Access 97 (Office 97 Pro preferably).
- ◆ 450MHz Pentium, 128Mb RAM, 12GB Hard Disk PC.

