



Integreen Workshop Bolzano, 27.6.2012

“iQ mobility – Experiences in Berlin”

Chris Schwarz, VMZ Berlin

Gefördert durch:



Bundesministerium
für Wirtschaft
und Technologie



iQ mobility Project

Quality Module

Lessons Learned

iQ mobility – Project Information

- Research project iQ mobility: 2005 – 2008 (two field test areas)
- 2008: further operation of the quality module prototype in Berlin & Potsdam
- 2010: development of the quality module to the product iQ Traffic (step 1)
 - Technical maturity (performance, stability, ...)
 - IMMIS^{mt}: adjustment to the new basis for calculation for air pollutants (HBEFA 3.1)
 - Professional extension of the accident analysis (ProViSta)
 - Spacial expansion: region within the S-Bahn circle
 - Further functional development (multi-window, aerial images,...)
- 2012: iQ Traffic (step 2)
 - Spacial expansion: complete Berlin
 - Integration of the new „detailed net“ (street net)
 - Further functional development (PT-messages, typified time variation curve for traffic volume,...)

Gefördert durch:





iQ mobility - Background

- In the agglomeration Berlin-Brandenburg exist many systems to control the road bound traffic.
- A traffic management is needed, that considers the interdependency of the individual traffic and public transport.
- Within iQ mobility the following objectives should be achieved through traffic management strategies und intelligent control measures:
 - Reducing traffic jams and incidents as well as fluidising the traffic.
 - Reducing air pollutants and noise emission caused by traffic.
 - Increasing the traffic safety.
- iQ mobility connects the existing IT and PT control centers in Berlin and Potsdam → this is a further step towards a regional traffic management in Berlin-Brandenburg.



iQ mobility Project

Quality Module

Lessons Learned

iQ mobility Approach



- Developing a quality management overall means of transport for the road bound traffic.
- Developing an instrument to control the success of traffic management measures in the road traffic and public transport.
- Analysing the interdependency of road bound traffic (vehicle traffic and public transport) and its impact on environment and safety.

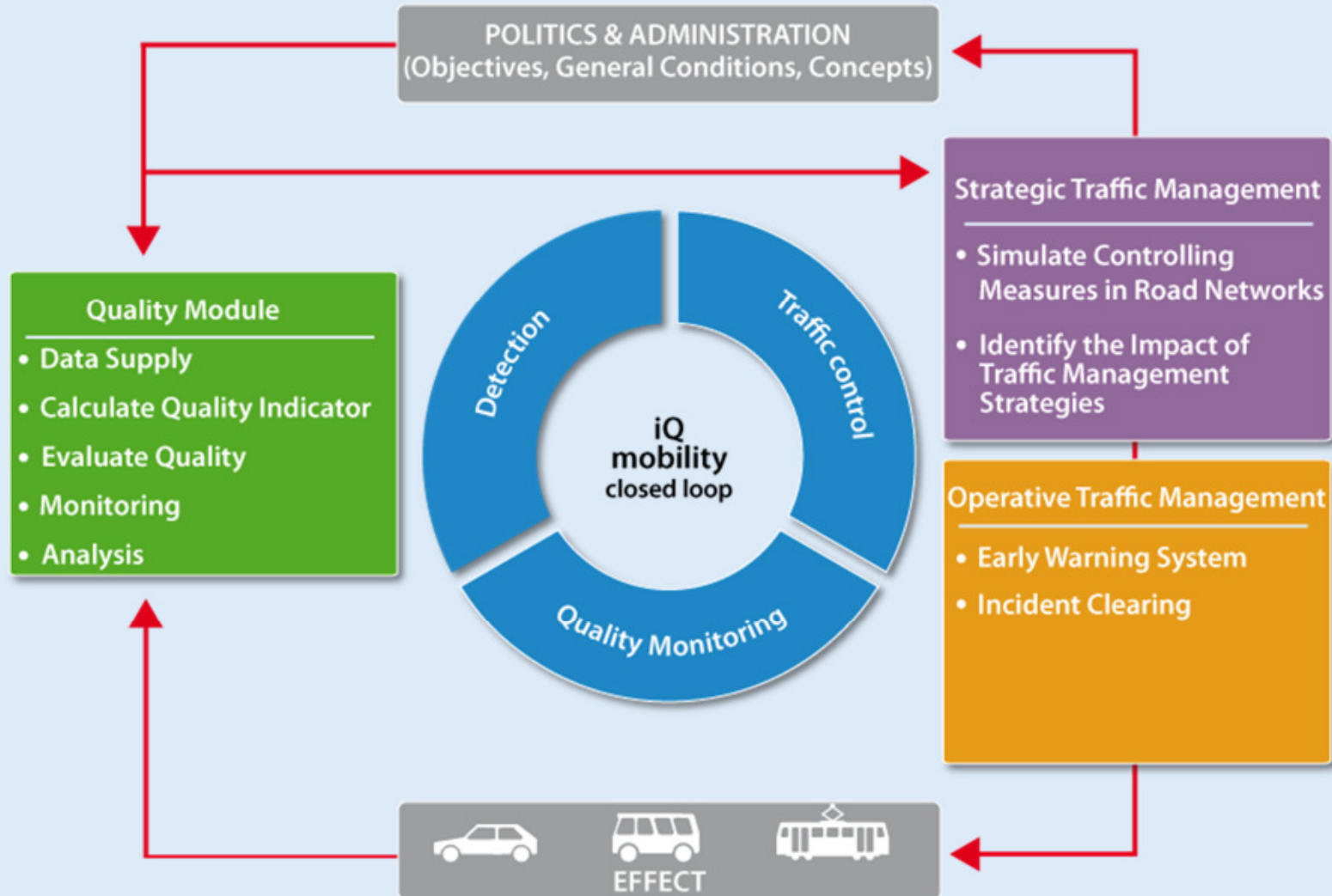
Gefördert durch:





iQ mobility Project
 Quality Module
 Lessons Learned

Quality and Mobility Management (over all Means of Transport)





iQ mobility Project
Quality Module
Lessons Learned

iQ mobility - Users



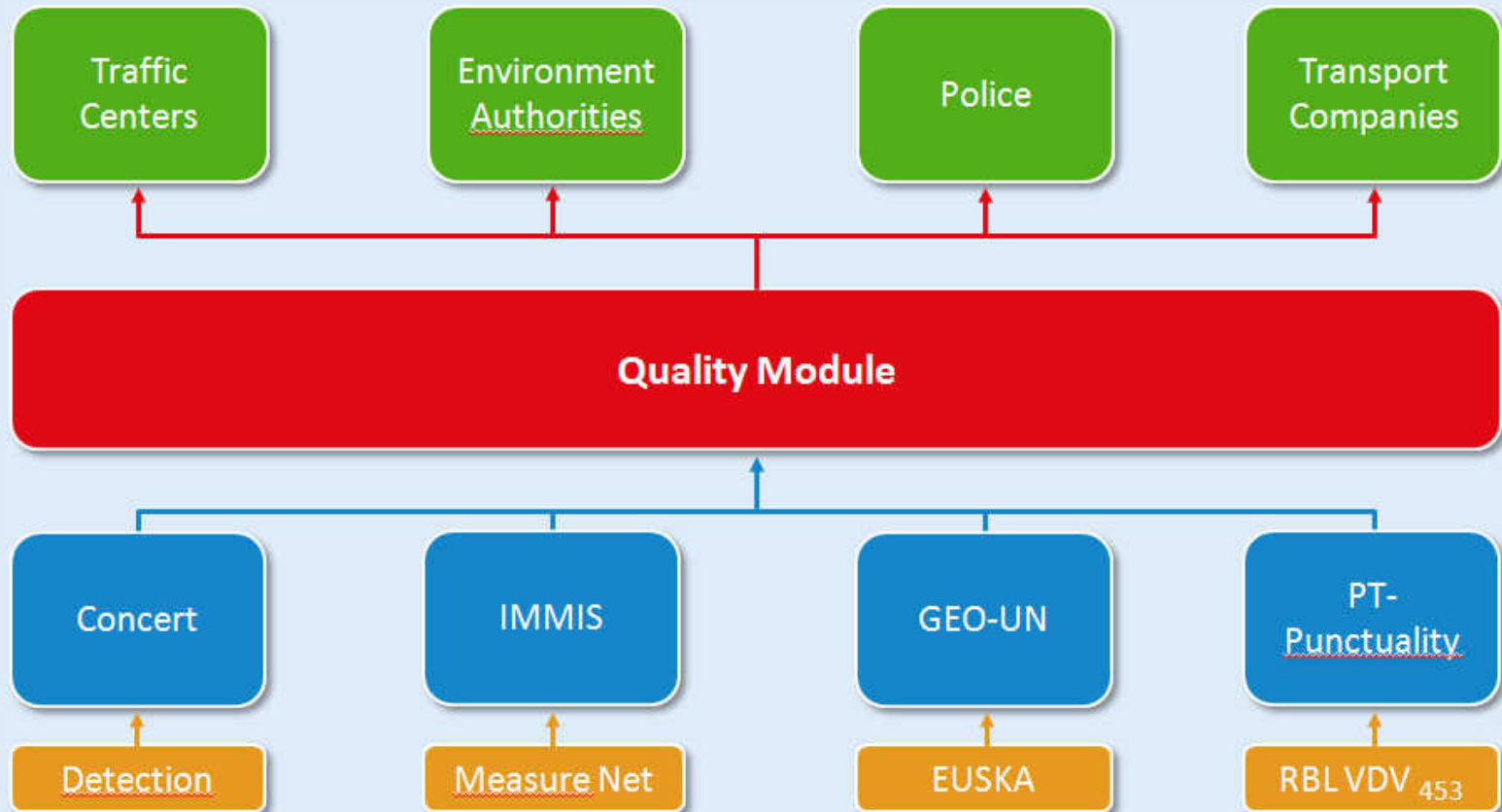
Gefördert durch:





iQ mobility Project
Quality Module
Lessons Learned

Quality Module - System Overview

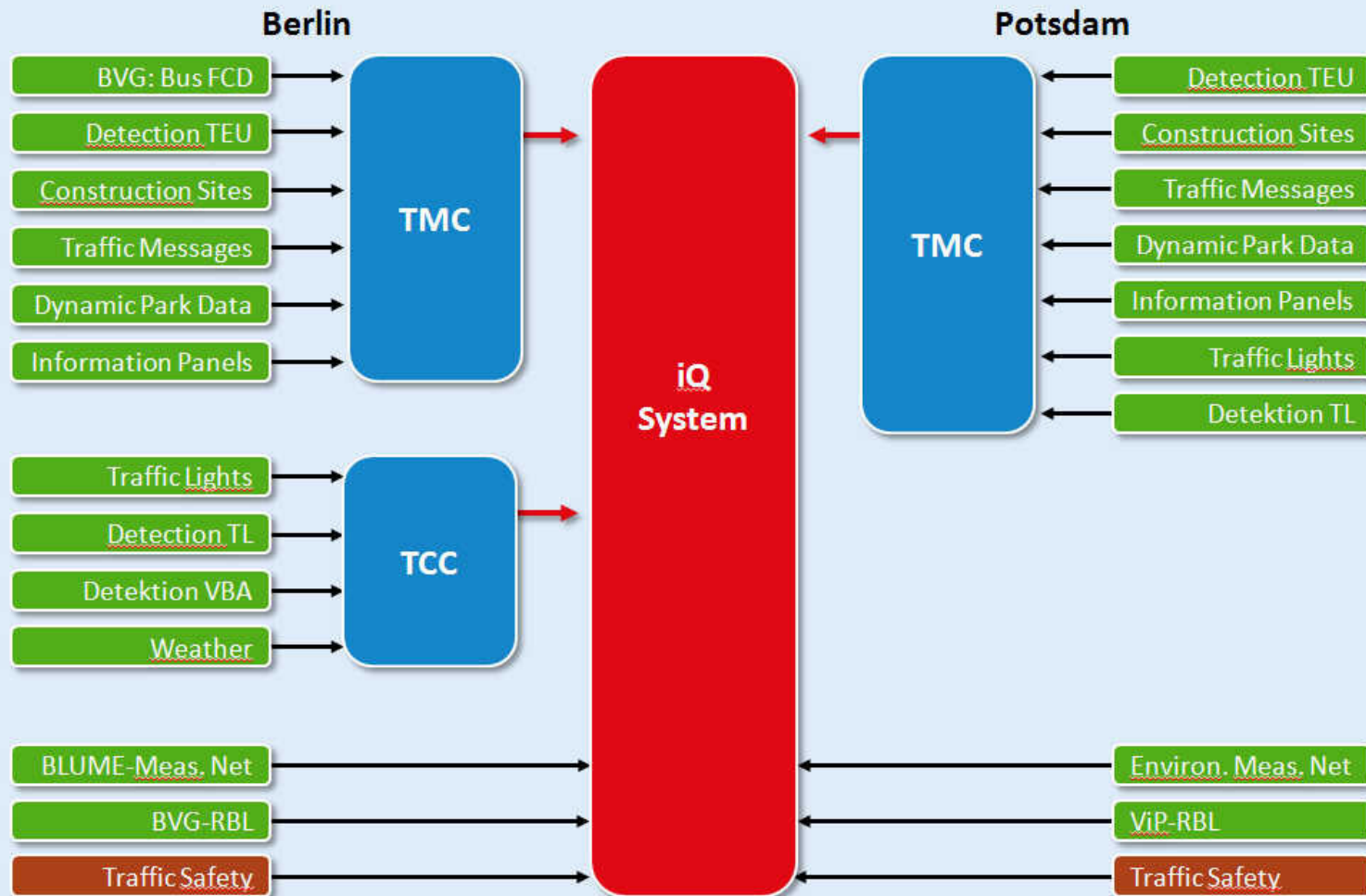


System Overview: Quality Module



iQ mobility Project
Quality Module
Lessons Learned

Quality Module – Integrated Data



Quality Module: Data Integration

Gefördert durch:



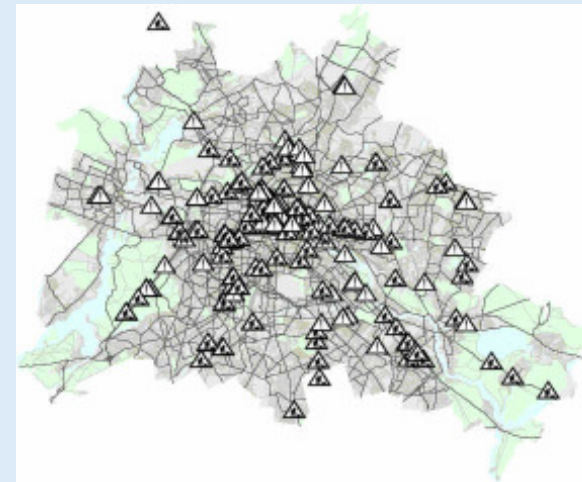


iQ mobility Project
 Quality Module
 Lessons Learned

Quality Modul – Objects (Individual Transport)



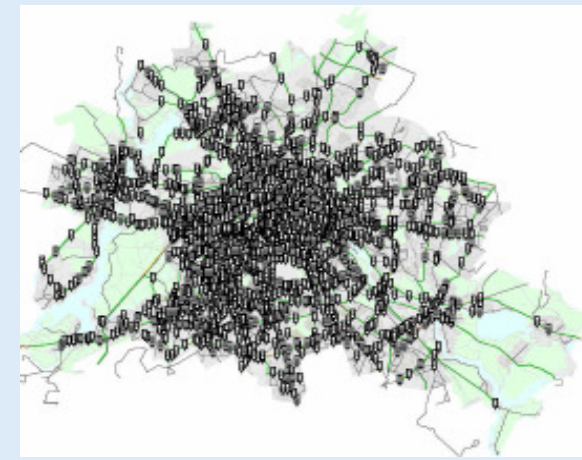
Detection



Traffic Messages



Info Panels



Traffic Lights

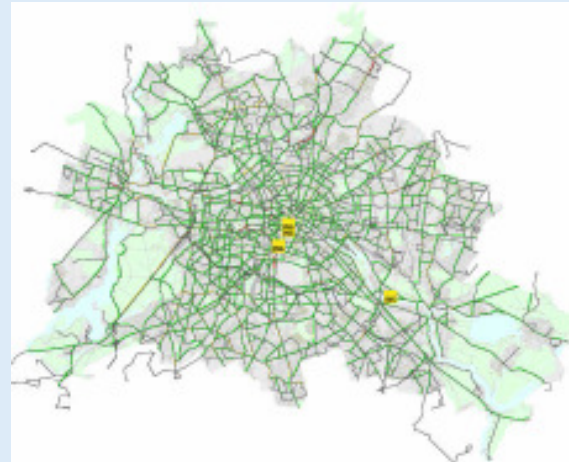
Gefördert durch:



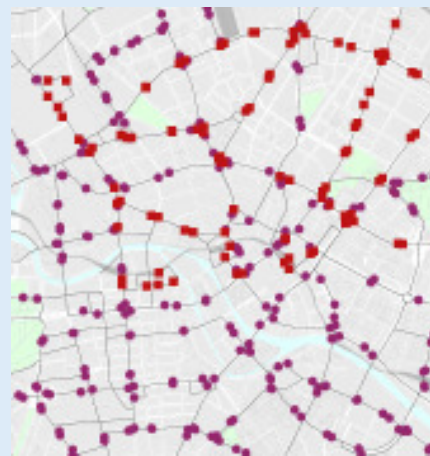


iQ mobility Project
Quality Module
Lessons Learned

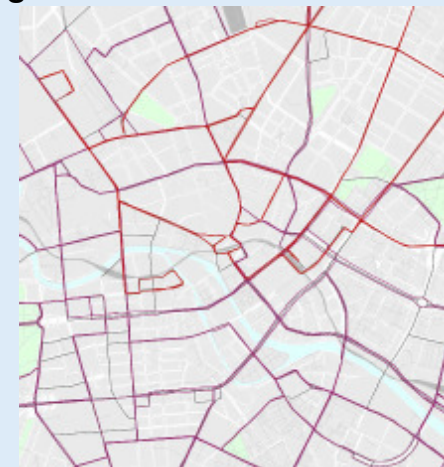
Quality Modul – Objects (Public Transport)



PT Messages



Bus / Tram stops



Bus / Tram Lines

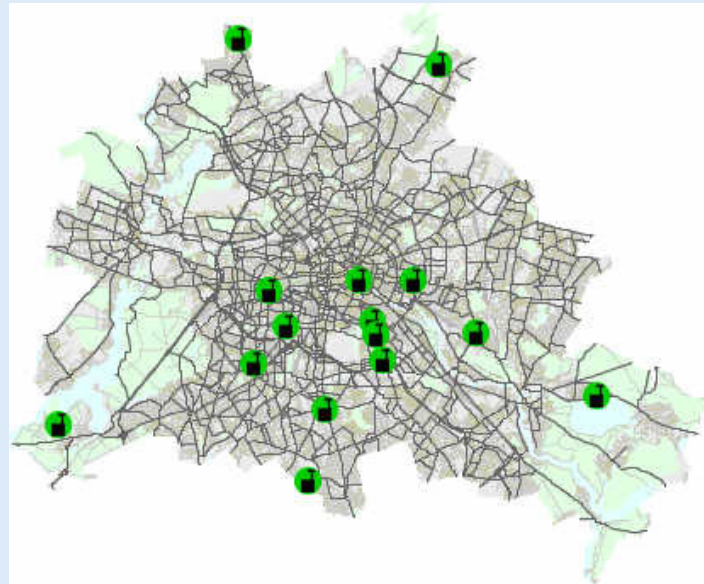


Quality Modul – Objects (Environment)

iQ mobility Project

Quality Module

Lessons Learned



Environment Stations



Weather Station

Gefördert durch:



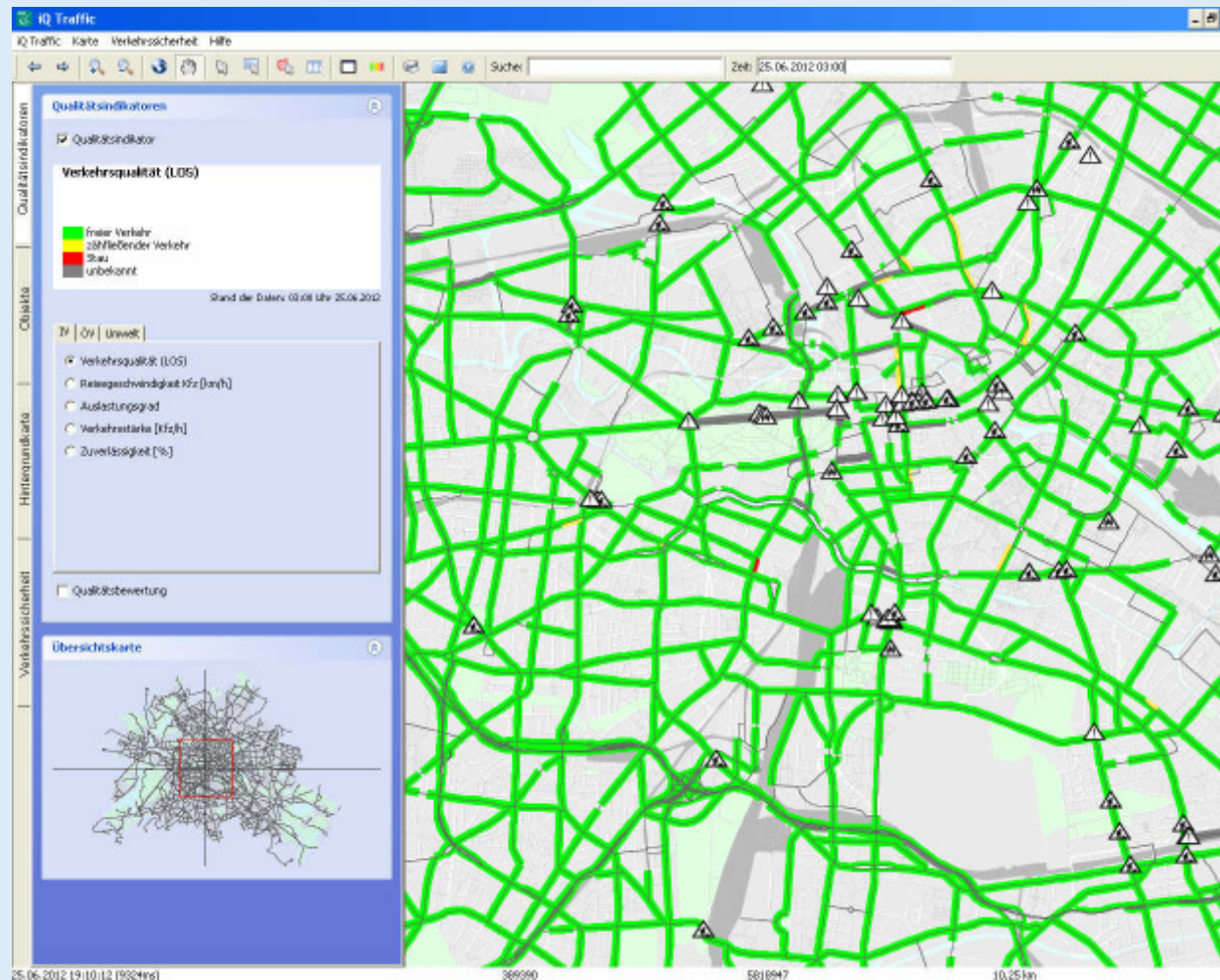


Quality Modul – Monitoring Individual Traffic (LOS, 03:00)

iQ mobility Project

Quality Module

Lessons Learned



Gefördert durch:



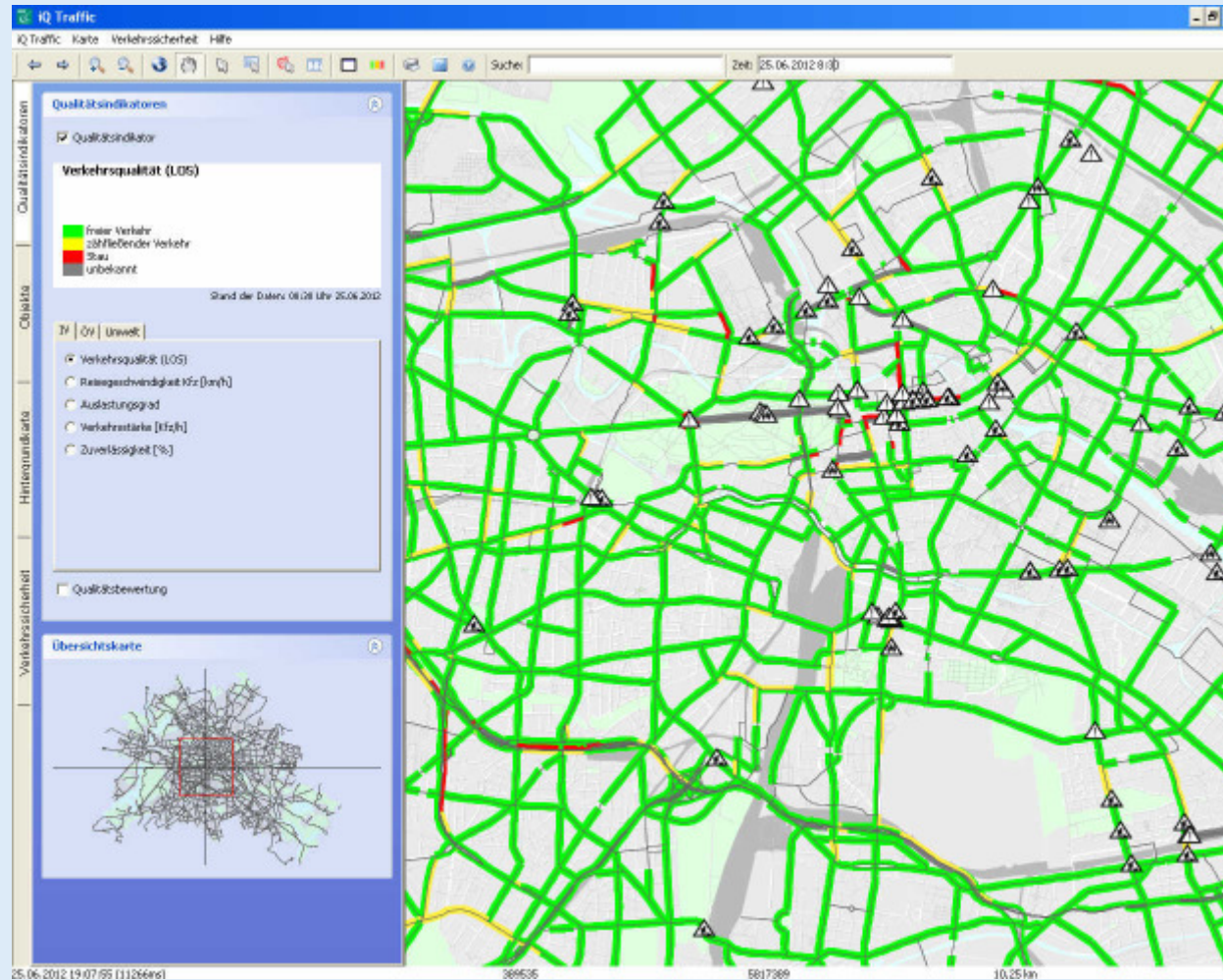


Quality Modul – Monitoring Individual Traffic (LOS, 08:30)

iQ mobility Project

Quality Module

Lessons Learned



Gefördert durch:



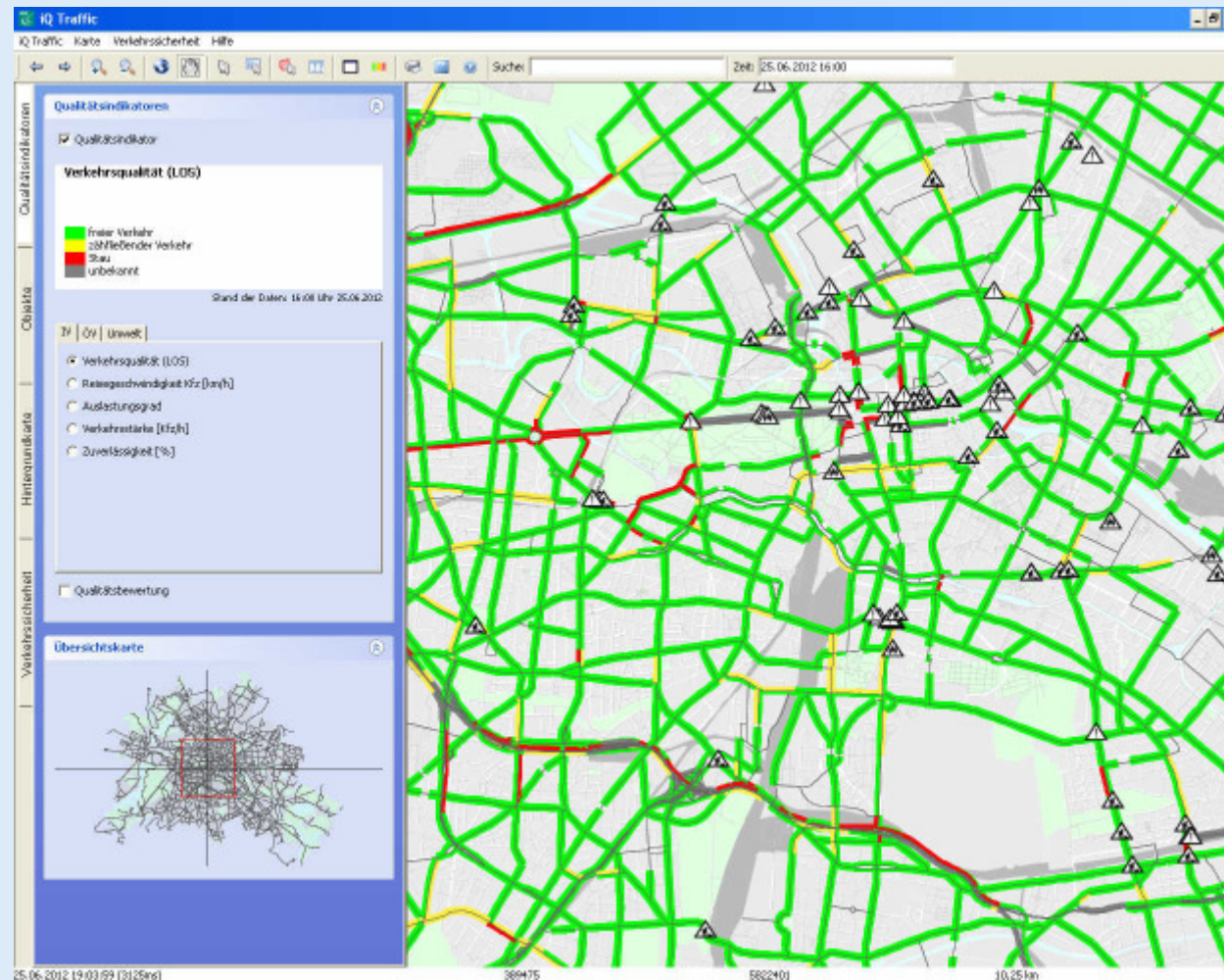


Quality Modul – Monitoring Individual Traffic (LOS, 16:00)

iQ mobility Project

Quality Module

Lessons Learned



Gefördert durch:



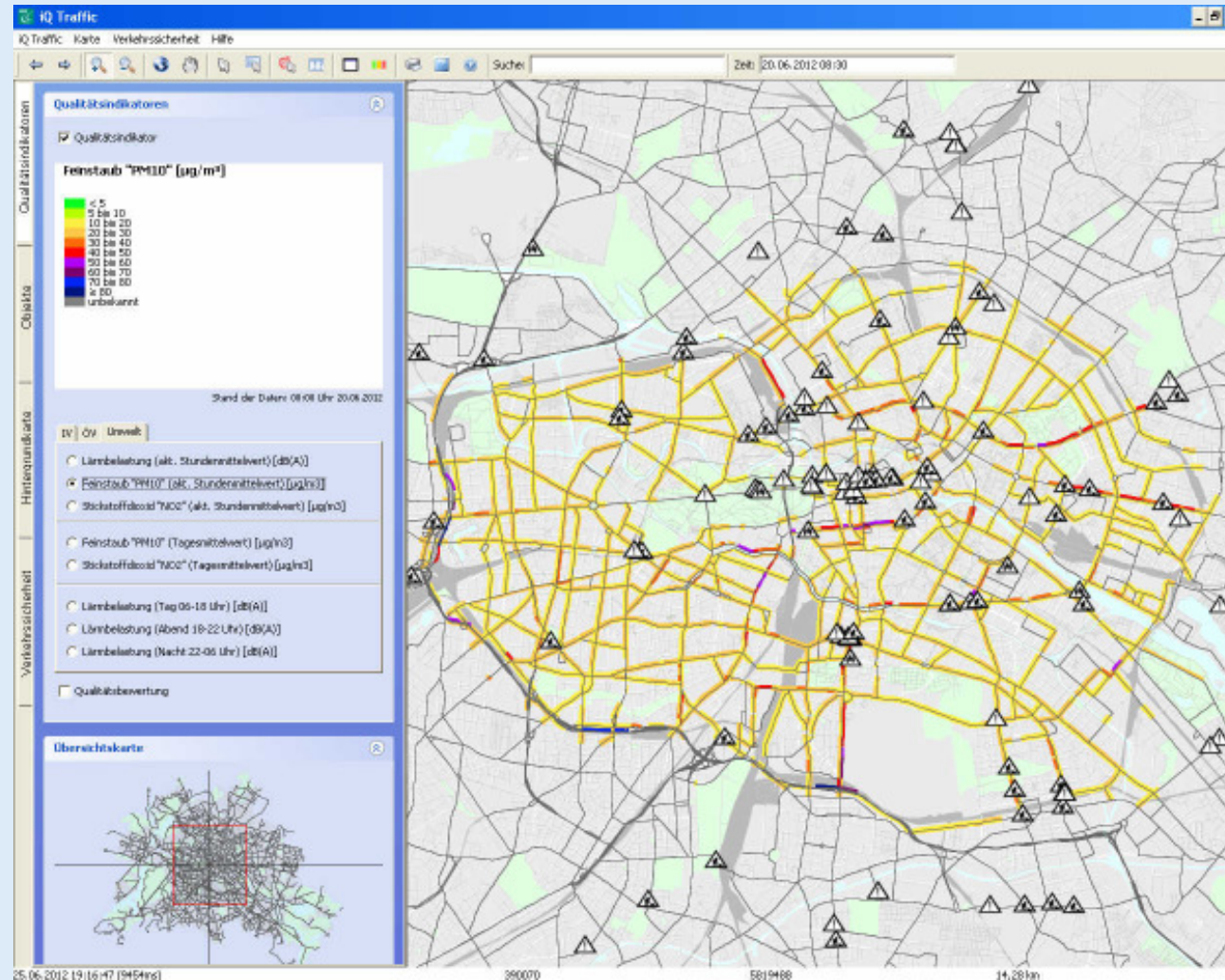


Quality Modul – Monitoring Environment (PM10, 08:30)

iQ mobility Project

Quality Module

Lessons Learned



Gefördert durch:



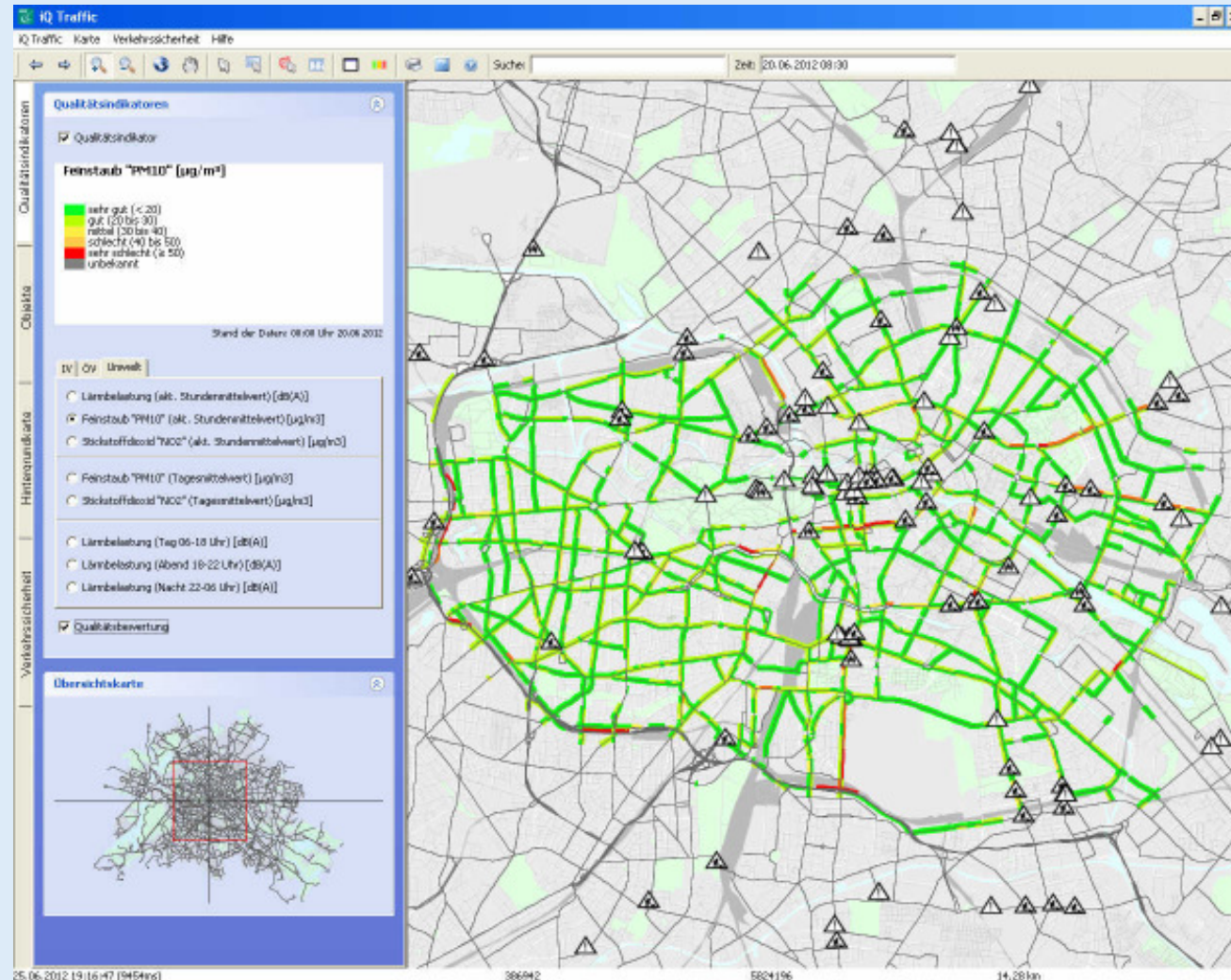


Quality Modul – Monitoring Environment (PM10), Evaluation

iQ mobility Project

Quality Module

Lessons Learned



Gefördert durch:



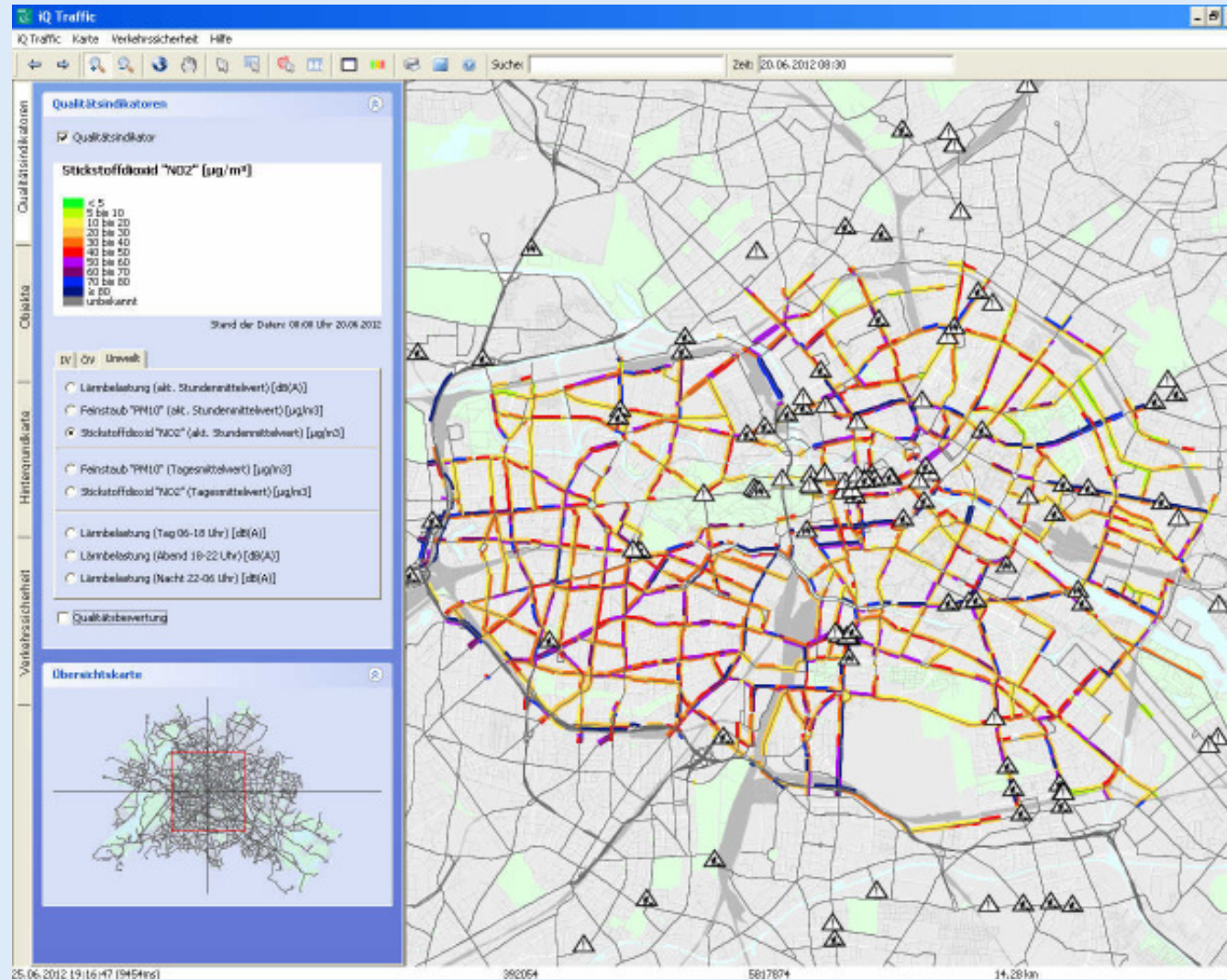


Quality Modul – Monitoring Environment (NO2, 08:30)

iQ mobility Project

Quality Module

Lessons Learned



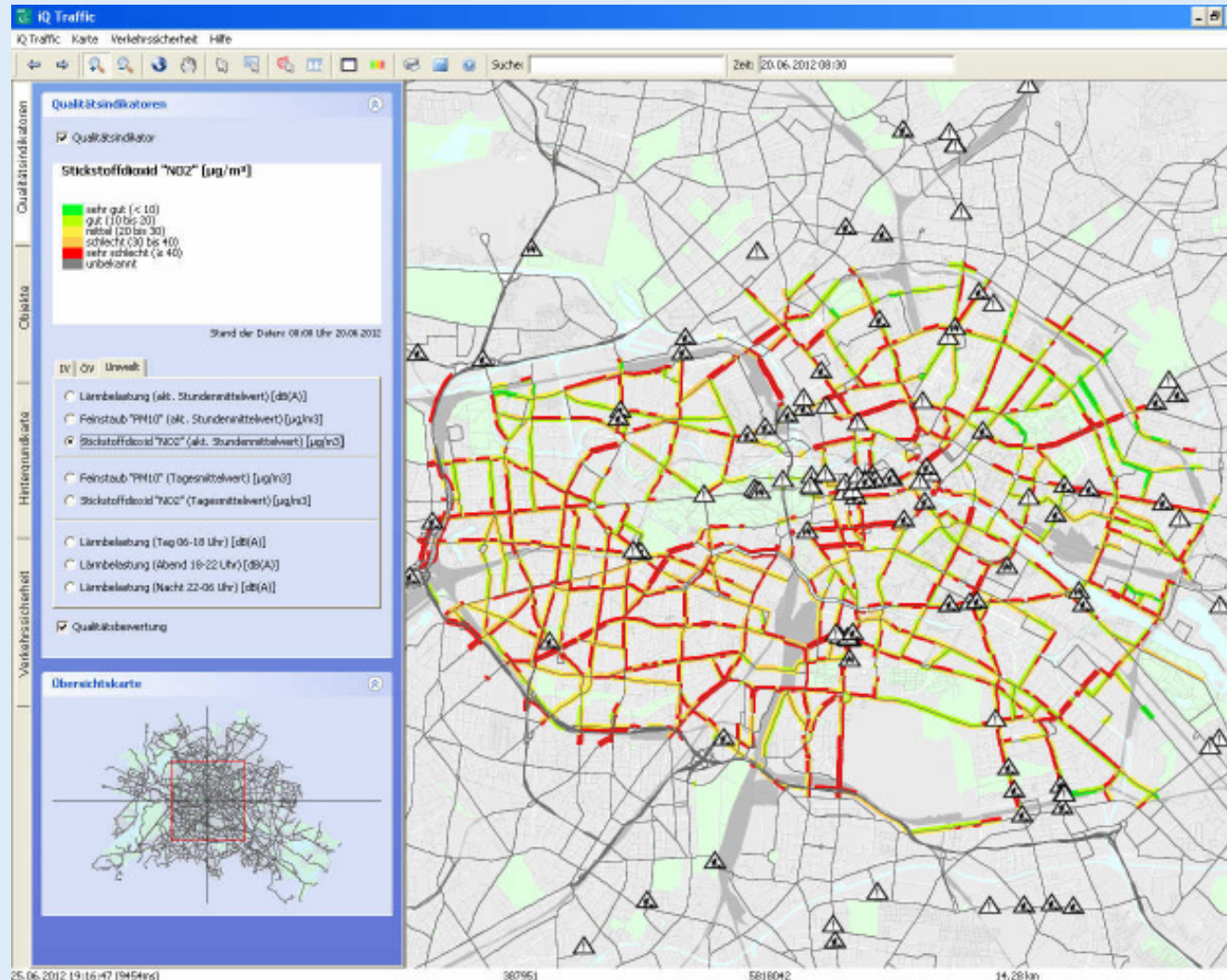
Gefördert durch:





Quality Modul – Monitoring Environment (NO2), Evaluation

iQ mobility Project
 Quality Module
 Lessons Learned





iQ mobility Project

Quality Module

Lessons Learned

Two Field Test Areas: one in Berlin & one in Potsdam



- **Zeppelin Street:** early warning system for detector problems (Parametrisation, detector switch, detector failure)
- **Nuthe Street:** Incident Management → unplanned incident of cable work (1.-17.12.2007)
- **Street 17. Juni:** strategic management for planned big events → realisation of improved strategies
- **Leipziger Street:** environment oriented traffic management

Gefördert durch:





iQ mobility Project
Quality Module
Lessons Learned

Field Test Area Berlin Mitte



Gefördert durch:





iQ mobility Project

Quality Module

Lessons Learned

Leipziger Street: Environment oriented Traffic Management

- Important east-west connection
- 40.000 – 45.000 vehicles / work day
- Field test on 1,6 km (between Potsdamer Platz and Spittelmarkt)
- All traffic lights can be controlled by the TCC to guarantee synchronized traffic lights („green wave“) at a certain speed (50 km/h or 30 km/h)
- Tempo 30 is only a recommended speed, not a speed limit
- At the beginning of the field test area were big signs „Field Test Traffic & Environment. Do not exceed 30 km/h)

Gefördert durch:



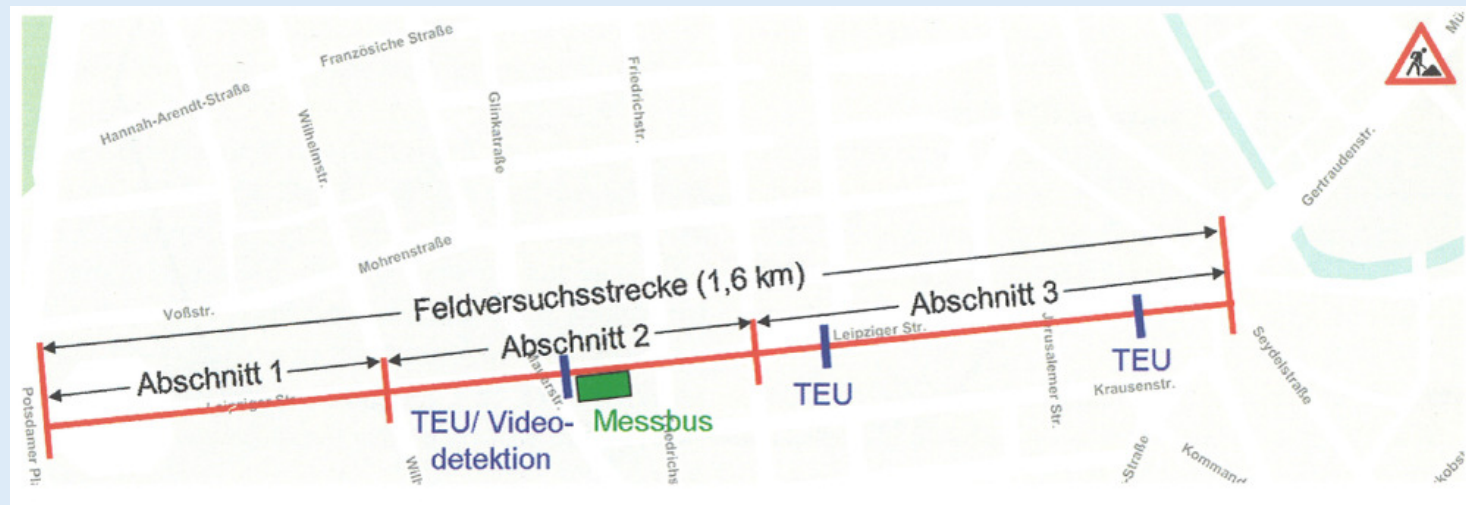


iQ mobility Project

Quality Module

Lessons Learned

Leipziger Street: Environment oriented Traffic Management



Gefördert durch:



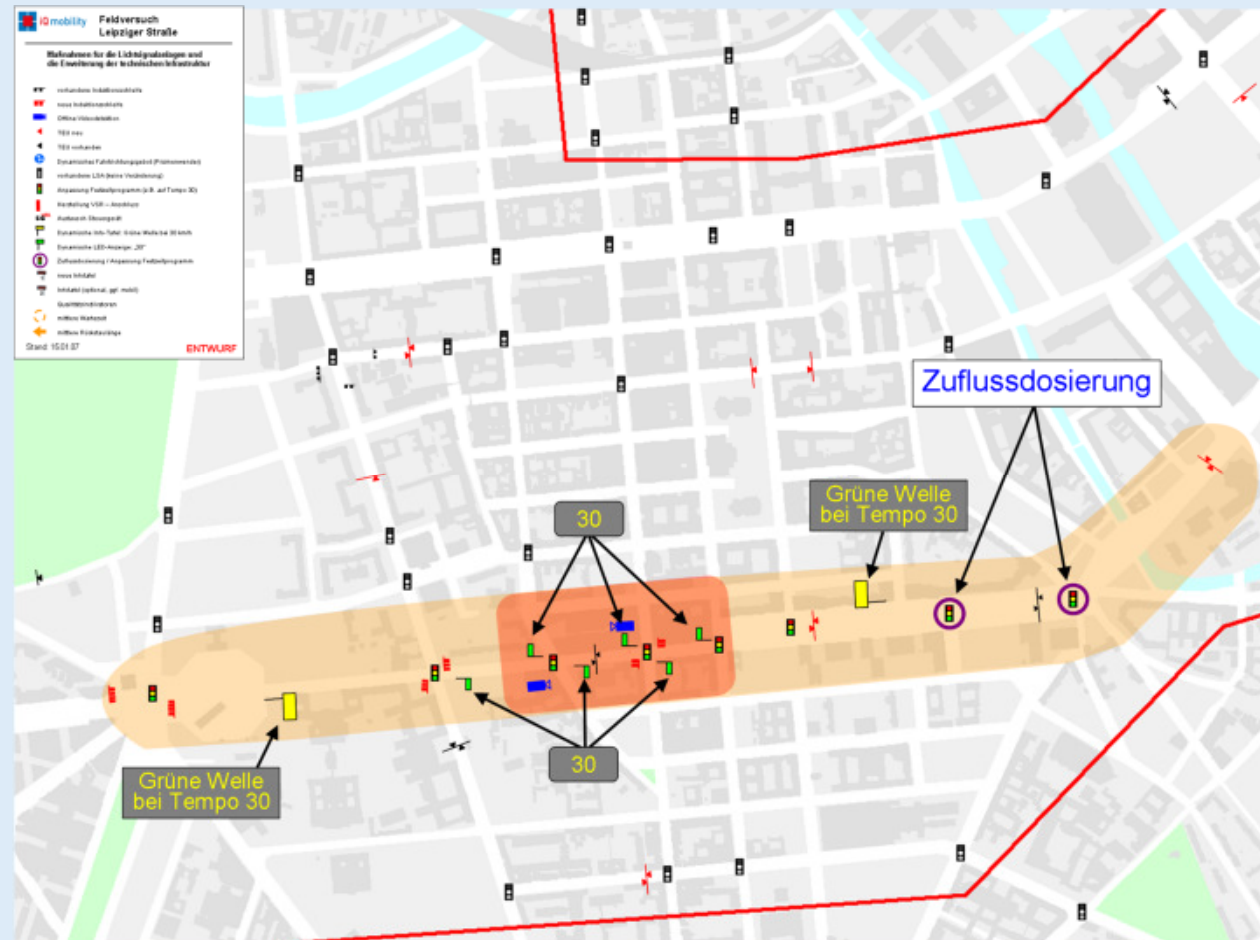


Infrastrukturmaßnahmen zu Feldversuchen Leipziger Straße

iQ mobility Project

Quality Module

Lessons Learned



Gefördert durch:





Leipziger Street: 4 Cases – each investigated for 3 weeks

T50 Traffic Related Steering (normal situation)

- The traffic lights are synchronized for a speed of 50 km/h. Traffic light programs relate to the traffic volume (not to daytime).

T50 Fixed Time Steering

- Traffic Light programs are based on fixed daytimes. „Green wave“ at a speed of 50 km/h.

T30 Fixed Time Steering

- Traffic Light programs are based on fixed daytimes. „Green wave“ at a speed of 30 km/h.

T30 Pollution Related Steering

- „Green wave“ at a speed of 30 km/h is only set up when critical environment pollution is building up.



Leipziger Street: Realisation

Gathering Environment Data

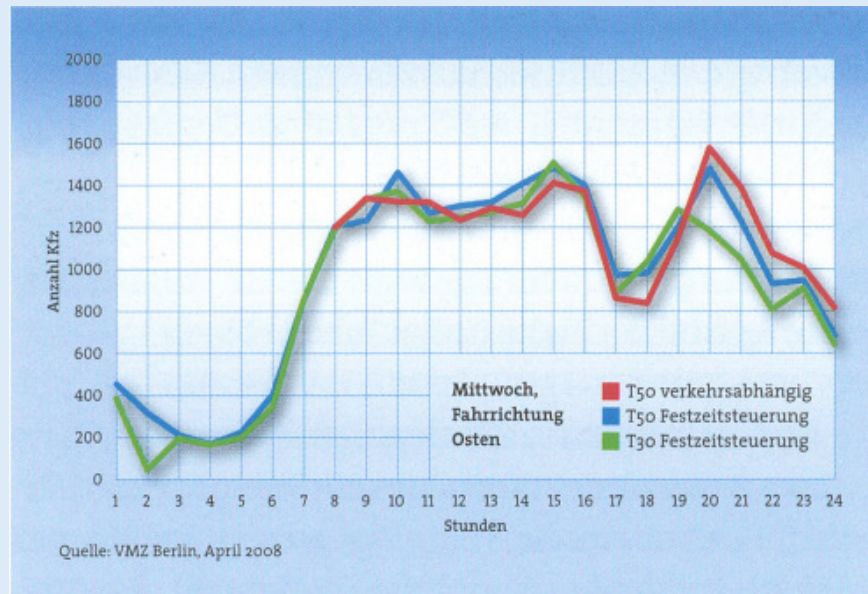
- Measure bus for local pollution → every half an hour data for PM10, NOx, carbon
- BLUME measure station at Amrumer Street → measures urban background pollution

Gathering Traffic Data

- Detection (TEUs and induction loops) → every 5 minutes
- Measure car on Mo, Wed, Fr and Sat from 5 am to 9 pm (over the whole period 1.310 ways)
- Video analysis → a camera was installed besides the measure bus: Tue and Wed from 5 am to 8 pm)



Leipziger Street: Analysis – Impact on Traffic



Traffic Volume
Wednesday
Direction East

- Similar curves of traffic volume for the 3 cases.
- 15:30-18:30 significant reduction caused by a construction site between Spittelmarkt and Alexanderplatz (traffic jam every afternoon).
- Average speed: T50 cases: 26,2 km/h; T30 case: 24,9 km/h
- 5,5 halts
- Constant driving: T50: 33%, T30: 40%

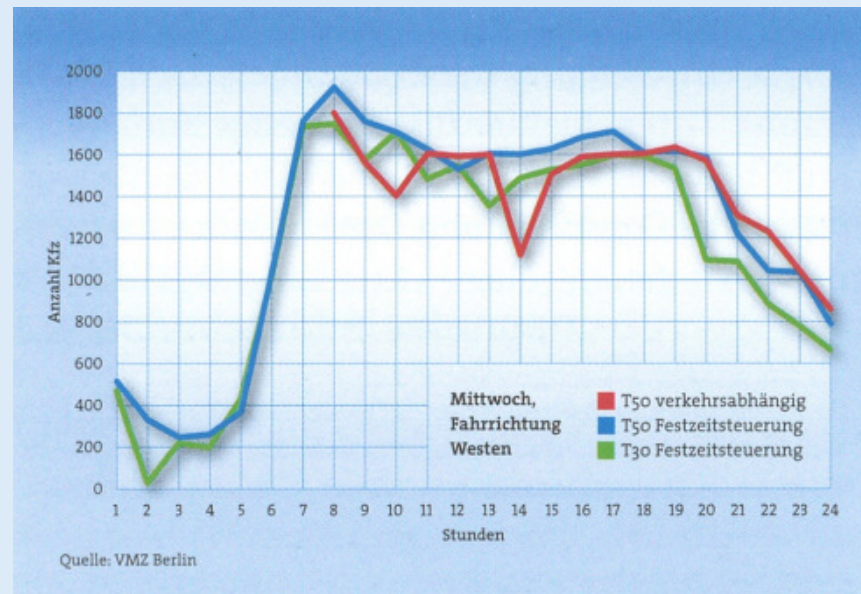


iQ mobility Project

Quality Module

Lessons Learned

Leipziger Street: Analysis – Impact on Traffic



Traffic Volume
Wednesday
Direction West

- Similar curves of traffic volume for the 3 cases.
- Average speed: T50 cases: 31,7 and 27,9 km/h; T30 case: 24,8 km/h
- 3 halts
- Constant driving: T50: 37%, T30: 38%

Gefördert durch:





Leipziger Street: Impact on Traffic - Results

- **Traffic Related Steering** leads more to a flowing traffic than **Fixed Time Steering**.
- Due to the high traffic volume the **average speed** during T50 scenarios was relatively low: 26-32 km/h. At a recommended speed of 30 km/h the average speed was only a little lower: 25 km/h
- At a recommended speed of 30 km/h and synchronized traffic lights at a speed of 30 km/h, the **average travel time** increases by 12 to 26 seconds and shows a lower maximum speed compared to T50 scenarios.
- If there is a very high traffic volume that **exceeds the capacity**, neither traffic related steering nor a recommended speed of 30 km/h shows great influence.

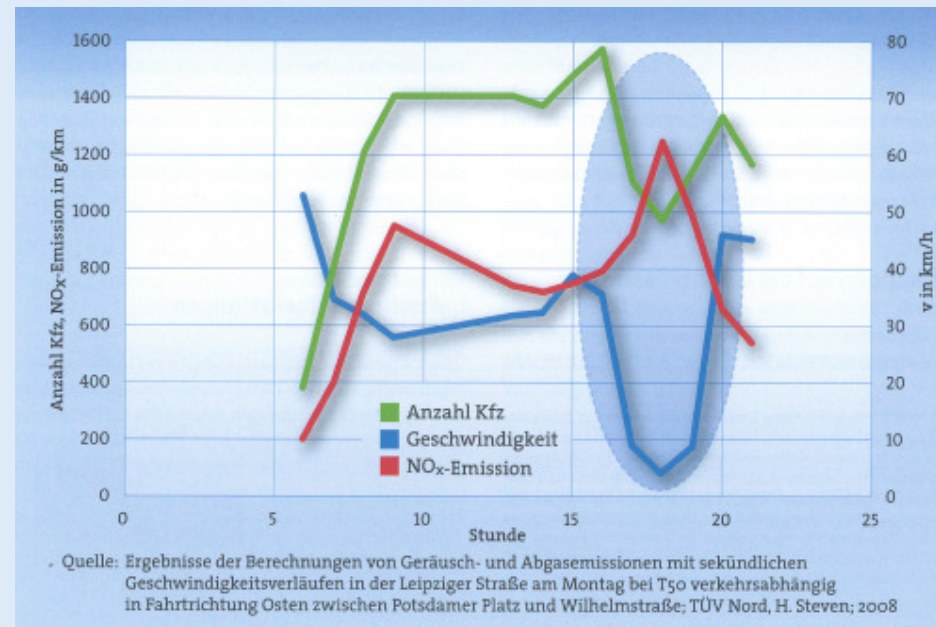


Leipziger Street: Analysis - Impact on Noise Emission

- Lower speed → less noise emission
- Flowing traffic → less noise emission
- higher maximum speed → more noise emission
- Especially the noise emission at night could be reduced with tempo 30.
- At night time, synchronized traffic lights by the speed of 30 km/h reduced the average speed up to 12 km/h.
- In times with little traffic and relatively high maximum speed and a low truck share the noise emission was reduced by **2 dB(A)**.
- During daytime the tempo 30 „green wave“ did not reduce the noise emission significantly, because during daytime this measure did not result in a reduction of the average speed.



Leipziger Street: Analysis - Impact on Air Pollution (NO_x)



- Traffic jams (speed less than 10 km/h) increase the immission of NO_x.
- The least NO_x immission was measured at an average speed between 40 and 50 km/h.
- The reduction of traffic jams and the increase of a constant flowing traffic are the best ways to reduce air pollution in the city traffic.
- T30 → more constant traffic → reduction of **NO_x by 4 %**.



iQ mobility Project

Quality Module

Lessons Learned

Leipziger Street: Analysis - Impact on Air Pollution (PM10)

- Abrasion and resuspension were not considered analysing PM 10.
- The reduction of traffic jams (especially in the afternoon) also showed positive impact on the PM10 immission.
- The **PM10** immission were **reduced by 3 %**.

Gefördert durch:





Leipziger Street: Impact on Environment Pollution - Results

- The highest environment pollution was measured for times in which the construction site between Spittelmarkt and Alexanderplatz caused traffic jams on Leipziger Street (especially in the afternoon).
- Additional traffic management measures to improve the traffic flow resulted in a further reduction of air pollutants: **10 % for NO2** (maximum reduction für NO2 17 %).
- The PM10 immission was also reduced but not as much as the NO2 immission (high urban background pollution).



iQ mobility Project

Quality Module

Lessons Learned

iQ mobility - Environment oriented Traffic Management



- Monitoring system for traffic (real time)
- Monitoring system for air pollutants and noise (real time)
- Development of scenarios for high traffic areas (control strategies)
- Situative traffic light control to reduce the pollutant load caused by road traffic

Gefördert durch:





iQ mobility Project

Quality Module

Lessons Learned

Links

- http://www.iqmobility.de/download/Broschuere_iQmobility.pdf
- <http://www.stadtentwicklung.berlin.de/umwelt/luftqualitaet/de/messnetz/>

Gefördert durch:

