

# WaLKIS Phase I and II

## Water management determinations and application of digital sealing data from official real estate cadastre data

Paved surfaces cause a reduction in the infiltration area for precipitation. This results in a change in the local water balance due to accelerated runoff behavior. In addition, run-off precipitation contaminated with pollutants and microparticles can pollute water bodies. In Phase I, a scientifically validated, reproducible method for the statistical estimation of sealed surfaces derived from ALKIS® data was created. During Phase II, an algorithm was developed based on the worksheet DWA-A 102/ BWK-A 3 (Teil A) „Principles for the Management and Treatment of Stormwater Runoff for Discharge into Surface Waters“ to derive nationwide standardized paved areas, their use-specific characteristics, their runoff effectiveness, and the associated potential area load.

### PHASE I

In general, paved areas in the official real estate cadastre information system (ALKIS®) can be divided into building and roof areas, traffic areas and access areas. These each account for 1/3 of the paved areas in North Rhine-Westphalia. In Phase I, the theoretical foundations and analysis methods for the determination of paved building and traffic areas as well as an area-wide analysis for the statistical estimation of paved access areas from the ALKIS® data and the verification of the results were developed.

### PHASE II

The work in Phase II is based on the preliminary work of the Emschergenossenschaft/Lippeverband (EGLV) according to Wessels (2019)<sup>1</sup>, which already contained important approaches to transfer the worksheet DWA-A 102/BWK-A 3 (Teil A) into a GIS-based, area-wide approach to estimate the load of paved traffic routes. Further development and automation of this approach followed, as well as a link to the Hamburg Authority for Environment, Climate, Energy and Agriculture (BUKEA) handout on „Requirement of treatment



Figure 1: Land-use specific load categories according to DWA-A 102/BWK-A 3 (Teil A) in the study area Gelsenkirchen. © FiW e. V.



Figure 2: Potential load categories of different road sections according to observed or deduced motor vehicle frequency in the study area Gelsenkirchen. © FiW e. V.

for stormwater from private traffic and roof areas“ (2021). Data sources used are: ALKIS®, ATKIS®, OpenStreetMap (OSM) and average daily traffic values (DTV).

FiW also carried out a detailed allocation of the area specification according to ALKIS® to DWA-A 102/BWK-A 3 (Teil A), including the runoff-reducing effect of permeable surface pavements (reduction value  $f_b$ ) as well as the roughness (Strickler coefficient  $k_{st}$ ). In this way, a fully automated allocation of the load categorization according to DWA-A 102/BWK-A 3 (Teil A) can be achieved depending on their land use. Furthermore, the use of OSM and DTV data enabled the estimation of the load caused by road traffic according to DWA-A 102/BWK-A 3 (Teil A). Together with EFTAS Fernerkundung Technologietransfer GmbH, an approach for the integration of water management issues into the project Cop4All (Copernicus for ATKIS®, ALKIS® and land cover NRW) was developed.

A working group accompanying the project (consisting, among others, of employees of MULNV, LANUV, GEObasis NRW, IT.NRW, district governments, lower water authorities and environmental protection authorities and offices as well as later users, such as EGLV and Gelsenwasser AG), provided valuable content-related findings on the one hand, and on the other hand this format helped to carry the results obtained from the project into administration and water management. With the completion of the project, uniformly derived map material is available for the whole of North Rhine-Westphalia at the district level. The land use-specific load categories of sealed surfaces according to DWA-A 102/BWK-A 3 (Teil A), the runoff coefficient and the roughness of the surface can be taken from this. In cooperation with IT.NRW, this geodata information will be available to approval authorities and users in the future. In cooperation with IT.NRW, this geodata information will be available to approval authorities and users in the future.

## Project overview

### PROJECT TITLE

Water management determinations and application of digital sealing data from official real estate cadastre data Phase I und II

### PROJECT PERIOD

02/2017 – 12/2018 (Phase I)

11/2020 – 07/2022 (Phase II)

### PROJECTPARTNER

EFTAS Fernerkundung Technologietransfer GmbH (Phase II)

### FUNDING

Ministerium für Umwelt,  
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### STATUS

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<sup>1</sup> Wessels, K. (2019): Ableitung von Belastungskategorien nach Arbeitsblatt DWA-A 102 Anhang A.