

## Work package 1 Prediction of pollutant loads and concentrations in road runoff

### Objective

*Knowledge of the characteristics of road runoff pollution (composition, quantity) being discharged from roads is crucial for the evaluation of its potential impacts on water bodies and related ecosystems, and to inform decisions on the need to construct treatment systems for impacts mitigation. The most precise method to characterise road runoff pollutant concentrations and loads is to carry out road runoff monitoring programs, including automatic sampling of rainfall and runoff, ecological and physico-chemical analysis of samples and calculation of the Event Mean Concentrations (EMC) / Site Mean Concentrations (SMC) and pollutants loads. It is generally accepted that at least 10 stormwater events from independent rainfall events must be monitored to calculate a robust SMC for a given location. Monitoring work requires considerable human, and material resources and are subject to variables not controllable, such as equipment damage or loss; absence of (appropriate) rainfall events, etc. Therefore, pollutant concentration/load prediction tools are a very important method to enable protection of the environment and water resources, as well as manage and reduce road runoff pollution discharges. The foundation of any consistent and sound prediction tool is a substantial road runoff monitoring database from sites with different characteristics (e.g.: rainfall pattern; road design; traffic density). The ultimate objective of this work package is to collate such an evidence base and use it to revise existing sound tools able to predict road runoff pollution in terms of loads and concentrations.*

### Description of work

*To accomplish the work package objective, several activities are identified, namely: i) a critical literature review of the main International studies and legislation on road runoff pollution; key pollutants and relevant tools for prediction of road runoff pollutants; ii) Co-development of criteria with an International Advisory Board (IAB) to inform selection of up to 4 tools that are likely to be applied with success to European roads; iii) testing and validation of the selected tools to predict road runoff pollution (with recommendations for their use in different European countries). As novel aspect, the literature review will also look to integrated learning and approaches from the use of traffic emission and air quality models, to look for synergies to refine pollutant prediction tool. WP1 activities are organized in 5 tasks.*

*As a support to the whole WP1 activities, a comprehensive literature review on pollution in road runoff will be developed in task 1.1. All consortium partners will contribute to it. Key pollutants according to the European legislation and the road and climate features that may influence the road runoff pollution will be addressed in this review.*

*Relevant and robust tools to assess pollution loads and concentrations in road runoff will be identified in the literature review conducted in task 1.1. They will comprise the (i) the Highways Agency Water Risk Assessment Tool (HAWRAT) and (ii) the Stochastic Empirical Loading and Dilution Model (SELDM) and review other tools able to comply with the basic characteristics of application to European roads. As a following step, a critical review of these tools will be developed in task 1.2 focusing on a set of parameters related to (i) input data; (ii) easiness of applicability of the tool and (iii) consistency and appropriateness of output results.*

*A selection of the most relevant tools - including HAWRAT, SELDM and up to 2 other tools will be one of the deliverables (D1.1). These up to 4 tools will be tested in Task 1.4, against already available and updated monitoring data from representative sites across Europe. As an intermediate step, Task 1.3 will promote a selection of relevant monitored sites, representative of European roads. These sites will represent different climate regions (e.g. Mediterranean, continental and maritime), road configurations and traffic characteristics.*

*Task 1.4 will be dedicated to collating the monitoring data for each event and representative sites and the output result of each of the tools used to predict pollution in road runoff. The analysis of results, and comparison among the tools will allow the evaluation of the type and level of uncertainty associated with each tool and their suitability to the objectives.*

*Task 1.5 will be focusing in providing data of traffic emission of pollutants to the air compartment, and analysis, when appropriated, of the soundness of background equation/ emission factors used by the different tools.*