

Recommended price concept for rainwater treatment systems (e.g. RRB)

Sediment and sludge monitoring in settling and retention basins

The effort required to determine sediment and sludge deposits in typical basin systems up to a size of one hectare of water surface area depends largely on the following factors:

- 1) Condition of the basin in terms of accessibility and vegetation (reeds, underwater weeds, etc.)
- 2) Type and level of detail of measurement and evaluation (usually dependent on the purpose of the recording)
- 3) Number of facilities or basins that are recorded simultaneously in a series

Therefore, services for typical basin systems can be offered within a recommended price concept for better orientation and transparency.

1) Basin types (classification of condition)

The state of vegetation at the time of recording is decisive for the measurement method to be used on site and is therefore decisive for the recording effort. The basin type can be classified in advance by the client or by us if appropriate image material is available. It is assumed that the sludge is easily penetrable, fine-grained, and non-cohesive, as is typically found in RRB settling areas (max. penetration pressure 0.5 MPa). If a different classification results during the work on site, this will be coordinated immediately with the client.

Basin type A

Dry or largely accessible from the shore if spot measurements are sufficient (also ditches or smaller box basins).

Terrestrial and Geospector DTS Acqua



Basin type B

Clean water surface (pollen and a small amount of foliage are acceptable), little underwater- and edge vegetation allow the use of water drones.

Geospector DTS Acqua



Basin type C

Dense vegetation (reeds, weeds, large areas of water lilies) on, under, or above the water requires the use of aerial drones or boats.

Geospector DTS Acqua+ or boat



2) Measurement and evaluation types

Standard evaluations that are frequently requested are offered as part of the recommended price concept. Additional evaluations (3D models, orthophotos, CAD-plan creation, etc.) are offered on an individual basis.

Initial survey with measurement report (bottom and sediment/sludge level)

When a basin is recorded for the first time, the bottom contour is first recorded at specific points, taking into account any plans. Depending on the type of basin, the sludge level is determined either over the entire area (type B) or at specific points (types A & C). In the measurement report, the difference values are shown as sludge depths on a map and an average value is calculated, as well as a rough estimate of the sludge volume in the recorded area. In addition, qualitative information on the condition of the facility (water level, weather, vegetation, etc.) is documented.

Optional: Follow-up survey with measurement report (sediment/sludge level only)

After the initial survey, the sludge level is measured again and a corresponding measurement report is created.

Optional: Exact volume calculations (geometric, terrestrial, or photogrammetric)

Parallel to the initial survey, the basin geometry above the water level up to the top of the embankment can be recorded and an internal 3D model of the entire basin can be created. From this, exact sludge and empty volumes (water level, impoundment target, top of embankment) can then be derived and additionally documented in the measurement report.

Areas that were not recorded by the specified measurement method (depending on the basin type) are estimated plausibly.

Without this precise bottom modeling, rough volume errors can occur in small basins with sloping embankments (see corresponding PDF). If the sludge volume values are to be used as a basis for cleaning work, this detailed volume determination is strongly recommended.

It can be agreed in advance that the exact volume measurement will only be carried out in the event of relevant sludge deposits.

Depending on the complexity of the basin geometry, the following recording methods are used:

- **Geometric:** In the case of simple geometries such as box basins. No slopes are modeled; instead, vertical banks are assumed. Also suitable for larger basins where sloping edges play a minor role and no volume calculations up to the embankment height are required.
- **Terrestrial:** GPS measurements are used to measure relevant embankment points by visual inspection and the bottom geometry is modeled with relevant slopes.
- **Photogrammetric:** Complex and expansive slope geometries are most reliably captured using terrestrial or drone photogrammetry.

3) Number of basins for series measurements

If several basins are commissioned simultaneously (series recording) in one area, the following volume discounts are granted:

- From 5 basins: 5%
- From 10 basins: 10%
- From 20 basins: 15%
- From 50 pools: on request

Notes

Connected basins within a facility (e.g., settling and retention areas separated by a threshold) count as two basins.

It is assumed that the client will provide appropriate support:

- Provision of any existing plans
- Brief introduction to the facility on site
- Ensuring access (gate system, access road, mowing if necessary)

It is assumed that the sediment or sludge layer can be clearly distinguished mechanically from the basin floor (e.g., concrete or solid clay).

The maximum depth from the water level to the bottom of the basin is assumed to be three meters.

The guide prices only apply to recording periods from March to October (daylight hours, battery life, etc.).

The guide price concept only includes on-site recording, evaluation, and the measurement report. In addition, there are usually ancillary costs (e.g., travel) and expenses for logistics, organization, and project management.

Procedure

Please refer to the current price list for the guide prices.

In the Excel file "RBB_RecommendedPriceConcept" (RBB_Guide price calculation), you can enter the data for the individual systems and basins as well as the desired scope of services and receive a preliminary price calculation. You can specify whether a volume evaluation should be carried out using criteria defined in the comments (e.g., sludge thickness) or only after consultation with you.

Please return the completed form to us by email. After checking and making any necessary corrections, we will then prepare a corresponding offer for you.

In order to assess the type of pool, we require the following up-to-date images:

- Overview photo of the facility, including any trees and obstacles
- Per pool, images of the water surface (without reflections if possible)
- Per pool, photos taken at an angle into the water (underwater vegetation)