

THE POINT
ABOUT...

WATER MANAGEMENT IN AGGREGATES QUARRIES AND SAND AND GRAVEL SITES

CONTEXT

In a watershed, any extraction of a mineral resource will naturally interfere with this environment, potentially generating qualitative and quantitative impacts on water resources. Water protection is a major challenge for aggregate operators.

Each quarry, like any facility classified for the protection of the environment, must be the subject of prior impact assessments to evaluate the effects of its activity on the territory concerned in all its components: hydrological and hydrogeological equilibria, aquatic ecosystems, water resources, space for the mobility of watercourses ...

In Europe, there are approximately 26.000 aggregates sites, nearly 60% of which carry out the washing of materials for their production. For several years, the industry has taken action to encourage aggregate producers to continuously improve: training of operators, control of water consumption, knowledge of water streams.

Washing of aggregates is an essential industrial step to remove fine particles naturally contained in the deposit and thus allow the product to obtain sufficient adhesion for use with binders (cement, lime, bitumen, etc.). To meet the needs of customers and normative constraints, facilities use water to wash aggregates, but also in an ancillary way, to classify them and correct their absorption.

To facilitate understanding of the water circuits used on aggregates sites and their processing facilities, the National Union of Aggregate Producers (France) proposes simple diagrams and a standardisation of semantics with the aim of improving the understanding of quarry water use by all stakeholders.



UNION NATIONALE DES
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THE CIRCUIT OF PROCESS WATER OF AGGREGATES TREATMENT AND WASHING FACILITIES ON A SITE

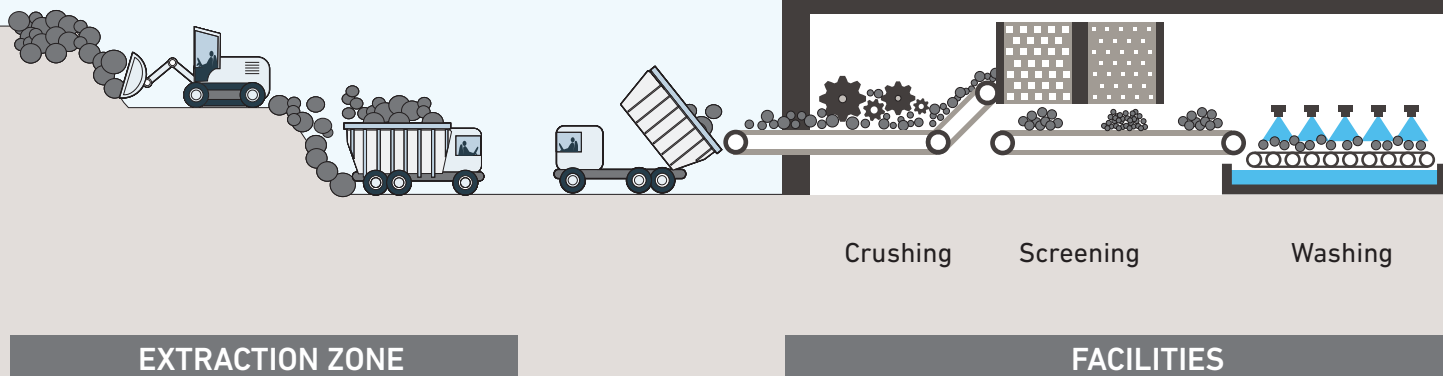
The process water circuit of the aggregate treatment and washing facilities is designed for recycling. The water from the washing process of the materials is charged with fine mineral inert particles. These waters are recycled by natural decantation or any other appropriate method described in the impact assessment, in accordance with the legislation.

AUTHORISED PERIMETER

In all cases, massive rocks or loose rocks, all waters are recycled within the authorised perimeter of the quarry.

PROCESS WATERS

All the waters used in the production process: incoming water (recycled water and water withdrawn) and waste water (water + fines and water in finished products).



WATER IN FINISHED P

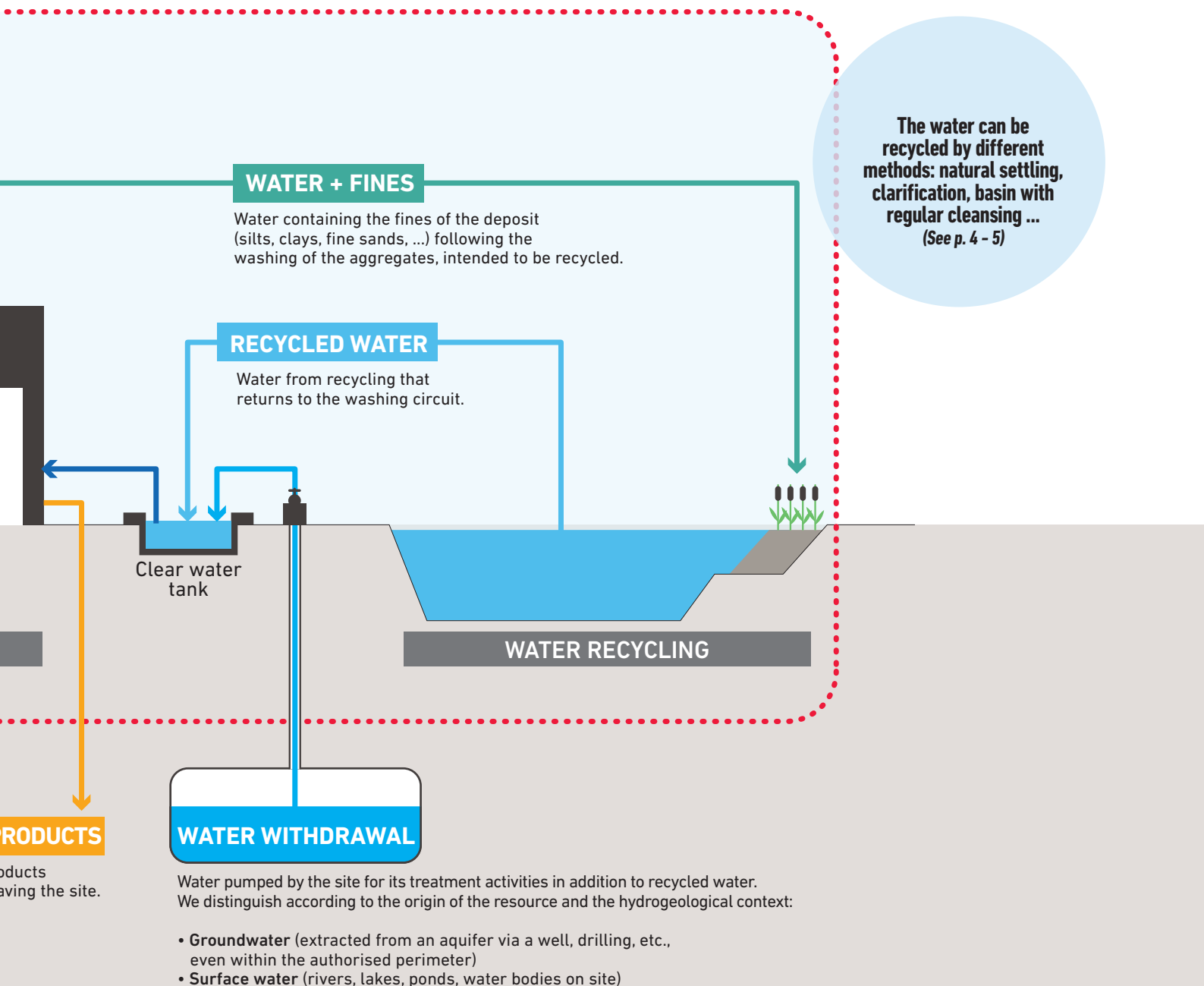
Water contained in finished pro (moisture from aggregates) lea



REGULATORY POINT

Quarry installations using process water are subject to the application of national provisions stating:

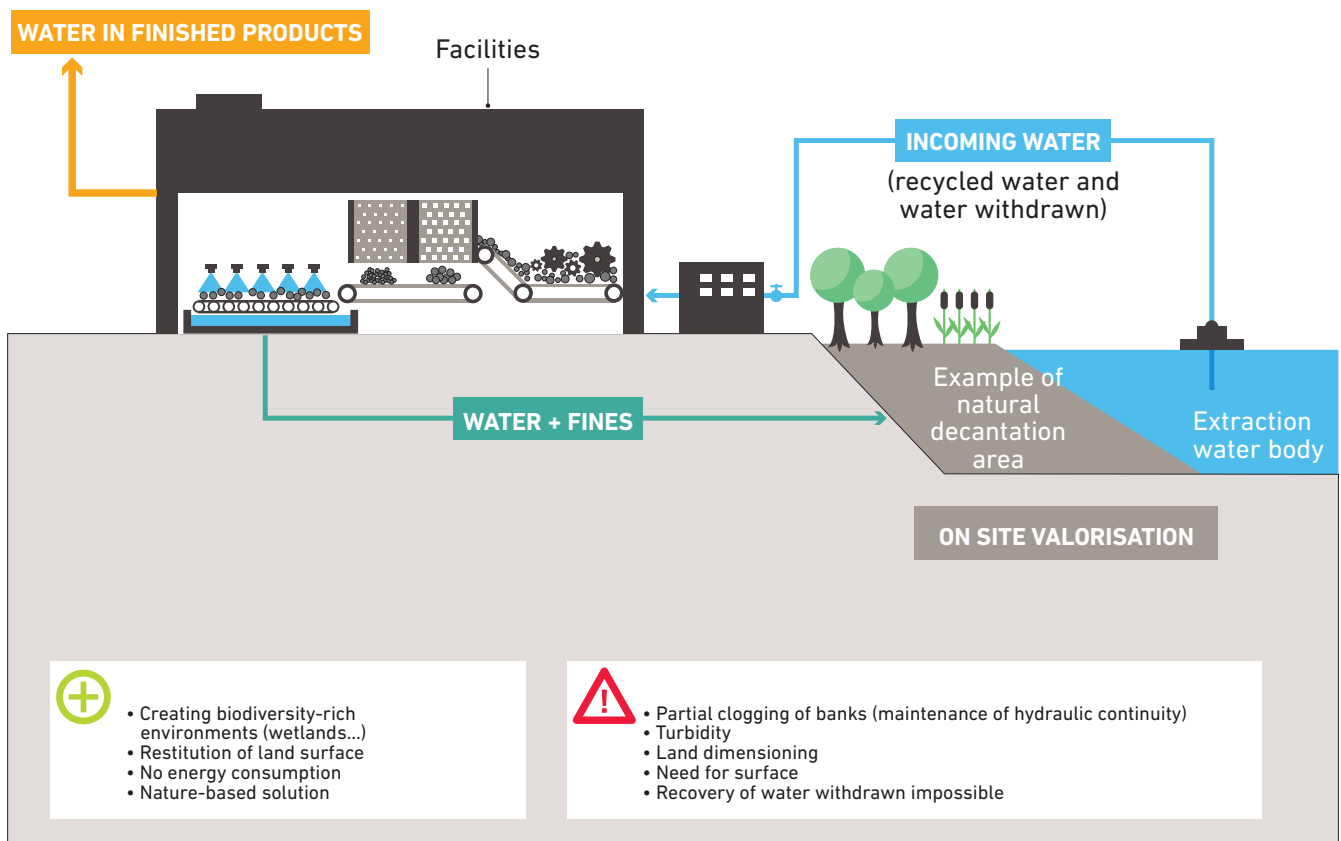
- ▶ If the discharge of process water from material processing facilities is allowed or prohibited outside the authorised site.
- ▶ The need that these waters are recycled and the quantitative and qualitative parameters to be reached.
- ▶ The conditions under which the recycling circuit must be designed in such a way that it cannot give rise to accidental pollution.



RECYCLING METHODS FOR PROCESS WATERS

The water loaded with fine particles at the exit of the installation is recycled to limit the water withdrawal from the natural environment. This recycling is carried out in a natural or industrial way. The following diagrams summarise the most commonly used methods.

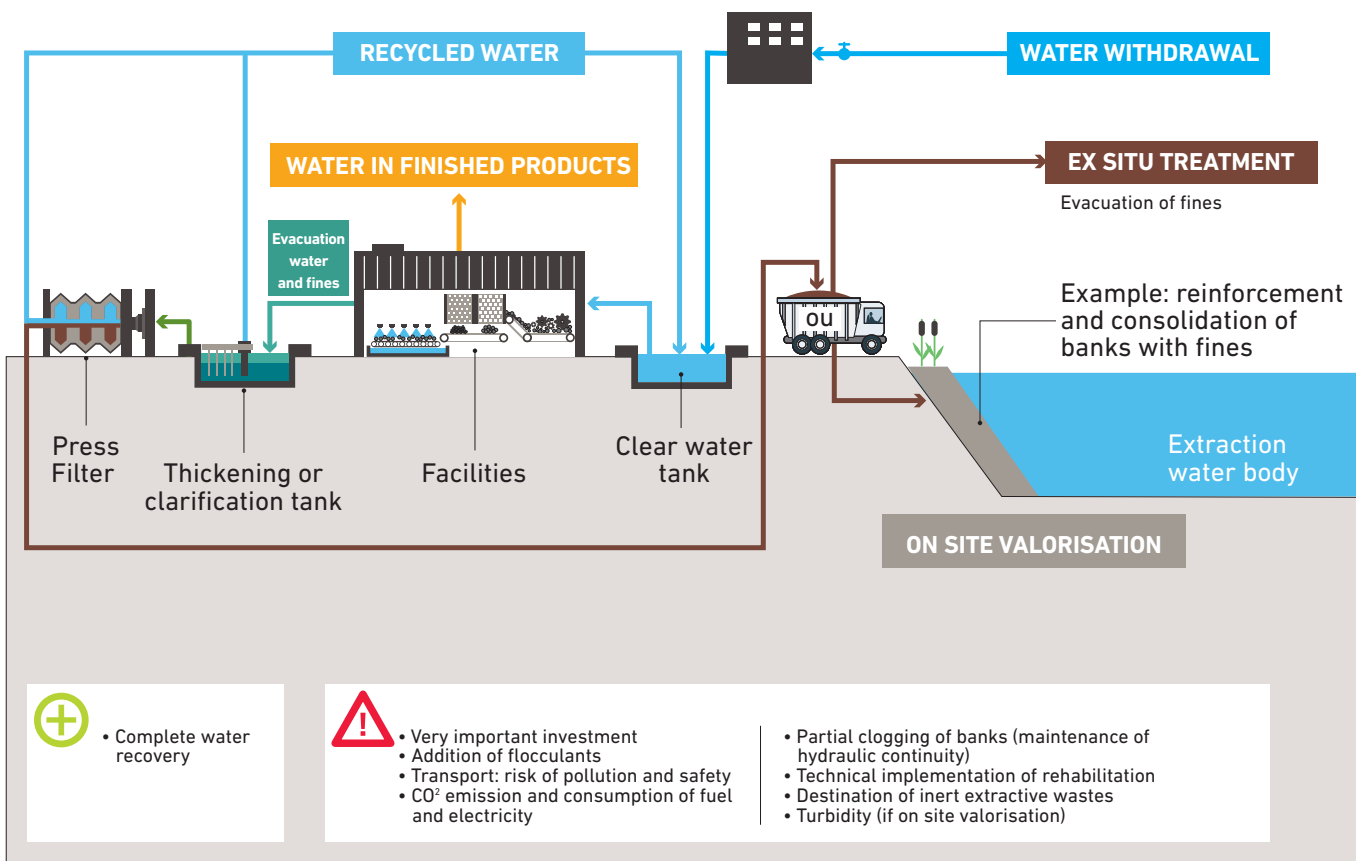
NATURAL DECANTATION BY GRAVITY





The most efficient way for water recycling is the one that takes into account the specificities of the site. Several factors must be considered to ensure its effectiveness, including: The area that can be used for recycling, the availability of water resources that can be mobilised, the need for the creation of ecological zones for rehabilitation, the level of investment ... Each recycling type presents points of interest ⊕ and vigilance ⚠ in relation to the stakes of the site. They should therefore be integrated at the design stage of the facility.

INDUSTRIAL PROCESSES CLARIFICATION / MUD PRESS FILTER



OTHER WATERS ON SITES

On aggregates quarries, sand and gravel sites and material treatment plants, there are other streams of water not included in the production process; These are the waters:

- ▶ For the maintenance of the site
- ▶ For the use of personnel (domestic water)
- ▶ Of natural origin (rainwater and drainage water)

These waters should be accounted for and monitored.

AUTHORISED PERIMETER

OTHER USES

Other uses of water in a quarry:

- Cleaning water: washing of fixed and mobile equipment (gear, installations, trucks, weighing bridge...)
- Dust suppression
- Sanitary, office, laboratory.

Oil separator
(de-oiler)

PROCESS WATERS

Crushing Screening

EXTRACTION AREA

FACILITIES

WATER DISCHARGE

Punctual discharge of water for other uses:

- After treatment with a de-oiler for waters that may have been polluted by hydrocarbons.
- After autonomous sanitation or in the water network for personal use.



Volumetric Tracking

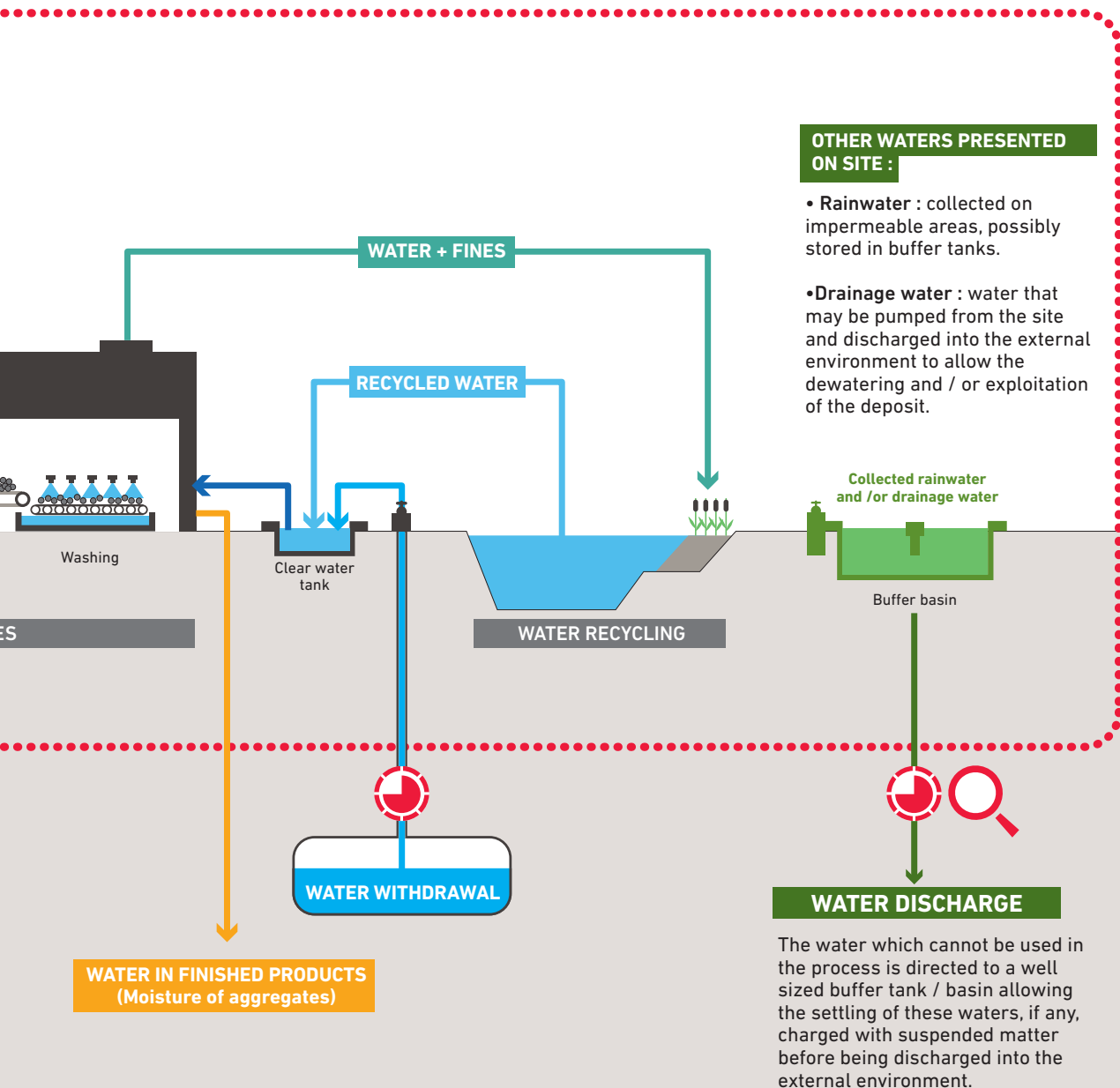


Qualitative monitoring of surface waters



REGULATORY POINT

Other water discharged into sites (drainage, cleaning, etc.) could be regulated by national or regional provisions. The discharges of these waters are subject to qualitative controls, the threshold values of which are normally established by specific national or regional regulations.



OTHER WATERS PRESENTED ON SITE :

- **Rainwater** : collected on impermeable areas, possibly stored in buffer tanks.
- **Drainage water** : water that may be pumped from the site and discharged into the external environment to allow the dewatering and / or exploitation of the deposit.

WATER DISCHARGE

The water which cannot be used in the process is directed to a well sized buffer tank / basin allowing the settling of these waters, if any, charged with suspended matter before being discharged into the external environment.

WHAT YOU SHOULD REMEMBER ABOUT WATER MANAGEMENT IN AGGREGATES QUARRIES AND SAND AND GRAVEL PITS



A WATER MANAGEMENT ADAPTED FOR EACH SITE

The aggregates sites fully recycle their process water. There is not only a type of recycling, but as many setups as sites..



WATER UNDER CONTROL

Water discharged outside the authorised perimeter is strictly monitored. No process water can be discharged without permit.



WATER COUNTED IS NOT ALWAYS WATER CONSUMED

Accounting for recycled water and withdrawn water is not always feasible because flows can be combined or cross-used.



WATER MANAGEMENT: AN OPPORTUNITY FOR BIODIVERSITY

The natural settling zones have shown their ecological value in active and rehabilitated sites: highland areas, reed beds ...



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