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SEDIMENT RETENTION POND






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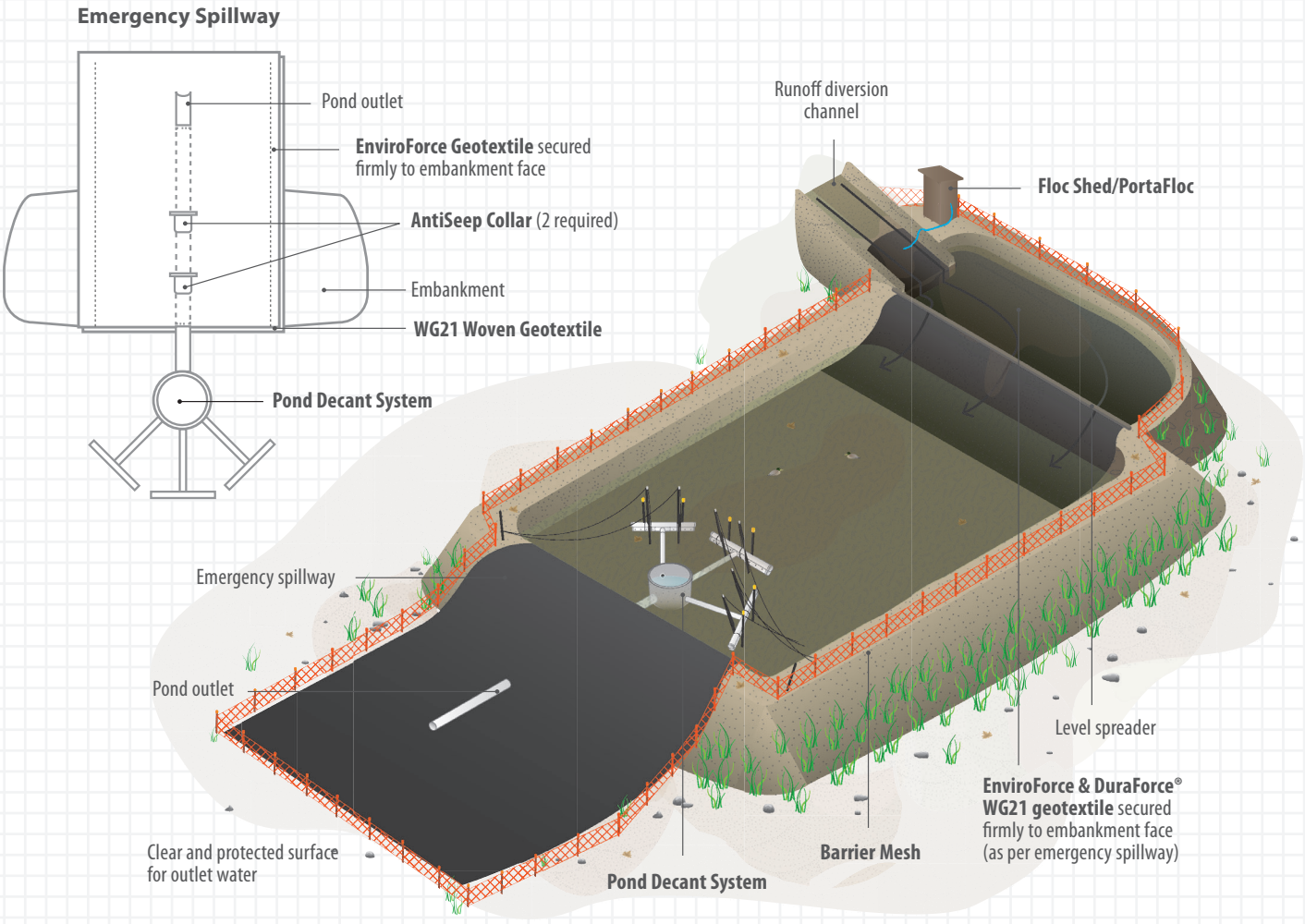
SEDIMENT RETENTION POND

Sediment Retention Ponds are appropriate where treatment of sediment laden runoff is necessary. They are generally considered the appropriate control measure for exposed catchments of more than 0.3 ha. It is vital that the Sediment Retention Pond is maintained until the disturbed area is fully protected against erosion by permanent stabilisation.

The location of the Sediment Retention Pond needs to be carefully considered in terms of the overall project, available room for construction, maintenance and the final location of any permanent stormwater retention facilities that may be constructed at a later stage.

Another major consideration is whether drainage works can be routed to the Sediment Retention Pond until such time as the site is fully stabilised. This eliminates the problem of installing and maintaining stormwate inlet protection throughout the later stages of a development.



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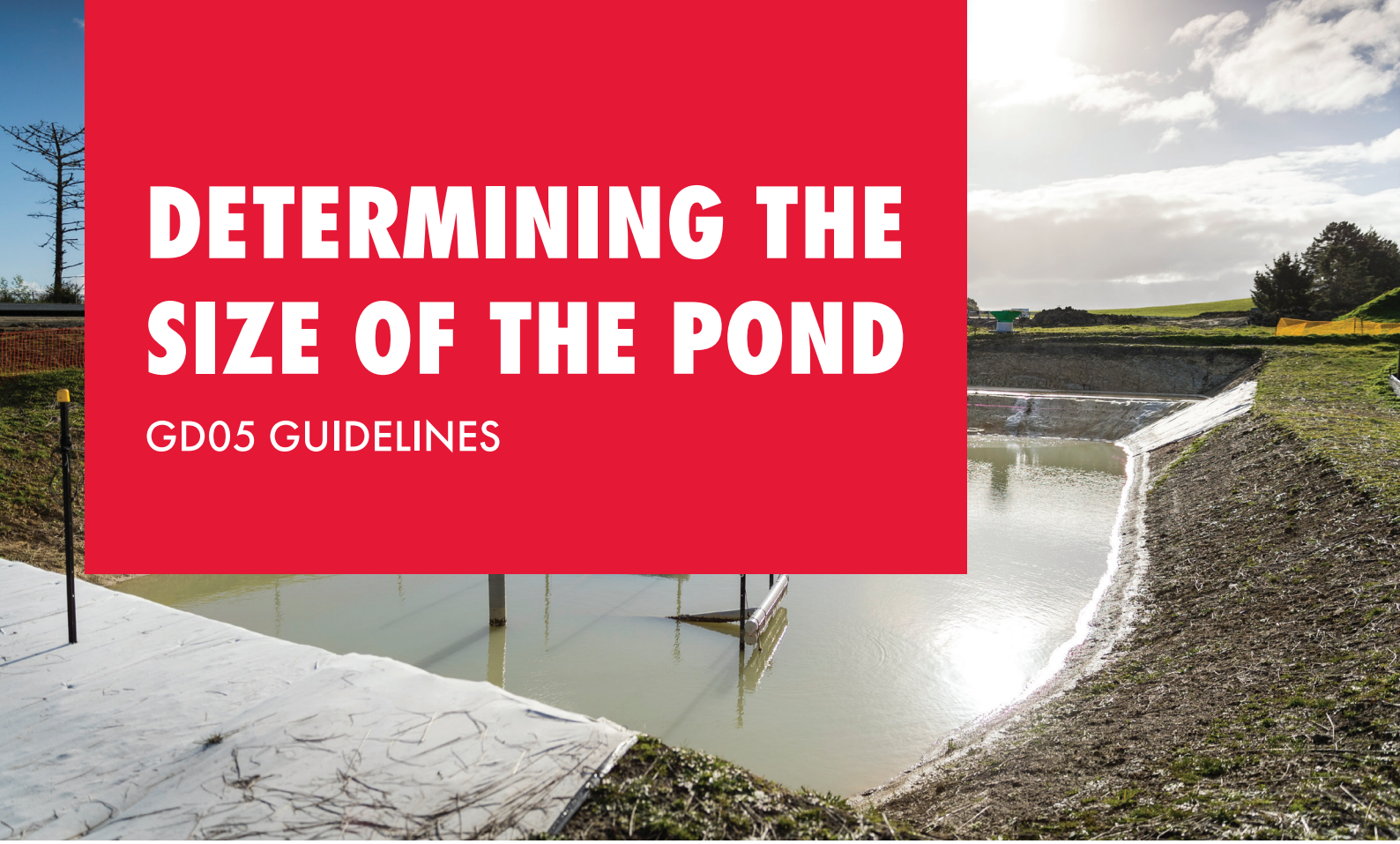
The general design approach is to create an impoundment of sufficient volume to capture a significant proportion of the design runoff event, and to provide stilling conditions which promote the settling of suspended sediment.

The Sediment Retention Pond design works in such a way that very large runoff events will receive at least partial treatment and smaller runoff events will receive a high level of treatment. To achieve this, the energy of the inlet water needs to be low to minimise re-suspension of sediment. The decant rate of the outlet also needs to be low to reduce water currents and to allow sufficient detention time for the suspended sediment to settle out.

DESIGN CRITERIA

1. Generally use Sediment Retention Ponds for bare areas of bulk earthworks of 0.3 ha or greater.
2. Restrict catchment areas to less than 5.0 ha per Sediment Retention Pond. This limits the length of overland flow paths and reduces maintenance problems.
3. Locate Sediment Retention Ponds so as to provide a convenient collection point for sediment laden runoff from the catchment area. This will require strategic use of cut-offs, runoff diversion channels and contour drains.
4. Locate Sediment Retention Ponds to allow access for removing sediment from the pond.
5. Wherever possible, locate Sediment Retention Ponds to allow the spillway to discharge over undisturbed, well vegetated ground.
6. Keep the Sediment Retention Pond life to less than two years. If a longer term is required then further measures to ensure stability and effectiveness are likely to be needed.
7. Do not locate Sediment Retention Ponds within watercourses.
8. Embankment and spillway stability are generally the weak point in Sediment Retention Pond construction. Correct compaction particularly around emergency spillways, discharge pipes and Anti-Seep Collars will keep the system robust.

MAINTENANCE: Inspect and maintain Decanting Earth Bunds regularly and after each rainfall event to check for accumulated sediment which may cause overtopping. Check any discharge points for signs of scouring and install further armouring or other stabilisation if scouring is evident.



DETERMINING THE SIZE OF THE POND

GD05 GUIDELINES

To calculate the volume of the Sediment Retention Pond using the depth measured from the base of the Sediment Retention Pond to the top of the outlet riser, the following design criteria apply.

- On earthwork sites with slopes less than 18% and less than 200m in length, construct a Sediment Retention Pond with a minimum volume of 2% of the contributing catchment (200m3 for each ha of contributing catchment).
- On sites with slopes greater than 18% and/or 200m in length, construct Sediment Retention Ponds with a minimum volume of 3% of the contributing catchment (300m³ capacity for each ha of contributing catchment).
- The slope angle is determined by slope immediately above the Sediment Retention Pond or by the average slope angle over the contributing catchment, whichever is the greater.
- On sites that are particularly steep or have sensitive downstream environments, a greater Sediment Retention Pond volume may be required.
- Clearly show the Sediment Retention Pond dimensions necessary to obtain the required volume, as detailed above, on the site's Erosion and Sediment Control Plan(s).
- For sand soils (less than 8% clay and less than 40% silt) the size of the Sediment Retention Pond may be calculated using the following formula:
  - Pond surface area (m²) = 1.5 x Peak Inflow Rate (litres per second)
  - Calculate the inflow rates using the 5% Annual Exceedance Probability (AEP) rainfall event. Ensure the Sediment Retention Pond has a minimum depth of 1m
  - Alternatively, construct Sediment Retention Ponds with a minimum volume of 1% of the contributing catchment (100 m3 capacity for each ha of contributing catchment)
- Clean out Sediment Retention Ponds when the volume of sediment accumulated within them reaches 20% of the design volume.

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