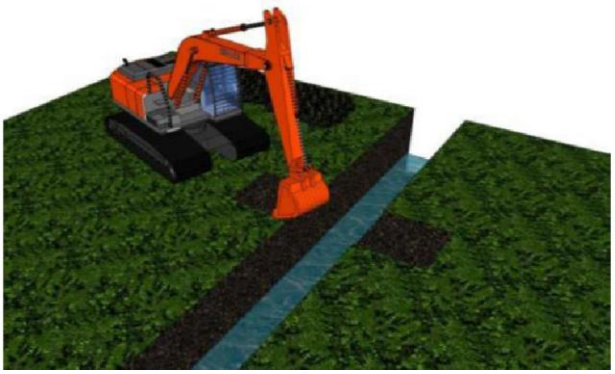
Installation Schematic:



1. Remove scraw from either side of the drain at the proposed location of the peat dam. Place material close by for replacement later.

2. Cut a key in the drain and ensure that it is 0.75m wider than the actual drain on both sides. The key should extend the full depth of the drain plus an additional 0.75m below the invert of the drain. The removed material should be placed behind the machine for replacement later.

3. Remove scraw from the area behind the machine to be used as a borrow pit. If more peat than usual is required to fill the drain, make sure to widen the borrow hole not deepen it as the best peat for damming is nearest ground level due to fibre content.

4. Dig out peat from borrow pit and place into drain compacting in layers of 3-4 buckets per layer depending on the size of drain and machine used. Compact the peat using the bucket before laying more peat from the borrow hole.

5. Build the dam 75cm above the ground level of the bog to allow subsequent shrinkage of the peat as it dries.

6. Take the scraw removed in step 1 and place it on either side of the dam. Then use the scraw removed from the top of the borrow hole to cover the rest of the dam. Backfill the borrow hole with the peat extracted from the drain in step 2. Press down on the sides of the peat borrow hole with the bucket to smooth the slope into the hole.

Reference:

McDonagh, E. (1996). Drain Blocking by machine on Raised Bogs. National Parks and Wildlife Service, Dublin

Measure:	Plastic dams on high bog and cutover (Z profile)

Description:

Plastic dams are typically installed by hand on high bog or cutovers, especially where peat dams may erode. On the high bog, they are used in areas where machine access is not possible or where relatively few dams are required meaning the costs of a machine are not justifiable. The aim is to bring the water table up to the bog surface and maintain it near the ground surface throughout the year. This is to restore suitable hydrological conditions to allow active raised bog (ARB) to develop on high bog. On cutover bog, these dams aim to reduce vertical loss of water from the high bog and provide suitable hydrological conditions for peat-forming vegetation to develop. Even in areas where ARB cannot be restored, drains should be blocked as this can help to reduce the rate of flow off the bog.

Examples where this has been used/done on the Living Bog Project:

- Carrowbehy/Caher Bog SAC
- Carrownagappul Bog SAC
- Kilsallagh Bog SAC
- Moyclare Bog SAC
- Sharavogue Bog SAC

Installation **method:**

Plastic dams are typically installed by hand using lengths of interlocking plastic piles. These can be supplied in varying lengths and if necessary cut to size depending on the depth of the drain. It is important that the piles are long enough to extend sufficiently below the base of the drain in order to be secure and minimise water flow under the base of the dam. This may vary depending on the characteristics of the drain. Plastic dams should be installed in drains every 10cm fall in elevation (McDonagh, 1996). The installation process is outlined below:

- Push the first plastic pile into the centre of the drain, ensuring it remains vertical.
- Drive the pile into the peat further until it is held firm using a large rubber mallet (if necessary protect the top of the plastic using a timber batten).
- Once the centre pile is in a secure position guide adjacent piles into position, pushing into the peat and using the rubber mallet to drive into a firm position.
- The dam should extend beyond the width of the drain into the bog, typically by a minimum of 75cm to prevent water from flowing around the dam and eroding the sides of the drain.
- Once all piles have been positioned and are secure they should be driven to a final position, starting from the centre until all piles are approximately 30cm above the level of the surface.
- This plastic should extend at least 75cm below the base of the drain if the peat is very firm. If the peat is weak the plastic should be driven in further until the plastic is held secure.
- If significant flow is expected which could cause erosion around the dam, create a notch for water to overflow by driving the centre pile(s) slightly further

Effectiveness:

Has been proven very effective at many bogs where it has been used and installed correctly. Very ineffective if plastic is not installed deep enough into the drain or does not extend far enough laterally into the bog. In some areas where significant water level fluctuations occur a gap may open up between the peat and plastic allowing increasing water losses over time.

Maintenance:

Maintenance requirements are low provided dams are installed correctly. Most damage will typically occur within the first year of installation during times of high flow. This may require a survey to check dam integrity and identify locations where dams require replacement or where reinforcement is required.

Lessons **Learned:**

- Plastic dams can fail if they are not installed correctly or can be ineffective in some situations e.g. where cracks are present in the peat.
- Plastic dams can provide effective reinforcement for peat dams in areas where significant flow can be anticipated such as steeply sloping high bog margins or on the cutover. The design of these hybrid dams will vary depending on the specific conditions of the site.
- More expensive than peat dams but can be more economical if machinery access is not feasible or if very few dams are required.
- Requires checks to ensure the integrity of the dam is maintained.

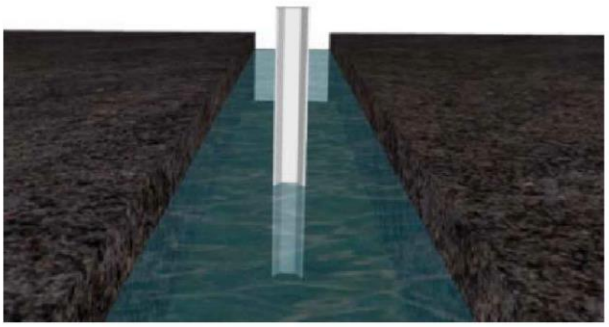
Costs:

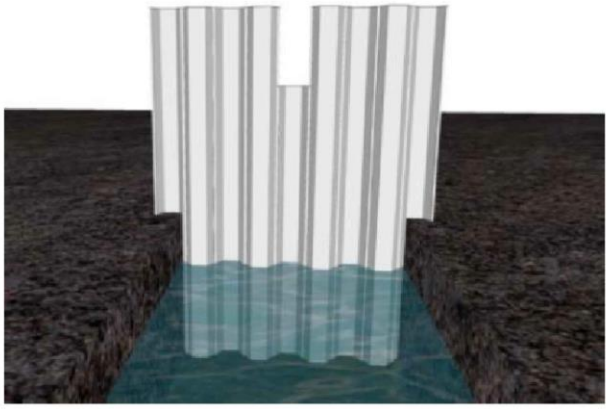
Varies with drain dimensions and type of plastic pile used – typical high bog drain using multi-lock piles c. 1m deep estimated to cost c. €350 to block including materials and labour.

Risks/ optimum time of year for operations:

Potential impacts on the water table in surrounding areas must be assessed, particularly for drain blocking on cutover areas. The optimum time of year for operations is in the summer months when water levels are lowest making working conditions more favourable. However, work can be carried out throughout the year provided conditions are suitable. Potential for impacts on sensitive habitats and species (e.g., ground-nesting birds) requires consideration and some vegetation clearance may be required, especially on cutover areas. Adequate planning is required to ensure any vegetation disturbance occurs outside of the bird nesting season (1st March to the 31st August).

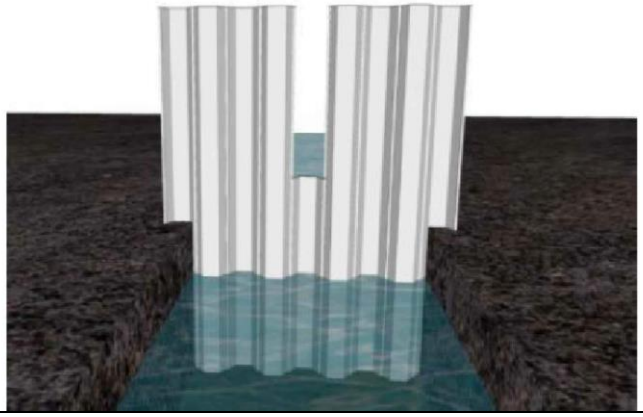
Installation Schematic:

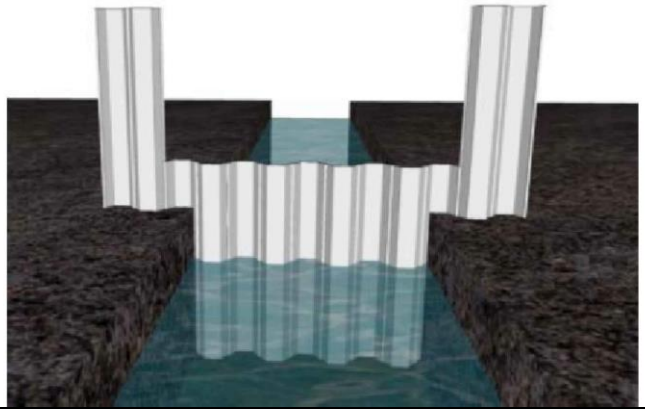




1. Push the first pile into the centre of the drain and drive using slow short bursts of pressure from the excavator bucket or a rubber mallet until secure. (If necessary, protect the top of the plastic using a timber batten.) Please ensure that the pile remains vertical and is embedded 75cm below the invert of the drain.

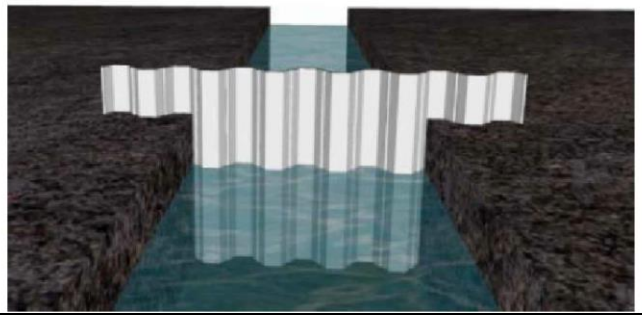
2. Guide adjacent piles into position, again use a machine bucket or rubber mallet to drive into a firm vertical position ensuring they are embedded at least 75cm below the base of the drain until the plastic is held secure.

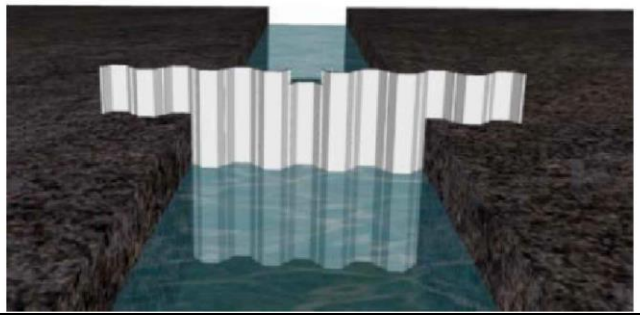




3. Drive piles into the final position starting with the centre pile until all piles are approximately 30cm above the level of the surface.

4. The dam should extend beyond the width of the drain into the bog, typically by a minimum of 75cm to prevent water from flowing around the dam and eroding the sides of the drain. Drive all piles to the final position.





5. Where drains are greater than 1.5m and the weight of the water could cause failure reinforcement should be added in the form of 10cm diameter vertical timber posts inserted into plastic piles (where Multi-lock is used) and support timbers fixed immediately behind the dam.

6. If significant flow is expected which could cause erosion around the dam, create a notch for water to overflow by driving the centre pile(s) slightly further until it is below the level of the adjacent bog surface.

Reference:

Best Practice in Raised Bog Restoration in Ireland (Mackin et al., 2017)

McDonagh, E. (1996). Drain Blocking by machine on Raised Bogs. National Parks and Wildlife Service, Dublin.

The Plastic Piling Company. Website, available at: http://www.plasticpiling.co.uk/