ACAE engineering notes

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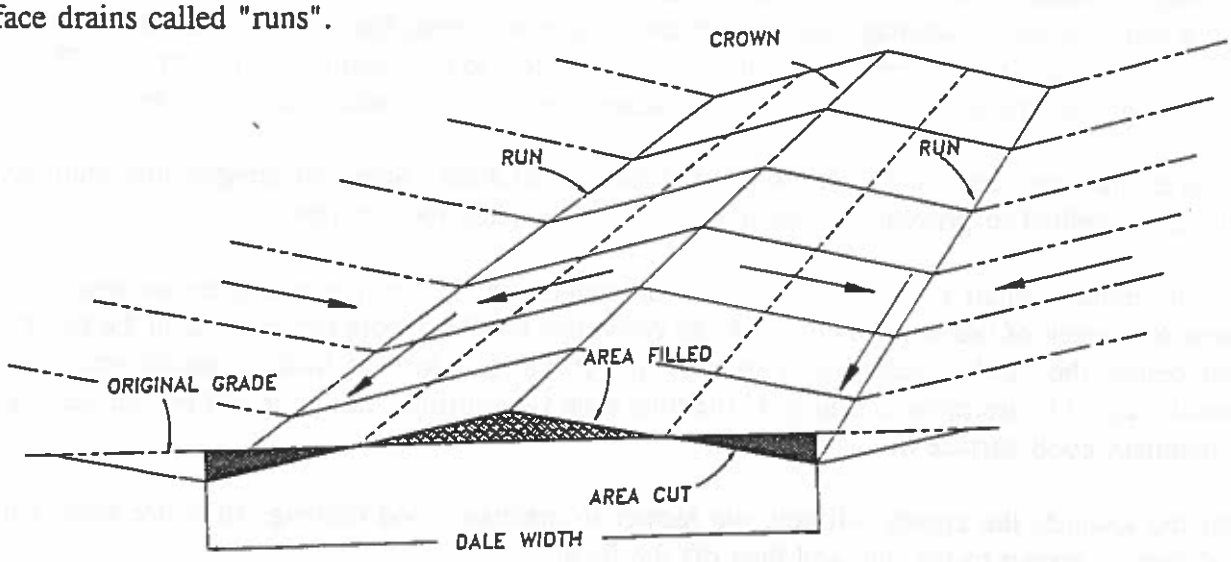
# DYKELAND LAND FORMING

Dykeland soils in New Brunswick and Nova Scotia have naturally low permeabilities. This means the downward movement of water through these soils is very slow. The naturally flat topography causes water to pond on the soil surface. The agricultural potential of these soils can be greatly improved by providing surface drainage with proper land forming. The surface drainage improvements will result in a longer growing season, improved crop yields and quality as well as improved field trafficability. Land forming can be used to develop previously unproductive dykeland and to consolidate small fields, hereby improving crop production efficiency when operating modern farm equipment.

## PRINCIPLES OF LAND FORMING

Land forming is the process of mechanically moving soil to change field topography to provide for improved surface drainage. Land forming involves the excavation of a series of parallel surface drains called "runs".




As illustrated in the above diagram the soil which is excavated from the runs is pushed into hills called "crowns". The surface water will drain off the crown to the two adjoining runs. The grade between the crown and the run should be 1 to 2%. The runoff is then drained from the run to a vent ditch and from there to the main ditch system. The grade on the run should not be less than 0.25%. The distance between a pair of runs is called the "dale width". Dale widths vary from 36 to 55 metres (120-180 ft).

## PLANNING AND CONSTRUCTION

When planning land forming, the farmer should determine which fields have priority for drainage improvement work. Return on drainage investment generally is greater from fields which are closest to the farm base and have the poorest existing drainage. The cost of land forming is approximately half the cost of tile drainage for upland soils.

The farmer should contact the Provincial Department of Agriculture Dykeland Engineer prior to starting land forming. He will assist the farmer in planning a feasible layout and will determine if vent and/or main ditch excavation is required before forming can begin.

Prior to forming, the field should be plowed and then harrowed, disced or rotovated to break up the sod cover. This will make the soil easier to form and allow for a finer seedbed to be prepared.

When this field cultivation work is completed, the Dept. of Agriculture surveyor will set crown markers and run grade markers which indicate the forming pattern for the field. The excavation work can begin by using a bulldozer which cuts soil to grade in the run and pushes it to the crown. The operator of the machine should be familiar with fine grade bull dozing techniques.

When the dozer work is completed, the field is ready for cultivating and levelling. A land leveller should be used to smooth out rough areas left after the dozer work. Levelling will improve surface drainage from the crown to the run and prepares a smooth seed bed.

## MANAGEMENT OF LAND FORMED FIELDS:

It is critical that land-formed runs be properly maintained so that there is no obstruction to drainage of water down the run. In some cases, it may be necessary to excavate a small ditch in the run to improve drainage and to increase crop growth near the run. If desired, the ditch can be excavated shallow enough to allow farm equipment to pass from crown to crown. These shallow ditches are constructed using small three-point hitch mounted tractor ditchers.

Some erosion may occur where a run empties into a vent ditch. Standard conservation methods should be applied to prevent this erosion. This may include rock or fabric.

It is desirable to plant a land-formed field to an annual crop in the first year after construction. Some settlement of the form could occur and corrective levelling work can be done in the second year before the field is seeded to a grass crop. If the land formed field is maintained in an annual crop, it is desirable to land level the field each year during cultivation and before seeding to maintain good surface drainage.

Plowing towards the crown will help the farmer to maintain good drainage of water from the land formed crown to the run, and then off the field.

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