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# A WET PATCH ? SOMETIMES THE CAUSE IS NOT WHAT YOU THINK !

*Presented by*
JUSTIN SMITH
Green Pigeon Consulting

# WHAT IS A DRAINAGE SYSTEM?

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## Primary Drainage:

**Purpose**: To remove excess water from the soil.
**Process**: Involves installing perforated pipes (main and lateral drains) beneath the surface. These pipes collect and transport water away from the playing area.

## Secondary Drainage:

**Purpose**: To enhance the effectiveness of the primary drainage system.
**Process**: Techniques such as sand slitting or gravel banding are used. These involve creating narrow trenches filled with sand or gravel that connect to the primary drainage pipes.

## Tertiary Drainage:

**Purpose**: To provide the highest level of drainage efficiency.
**Process**: Involves additional surface treatments like aeration, topdressing with sand, and the use of specialized equipment to ensure optimal water infiltration and drainage.

# WHAT IS A DRAINAGE SYSTEM?

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# “Types of Drainage Problem!”

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# TOP WATER
# BOTTOM WATER

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# TOP WATER

# TEMPORARY (PERCHED) WATER TABLES

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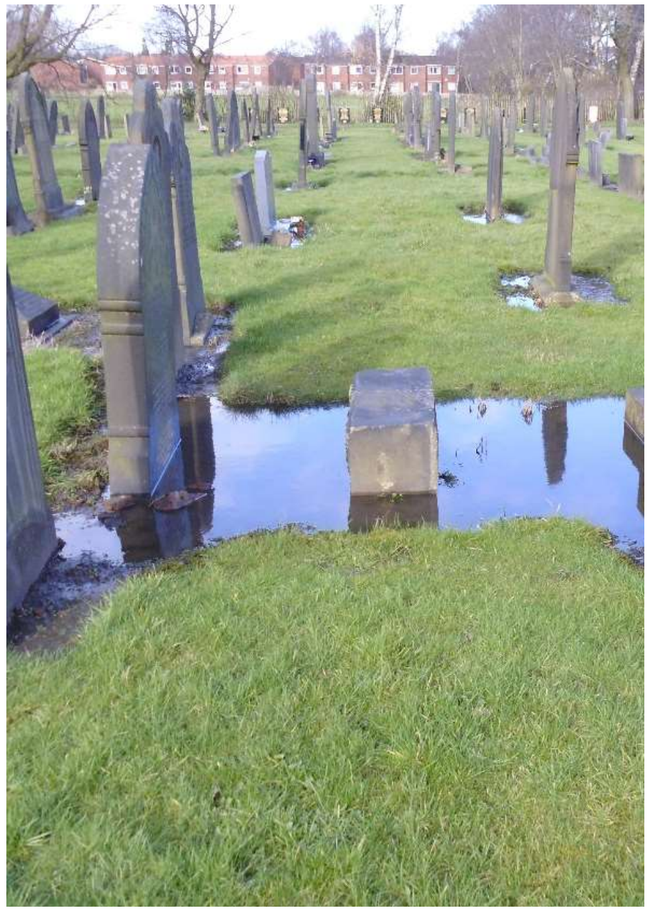

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# PRIMARY DRAINAGE FOR TOP WATER

# SOIL WATER POTENTIAL

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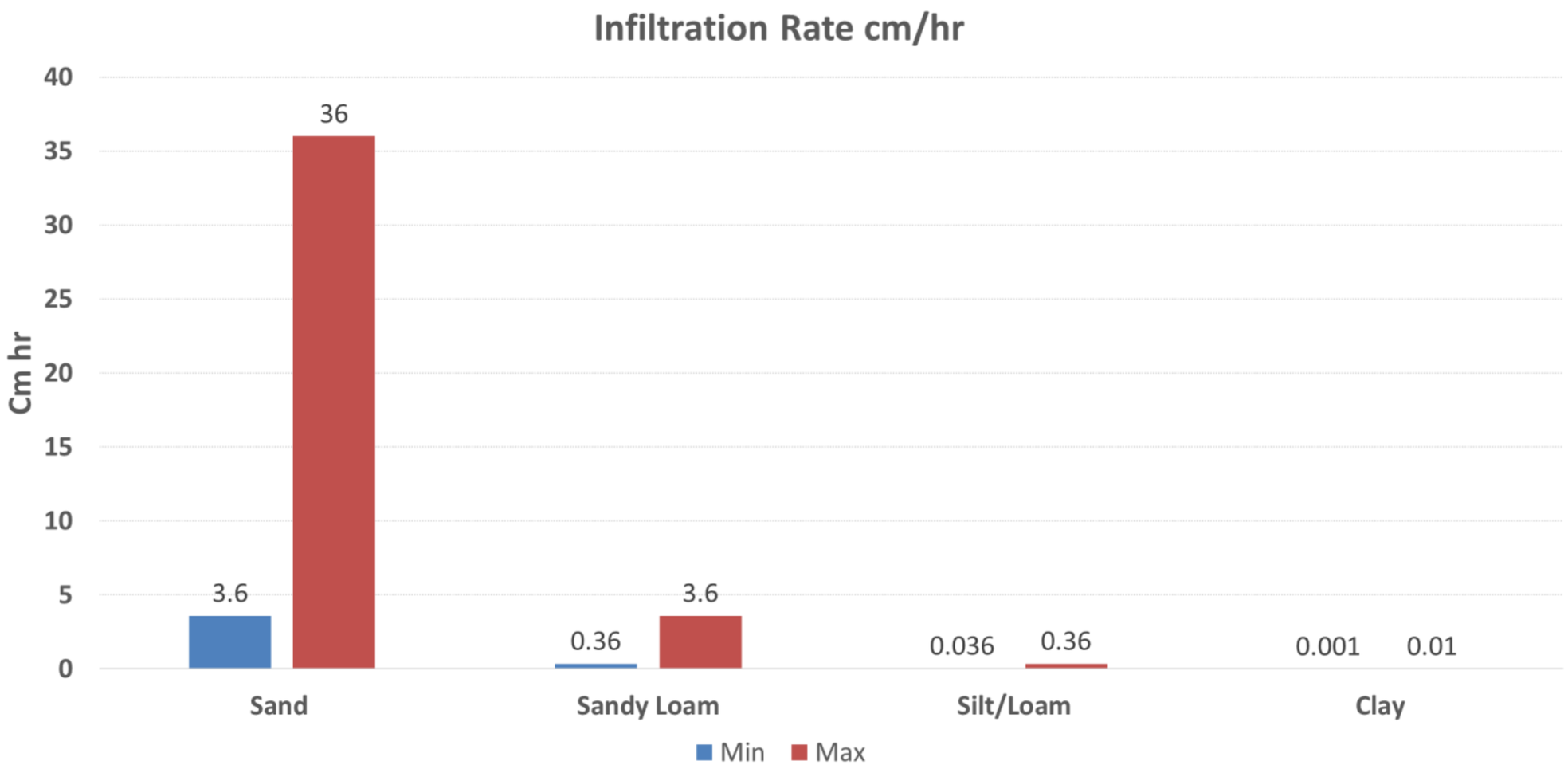

# TEMPORARY (PERCHED) WATER TABLES

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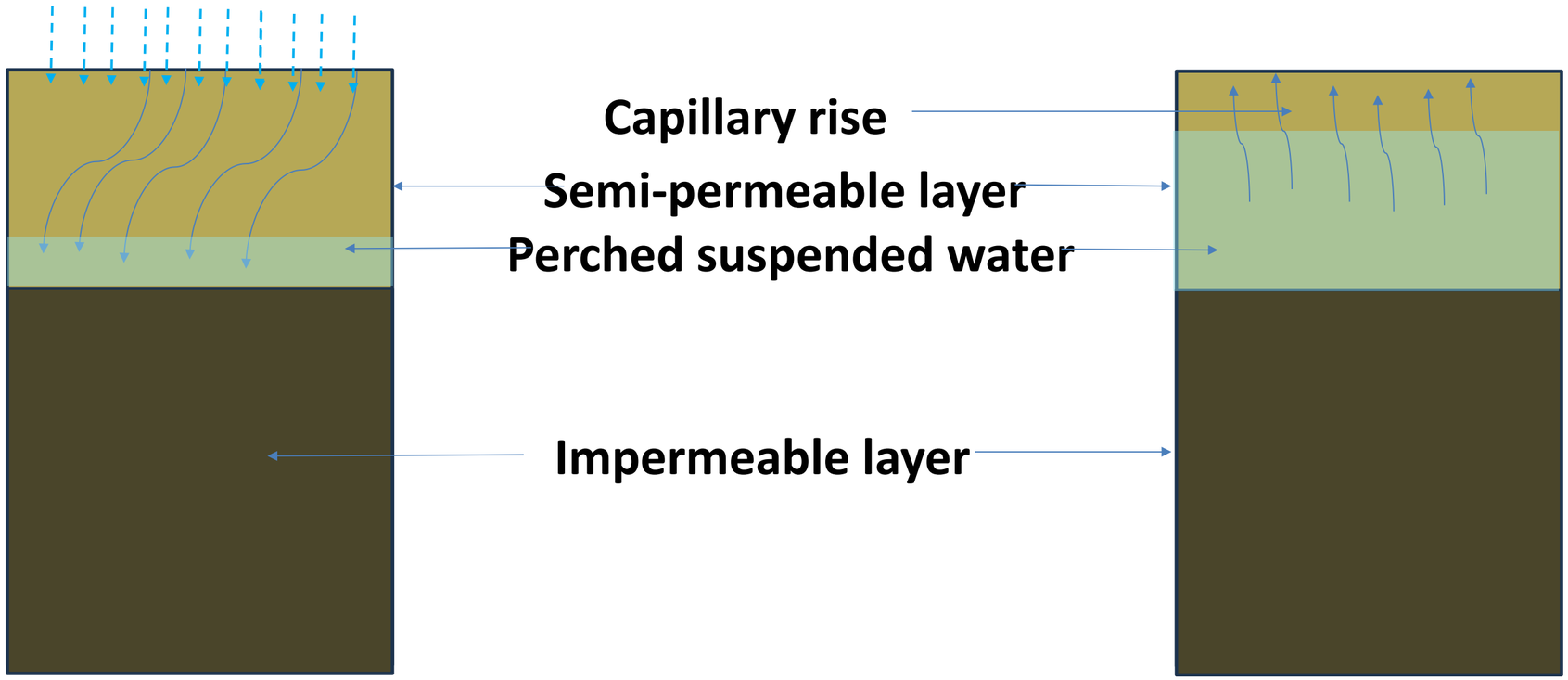
**Water perched within layer of semi-permeable (sandy and loamy soils) above impermeable layer**



# TEMPORARY (PERCHED) WATER TABLES

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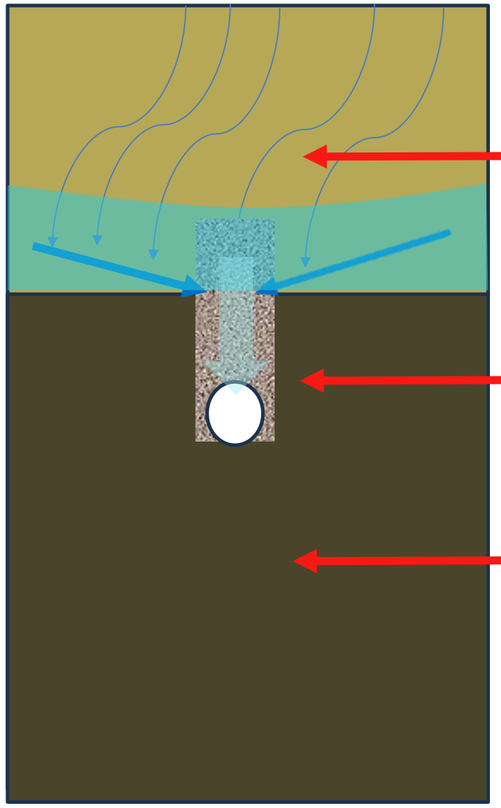
**Primary Drainage**



# SOIL WATER POTENTIAL

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# TEMPORARY (PERCHED) WATER TABLES

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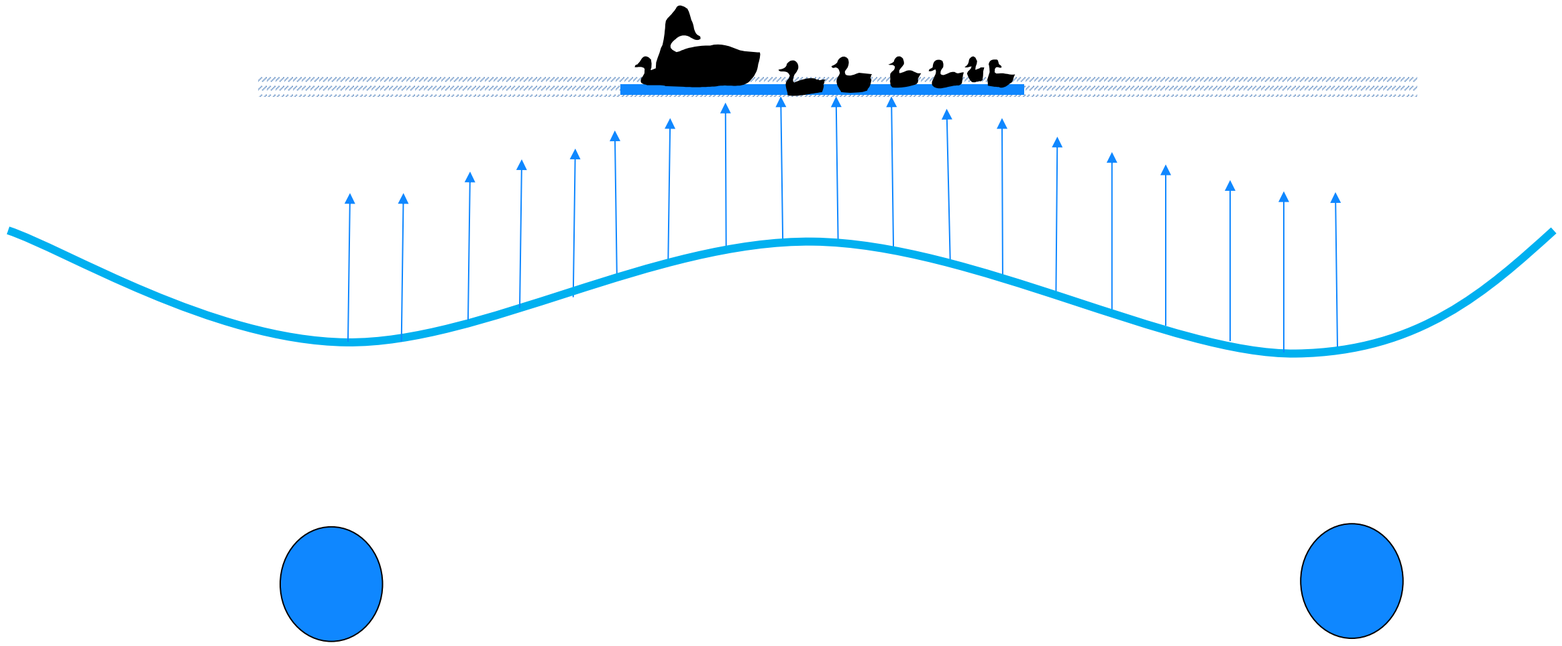
## Drain spacing and capillary rise



# TEMPORARY (PERCHED) WATER TABLES

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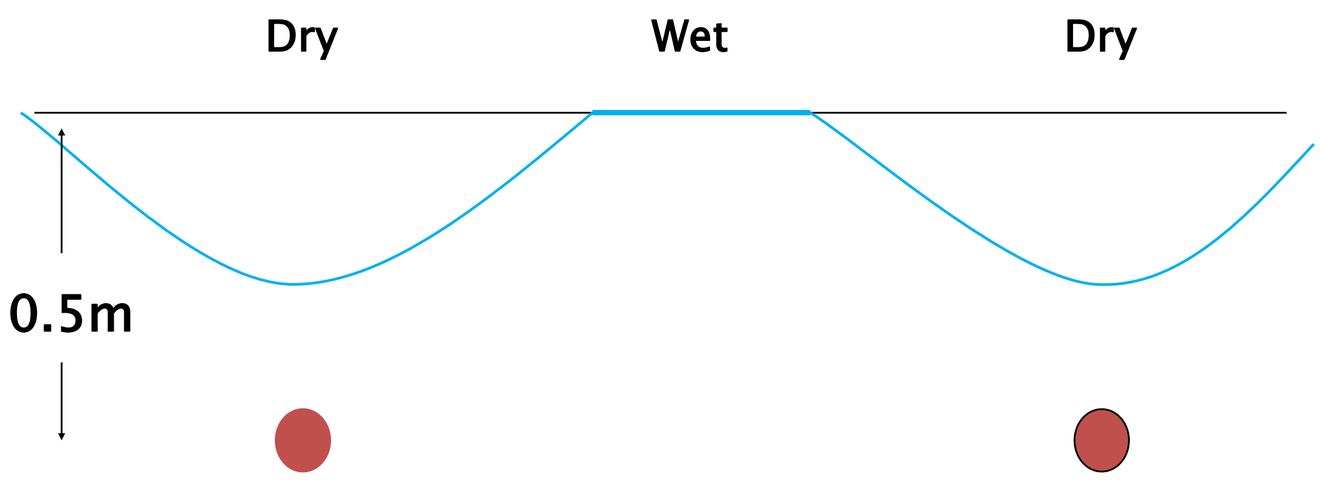
## Effect of depth on drain spacing



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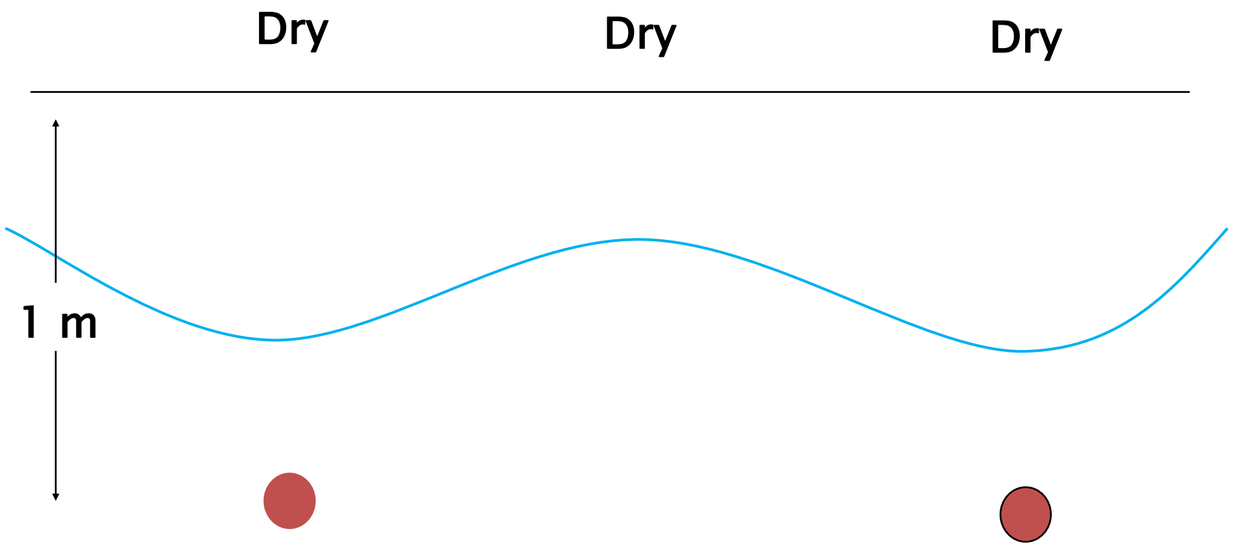

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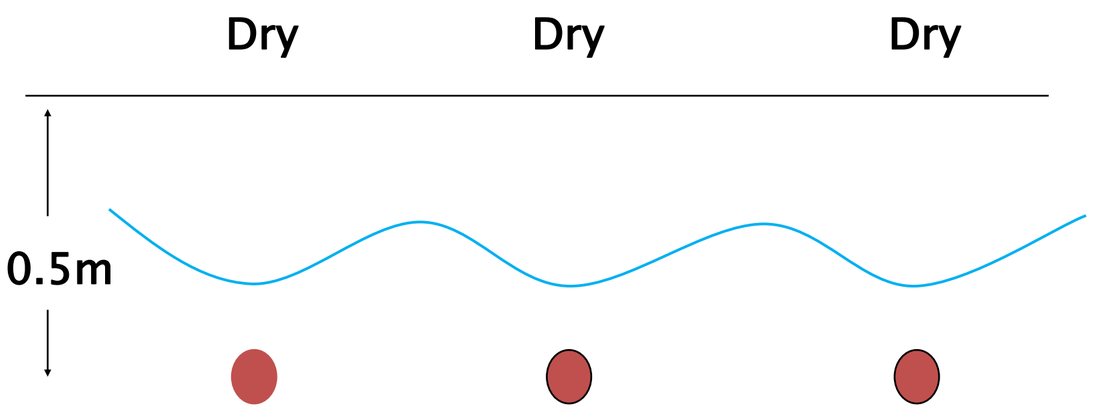
## Effect of depth on drain spacing



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# PRIMARY AND SECONDARY DRAINAGE

# TOP WATER PROBLEMS

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**Surface water perched over impermeable layer**

**Perched suspended water**

**Impermeable layer.**
**Clayey to clay soils**

# TOP WATER PROBLEMS

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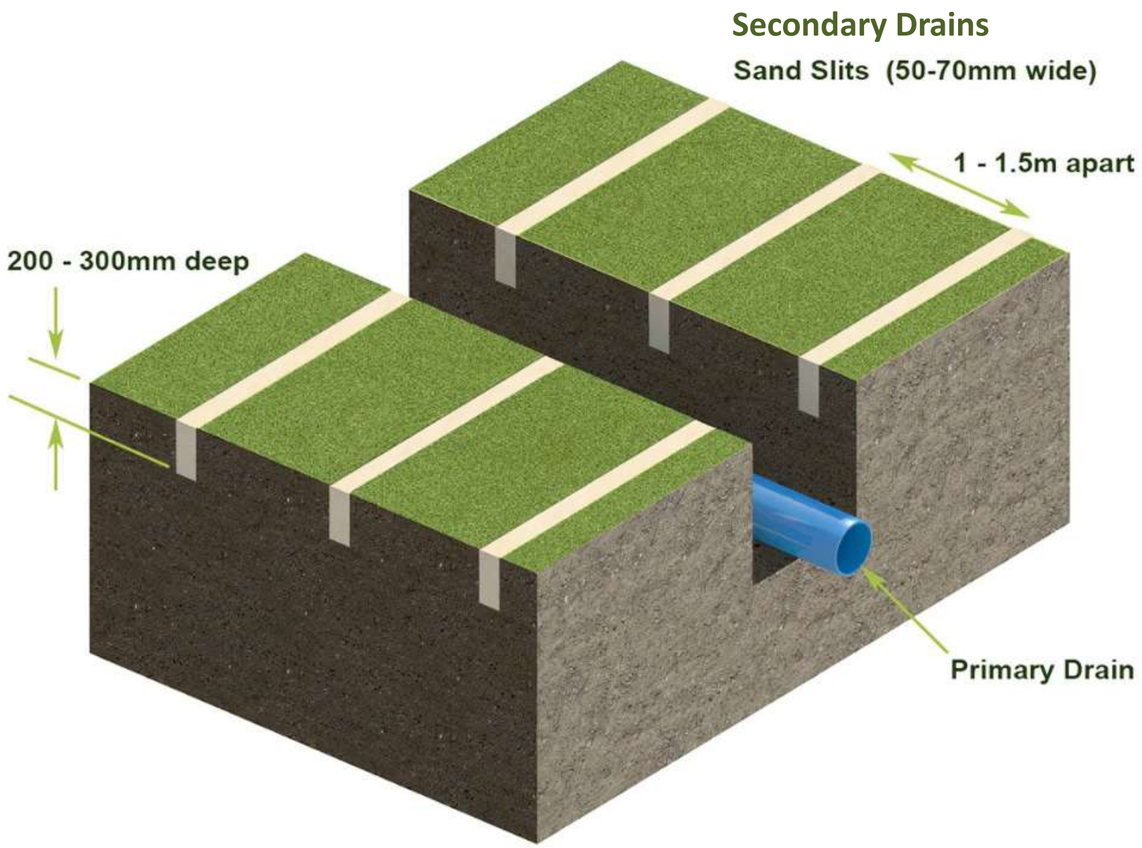
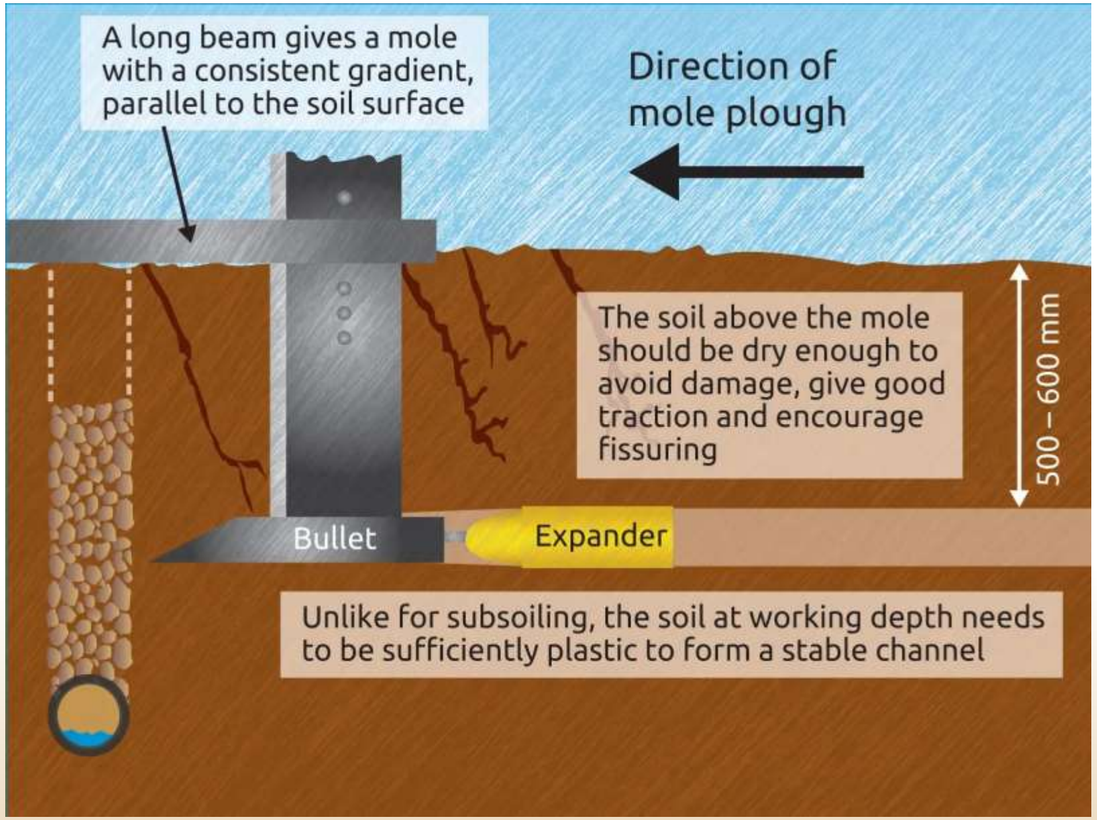
## Primary Drainage and Secondary Drainage

**Surface water perched over impermeable layer**



# TOP WATER PROBLEMS

**With the right clay content and in the right soil conditions, mole drainage can provide very effective and cheap secondary drainage**



# TOP WATER PROBLEMS

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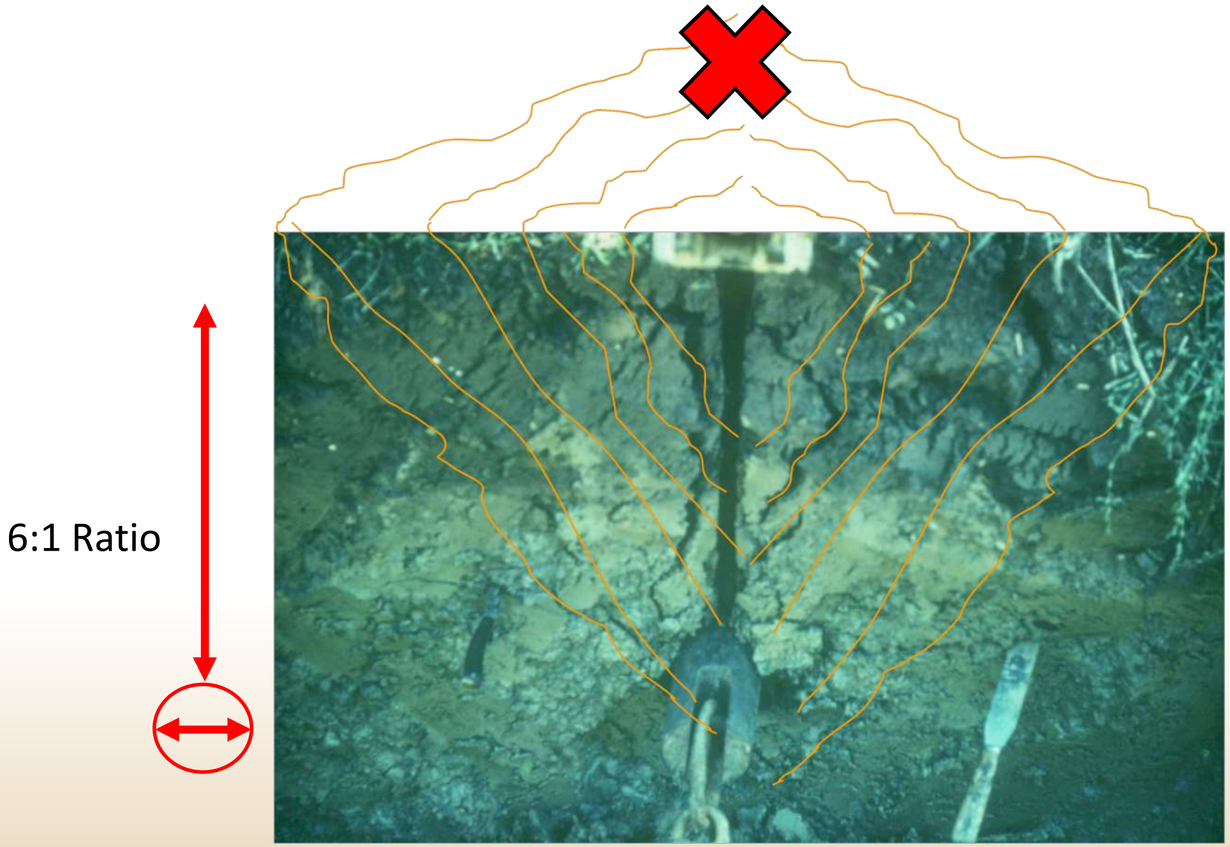
## Operating at the right depth is critical to prevent surface heave



# TOP WATER PROBLEMS

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**To protect the secondary drainage a sand dressing can be applied**

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# TERTIARY DRAINAGE

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## good structure


**Sandy Loam**



## poor structure

# TERTIARY DRAINAGE

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## Rotary decompaction


# TERTIARY DRAINAGE

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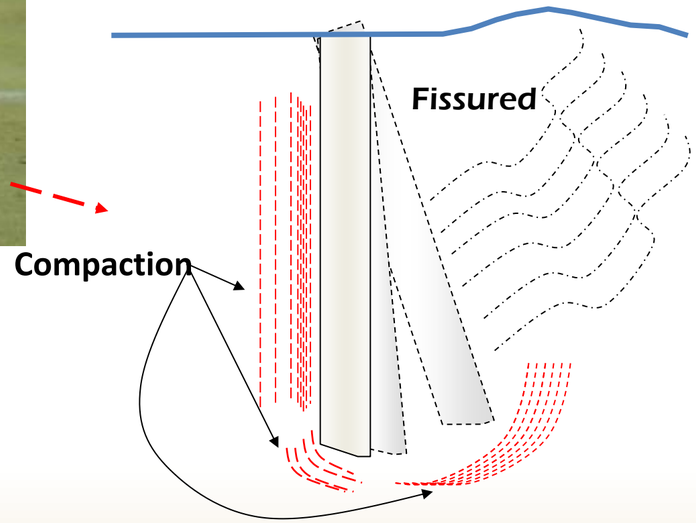
**Operating in the wrong conditions worse than doing nothing?**






**BOW WAVE!!**

**Consolidation or compaction roller?**

# TERTIARY DRAINAGE

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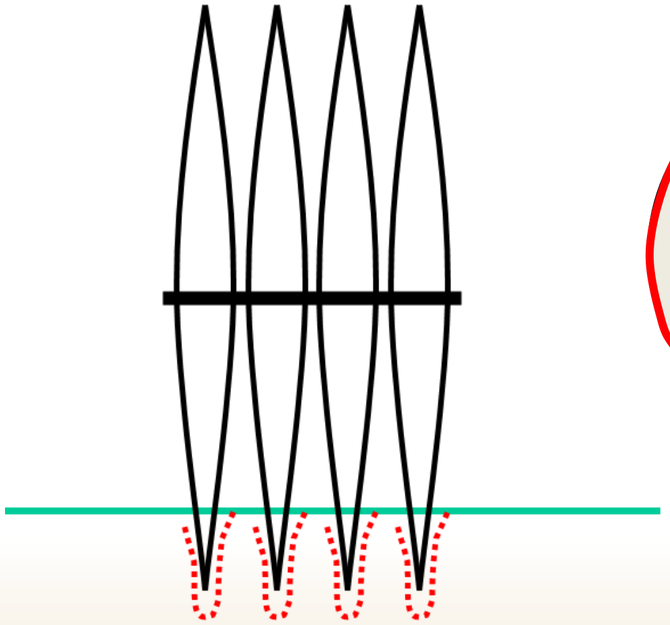
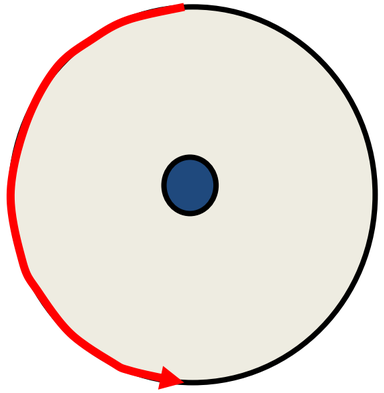
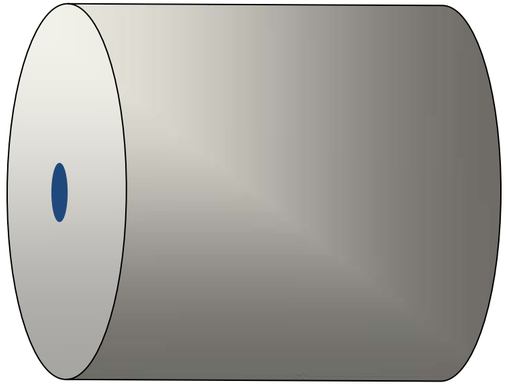
**Operating in the wrong conditions worse than doing nothing?**







**Discs are still backward-facing tines and will compact**

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# BOTTOM WATER

# DEEPER (GROUND) WATER TABLES

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# DEEPER (GROUND) WATER TABLES

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## Deep Drainage

# DEEPER (GROUND) WATER TABLES

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## Deep Drainage

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# WHEN DRAINAGE GOES BAD!

# ORIENTATION OF DRAINAGE SYSTEM?

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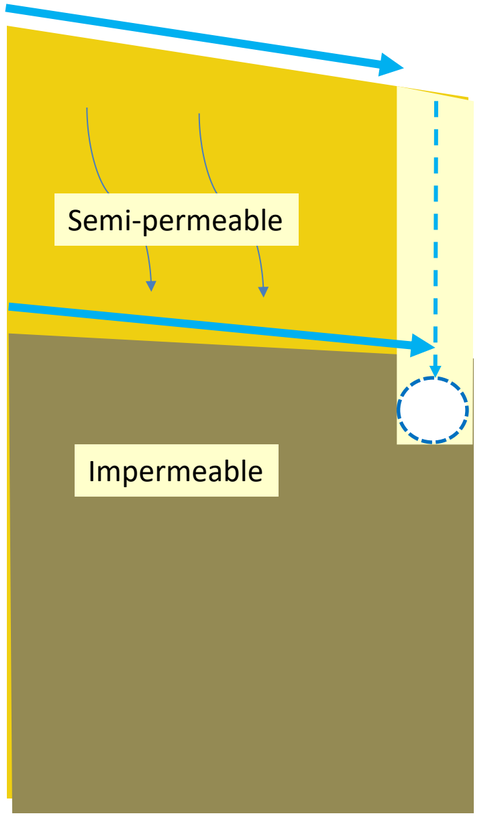


**Primary drainage**

# ORIENTATION OF DRAINAGE SYSTEM?

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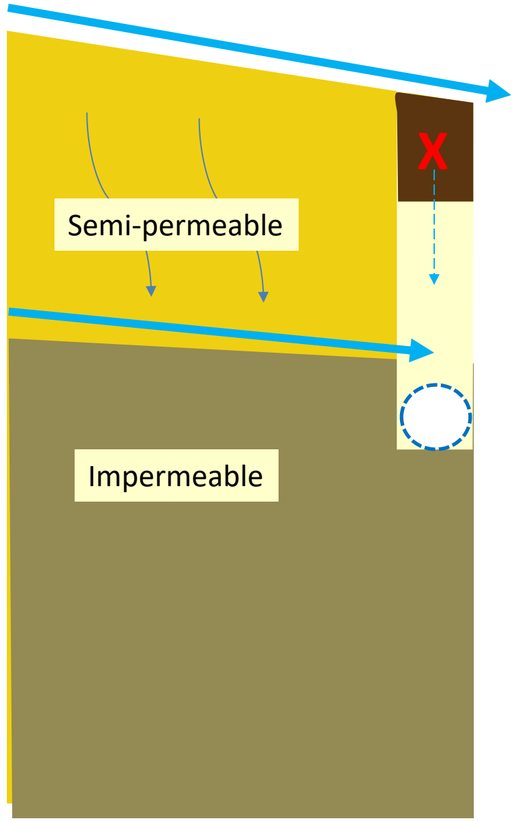


**Fines contamination**

**Primary drainage**

# ORIENTATION OF DRAINAGE SYSTEM?

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# CAPPING OF DRAINS

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Perched water-table

Fines Contaminated back fill

# SOIL WATER POTENTIAL

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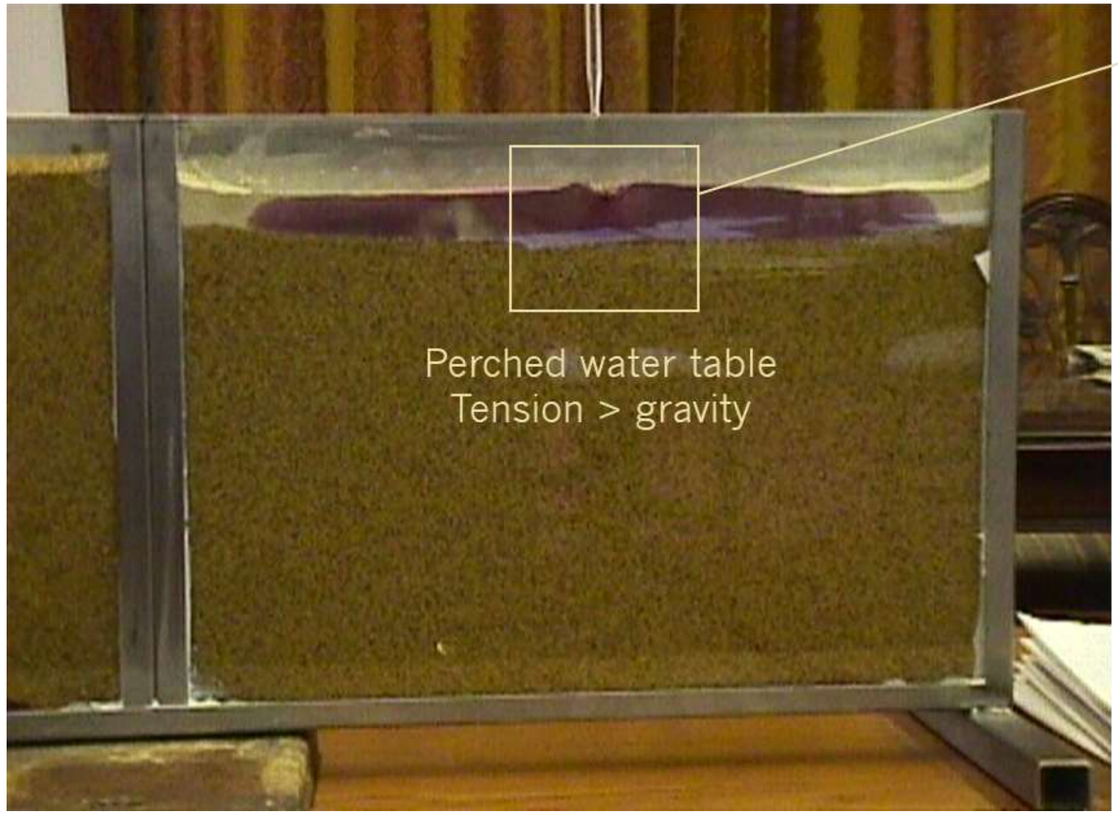


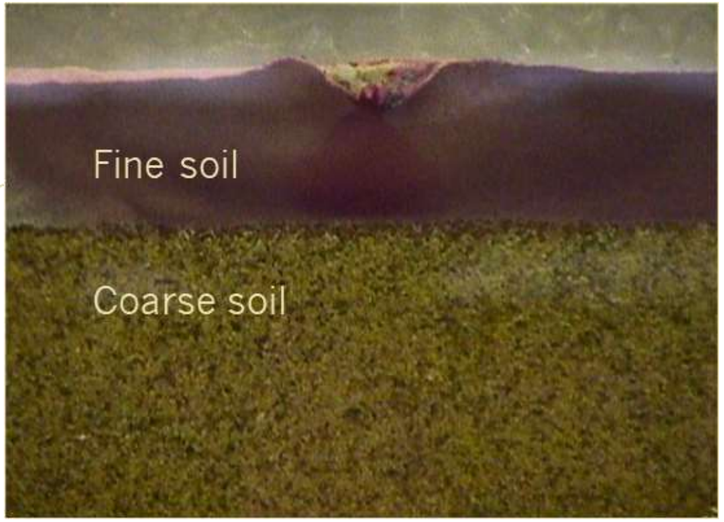

# SOIL WATER POTENTIAL

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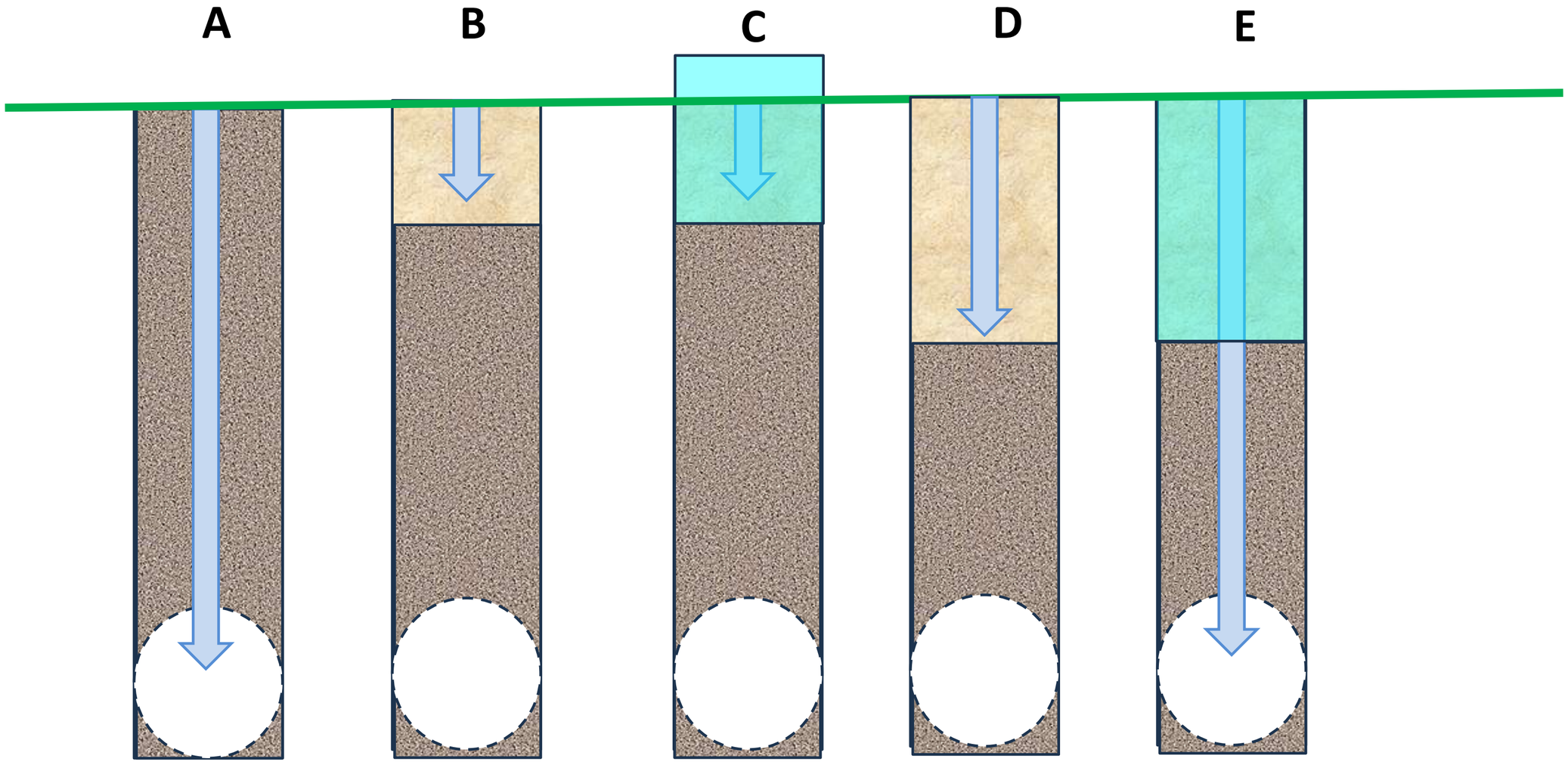

# SOIL WATER POTENTIAL

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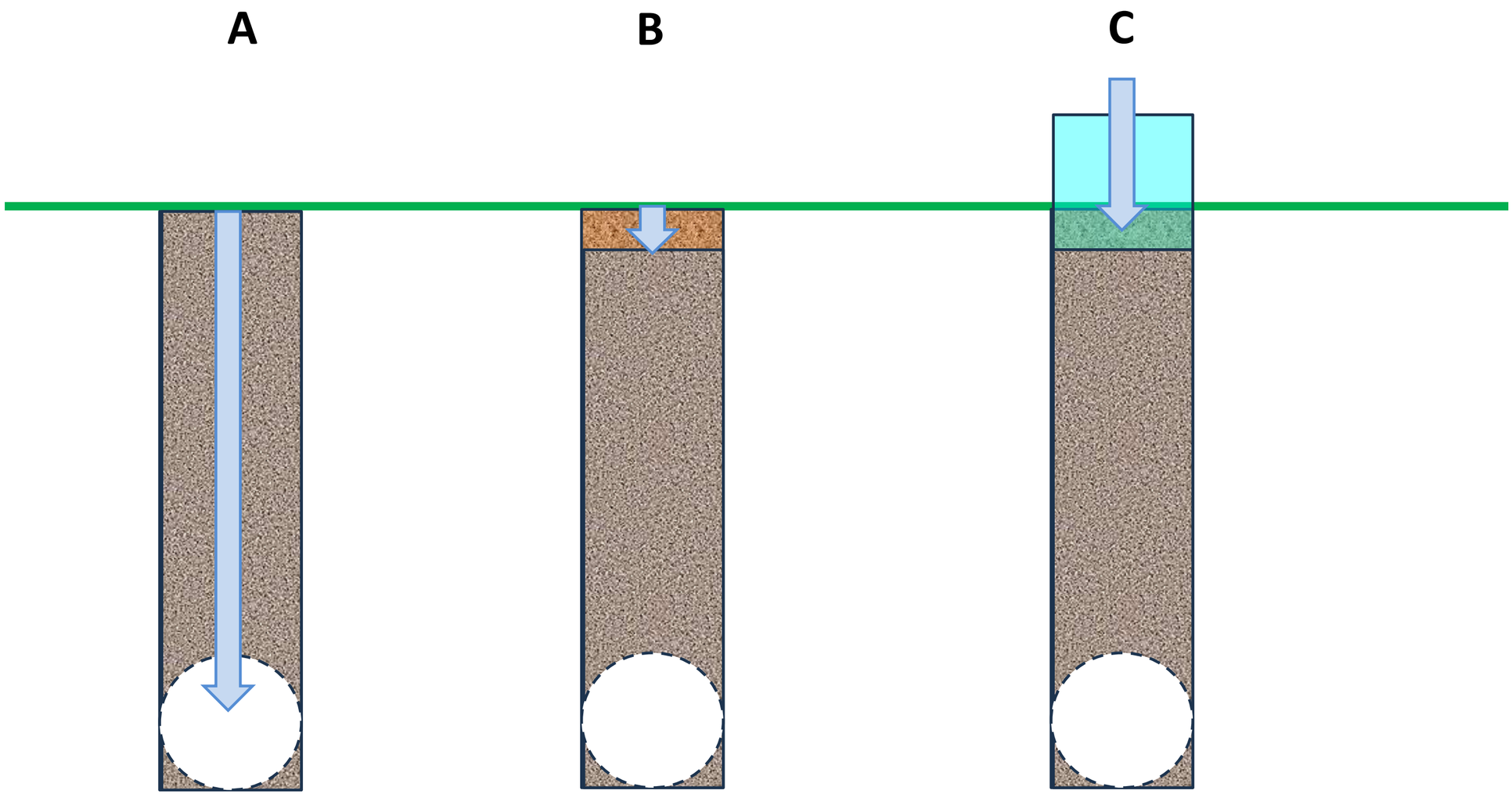

# SOIL WATER POTENTIAL

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Perched

Perched

# SECONDARY DRAINAGE SOLUTION

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# TOP WATER PROBLEMS

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**To protect the secondary drainage a sand dressing can be applied**

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# SUMMARY

# APPLY A METHOD-BASED APPROACH TO THE PROBLEM

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- Do you have existing drainage scheme?
  - Can it be re-instated?
- Do you have an outfall
- Is it top water?
- Is it a suspended / perched water table?
- Is it ground water?
- What is the current design and layout?
- Have the drains been capped?
- What is your budget?

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# Thank You!