HYDRAULIC-DRAIN CAPACITY

HANDS-ON

OVERVIEW

- **Analysis of hydraulic capacity using standard drain in STD DRW/S3 (Pindaan 2014) : Drainage Works**
  - Flow area, A
  - Hydraulic radius, R
  - Longitudinal slope, S_0
  - Checking of velocity, V

ACTIVITY 1

- Prove how the formula of hydraulic capacity, $Q_d = AR^{2/3}S^{1/2}/n$ is derive.

HYDRAULIC CAPACITY

- $Q_d = AR^{2/3}S^{1/2}/n$

    where,   A = flow area (m^2)

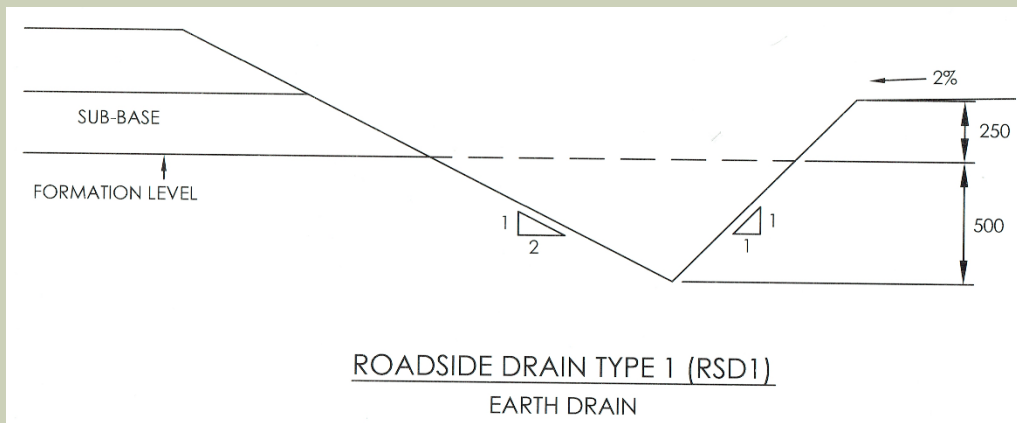   R = hydraulic radius (m)

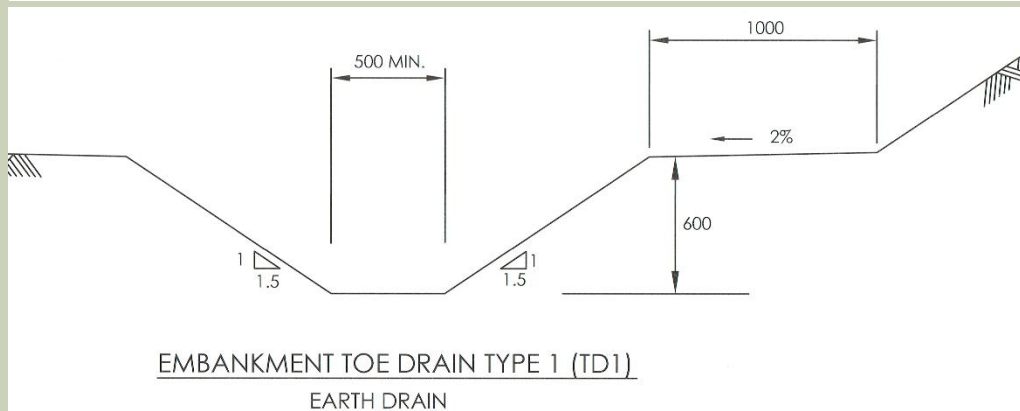   S = longitudinal slope (m/m)

                         n = Manning coefficient (Table 2.3)

FLOW AREA

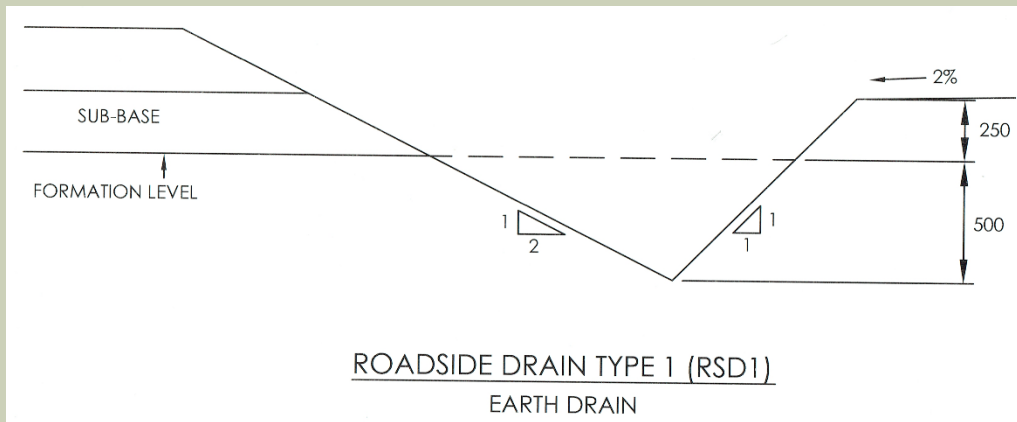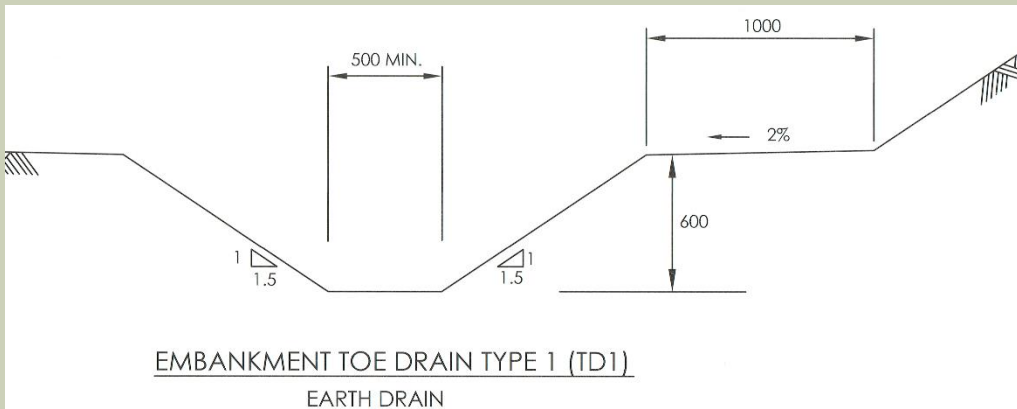- The area of the drain in full capacity (excluding freeboard)

ROADSIDE DRAIN TYPE 1 (RSD1)
EARTH DRAIN

- A =

EMBANKMENT TOE DRAIN TYPE 1 (TD1)
EARTH DRAIN

- A =

HYDRAULIC RADIUS

- R = A/P where, P = wetted perimeter (m) without the freeboard

ROADSIDE DRAIN TYPE 1 (RSD1)
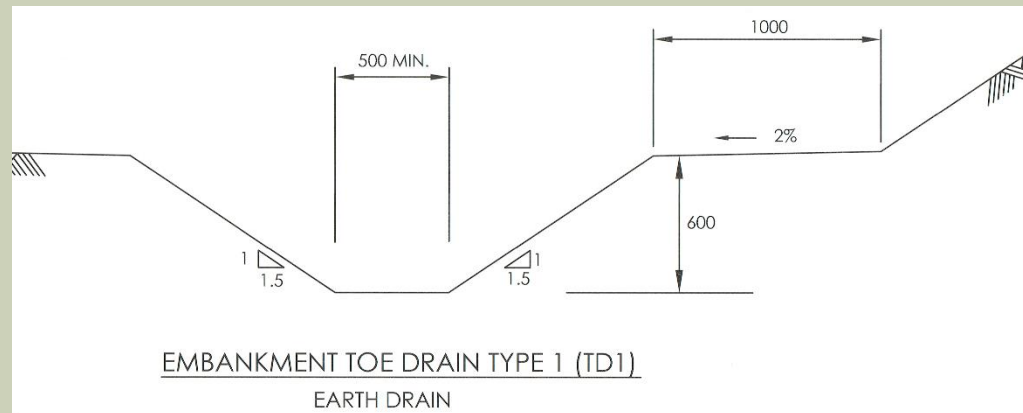EARTH DRAIN

- P =

EMBANKMENT TOE DRAIN TYPE 1 (TD1)
EARTH DRAIN

- P =

ACTIVITY 2

- Calculate the flow area & hydraulic radius for the Toe Drain (TD) in the diagram below.

EMBANKMENT TOE DRAIN TYPE 1 (TD1)
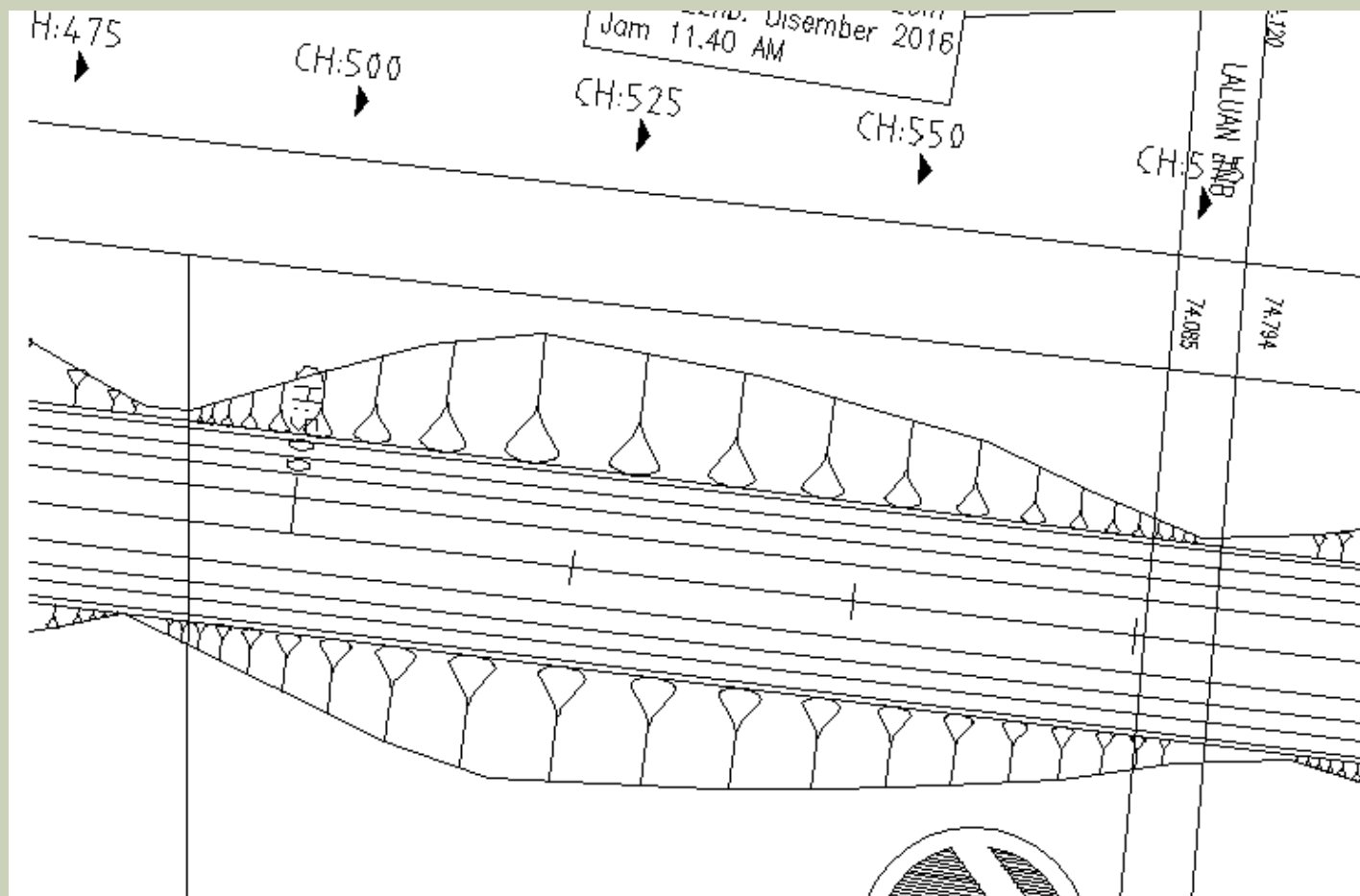EARTH DRAIN

A =

CONT'D..

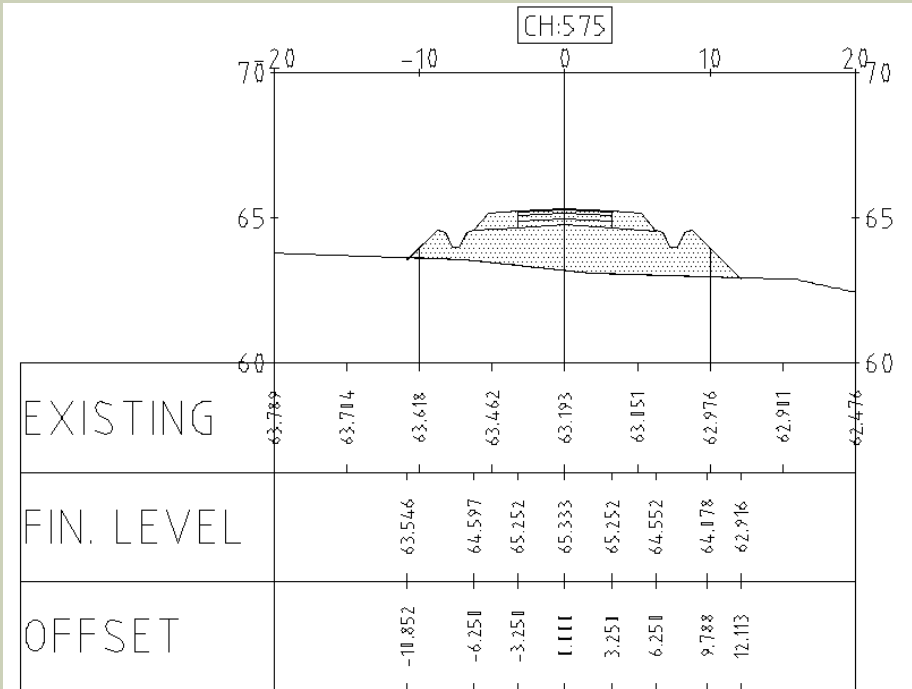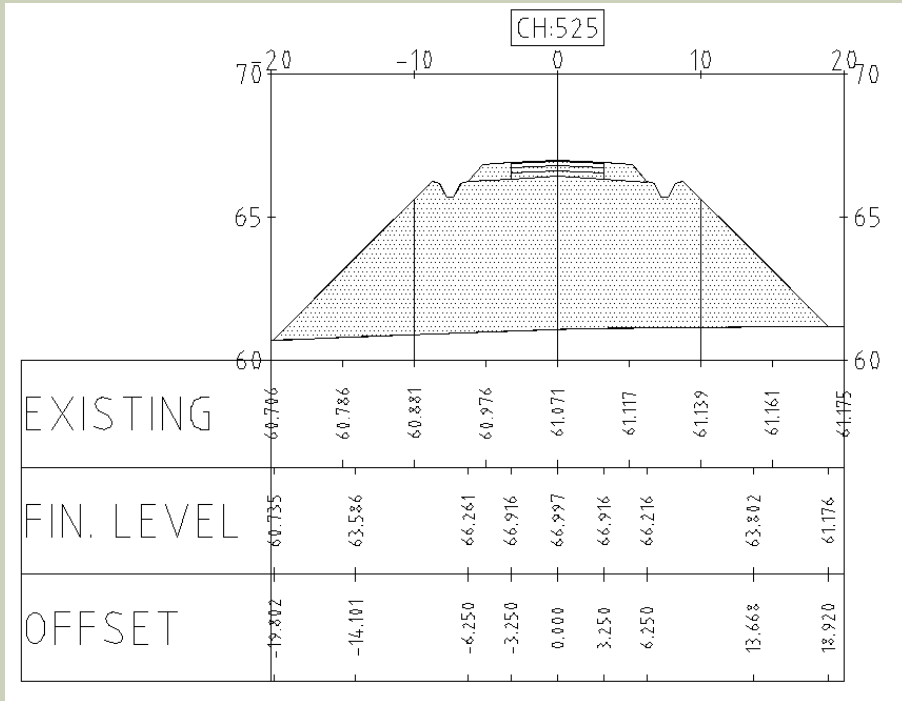P =

R =

LONGITUDINAL SLOPE

- Should be taken from :
    -
    -

- Minimum gradient should be
- The unit used is per meter run (m/m)

CONT'D..

CONT'D…

L =

H =

S_0 =

ACTIVITY 3

- Calculate the total hydraulic capacity of the drain if **concrete** material is being used from CH525 to CH575

$$Q_d = AR^{2/3}S^{1/2}/n$$

$$=$$

CHECKING VELOCITY

- Allowable velocity : not more than 4m/s

$$v = Q_d/A$$
$$=$$
$$=$$