

**Proposed Temporary Shop & Services for a Period of 3 Years and Associated Filling of Land and Associated Excavation of Land at Lot 1370 S.I in D.D. 112, Shui Tsan Tin, Shek Kong, Yuen Long, N.T.**

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**Annex 1 Drainage Assessment**

A. Site particulars

- 1.1.1 The site possesses an area of about 240m<sup>2</sup>. The surface of the application site will be hard paved.
- 1.1.2 The application site will be occupied by a shop and services for selling grocery to serve the nearby community.

B. Level and gradient of the subject site & proposed surface channel

- 1.1.3 The subject site has been hard paved and occupied an area of approximately 240m<sup>2</sup>. It has a gradient sloping from south to north from about +17.9mPD to +17.6mPD.
- 1.1.4 In order to follow the topography of the application site, the proposed surface channel will be constructed following the gradient of the site. As demonstrated in the calculation in **Annex 1.3** hereunder, 375mm surface U-channel will be capable to drain surface runoff accrued at the subject site and the same passing through the site from adjacent area.

C. Catchment area of the proposed drainage provision at the subject site

- 1.1.5 With regard to the location of the existing drain and the topography surrounding the application site, the land to the north, east and west is slightly lower or at the same level as the application site. It is noted that the land to the south is generally higher than the application site, external catchment is considered in the drainage calculation up to the small houses of which drainage facilities have been found.

D. Particulars of the existing drainage facilities to accept the surface runoff collected at the application site

- 1.1.6 There is an existing river to the north of the application site.

## **1.2 Runoff Estimation & Proposed Drainage Facilities**

### **A. Proposed drainage facilities**

- 1.2.1 Subject to the above calculations, it is determined that 375mm surface U-channel which is made of concrete along the site periphery is adequate to intercept storm water passing through and generated at the application site (**Figure 4**).
- 1.2.2 The collected surface runoff will be conveyed to existing river to the north of the site. (**Figure 4**) through a section of 375mm stepped surface channel.
- 1.2.3 All the proposed drainage facilities, including the section of surface channel proposed in between of the subject site to the open drain, will be provided and maintained at the applicant's own expense. Also, sand trap and U-channel will be cleaned at regular interval to avoid the accumulation of rubbish/debris which would affect the dissipation of storm water.
- 1.2.4 The provision of the proposed surface U-channel will follow the gradient of the application site. All the proposed drainage facilities will be constructed and maintained at the expense of the applicant.
- 1.2.5 100mm openings will be provided at the toe of hoarding so as to allow unobstructed flow of surface runoff from adjacent area.
- 1.2.6 The applicant is conscientious in preparing this drainage proposal. Also, he is willing to provide necessary drainage facilities to minimize the drainage impact accrued by the proposed development. The acceptance of this drainage proposal will give positive recognition to the applicant's efforts.

## Annex 1.3 Drainage Calculation for the Proposed Provision of Drainage Facilities at Subject Site

### 1. Runoff Estimation

1.1 Rational method is adopted for estimating the designed run-off

$$Q = k \times i \times A / 3,600$$

Assuming that:

- i. The area of the entire catchment is approximately 240m<sup>2</sup> and the external catchment is about 2,220m<sup>2</sup>; (**Figure 4**)
- ii. It is assumed that the value of run-off co-efficient (k) is taken as 1 for conservative reason.

$$\text{Difference in Land Datum} = 19.8\text{m} - 17.6\text{m} = 2.2\text{m}$$

$$L = 89\text{m}$$

$$\therefore \text{Average fall} = 2.2\text{m in } 89\text{m} \text{ or } 1\text{m in } 40.45\text{m}$$

According to the Brandsby-Williams Equation adopted from the “Stormwater Drainage Manual – Planning, Design and Management” published by the Drainage Services Department (DSD),

$$\text{Time of Concentration } (t_c) = 0.14465 [ L / (H^{0.2} \times A^{0.1}) ]$$

$$t_c = 0.14465 [ 829 (2.47^{0.2} \times 2,460^{0.1}) ]$$

$$t_c = 4.92 \text{ minutes}$$

With reference to the Intensity-Duration-Frequency Curves provided in the abovementioned manual, the mean rainfall intensity (i) for 1 in 50 recurrent flooding period is found to be 280 mm/hr

$$\text{By Rational Method, } Q = 1 \times 280 \times 2,460 / 3,600$$

$$\therefore Q = 191.33 \text{ l/s} = 11,480 \text{ l/min}$$

In accordance with the Chart or the Rapid Design of Channels in “Geotechnical Manual for Slopes”, for an approximate gradient of about 1:110 & 1:120 along the site periphery of the site, 375mm surface U-channel is considered adequate to dissipate all the stormwater accrued by the application site.