

Stormwater Drainage Design

For

Temporary Warehouse Storage (excluding dangerous Goods)
with Facilities and Filling Works at Lots 1041,1042 & 1047 (Part)
in DD109, Kam Tin North, Yuen Long, N.T.

Report No.: **LD/L1041/DS01**
Date: **7/6/2026**

Project : Temporary Warehouse Storage (excluding dangerous Goods) with Facilities and Filling	
Works at Lots 1041,1042 & 1047 (Part) in DD109, Kam Tin North, Yuen Long, N.T.	
Drainage Design	P. 1 of 5
1. <u>Equations and Assumptions</u> 1.1 Surface drainage design is in accordance with Geotechnical Manual for Slopes (2nd Edition, 1984). 1.2 Slope drainage is designed to a frequency of 1 in 50 rainfall return period. 1.3 Time of Concentration = time of entry + time of flow i.e. $t_c = t_e + t_f$ 1.4 Time of entry is calculated based on the modified form of Bransby-Williams Equation: $t_e = 0.14465 \times L / (H^{0.2} \times A^{0.1})$ where t_e = time of entry (min) , A = area of catchment (m^2) , H = average fall (m per 100m) from the summit of catchment to the point of design, L = distance in metre measured on the line of natural flow between the design section and that point of catchment from which water would take the longest time to reach the design section (m) 1.5 Time of flow is calculated from the measured water flow length in channel divided by the assumed flow velocity. i.e. $t_f = w / v$ where t_f = time of flow (min) , w = measured water flow length in channel (m) , v = assumed water flow velocity (m/s) 1.6 Runoff coefficient for the slope is assumed to be 1.0 for paved ground surface. 1.7 Peak stormwater is determined by the "Rational Method" using the following formula: $Q = KiA/60$ where Q = maximum runoff (litres/min) , K = runoff coefficient (K = 1.0) , i = design mean intensity of rainfall (mm/hr) , A = area of catchment (m^2) .	Eqn. 8.2 Geotechnical Manual for Slopes Geotechnical Manual for Slopes (p. 96) Eqn. 8.7 Geotechnical Manual for Slopes

The catchment area for the design of surface channels is shown below :



Plan of Catchment Areas
NTS

3. Checking requirement width by rainwater through between 1 and 2

a. Catchment Area A to Existing Drainage (375 UC)

$$\begin{array}{rcl} \text{Area} & A & = 1640 \text{ m}^2 \\ L & = & 120 \text{ m} \end{array}$$

$$\delta h = 14 - 13.9 = 0.1 \text{ m}$$

H = 999999999996 * 10⁻¹¹ = **0.08** m (average fall per 100m run)

$$t_c = 0.14465 \times 120 / (0.08^{0.2} \times 1640^{0.1}) = 13.721 \text{ min}$$

For t_f , $w = 120$ m, $v = 3$ m/s (assumed)

$$t_{fl} = 120 / (3 \times 60) = 0.667 \text{ min}$$

$$t_1 = 13.721 + 0.667 = 14.388 \text{ min}$$

From rainfall curve, use $t = 14.4$ min

$$\begin{aligned} i_{50} &= 220 \text{ mm/hr} \\ K &= 1 \end{aligned}$$

Flow for 50 years return periods,

$$Q_{50} = 1 \times 220 \times 1640 / 60 = 6013 \text{ litres/min}$$

Drop of channel = 13.850 - 13.250 = 0.60 m

Gradient = 0.6 / 120 = 1 in 200

Existing channel size = 375 UC

Capacity = 10000 > Q50 OK

Read $v_{\max}$ = 1.4 m/s < 4 m/s OK

Therefore, Proposed 375mm UC is adequate for catchment Area of A.

Fig. 1, TGN 30

Fig. 8.7
Geotechnical
Manual for Slopes

**Geotechnical Engineering Office, Civil Engineering and Development Department
 The Government of the Hong Kong Special Administrative Region**

**GEO Technical Guidance Note No. 30 (TGN 30)
 New Intensity-Duration-Frequency Curves for Slope Drainage Design**

Issue No.: 1	Revision: -	Date: 21.3.2011	Page: 3 of 4
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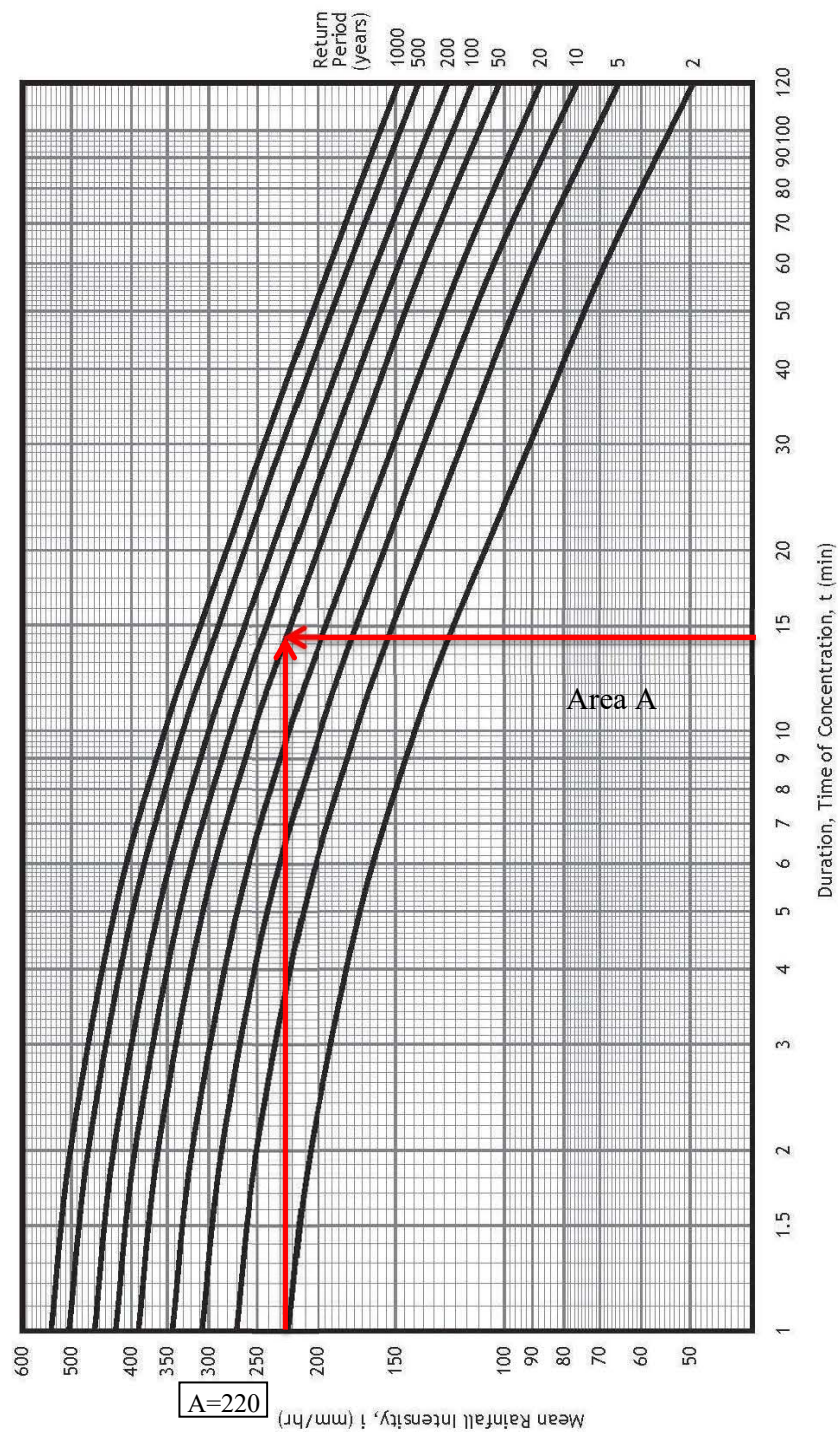


Figure 1 – New Intensity-Duration-Frequency (IDF) Curves (Tang & Cheung, 2011)

Note: These IDF curves are to supersede those given in Figure 8.2 of the Geotechnical Manual for Slopes (GCO, 1984).

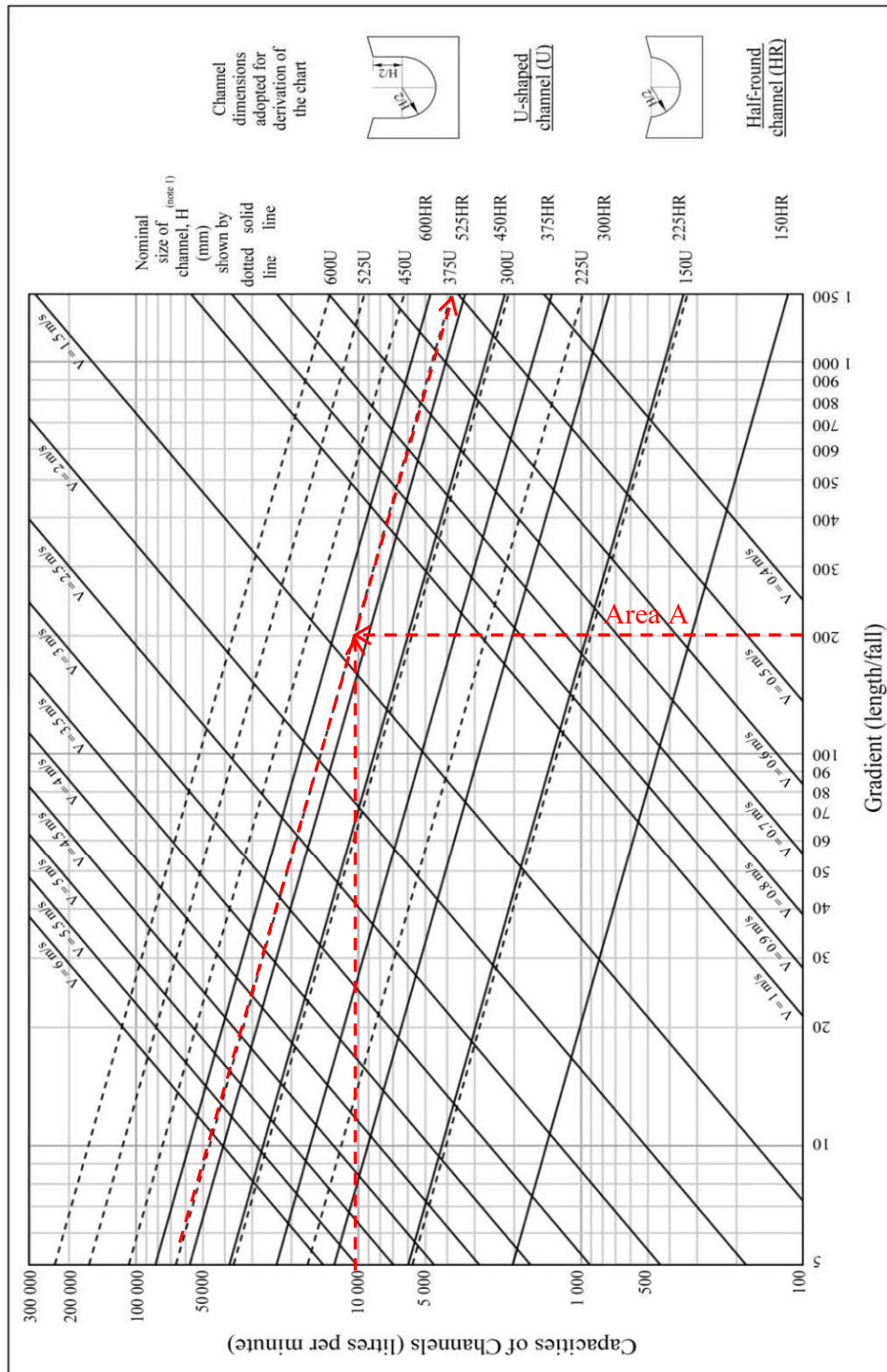
**Geotechnical Engineering Office, Civil Engineering and Development Department
The Government of the Hong Kong Special Administrative Region**

GEO Technical Guidance Note No. 43 (TGN 43)

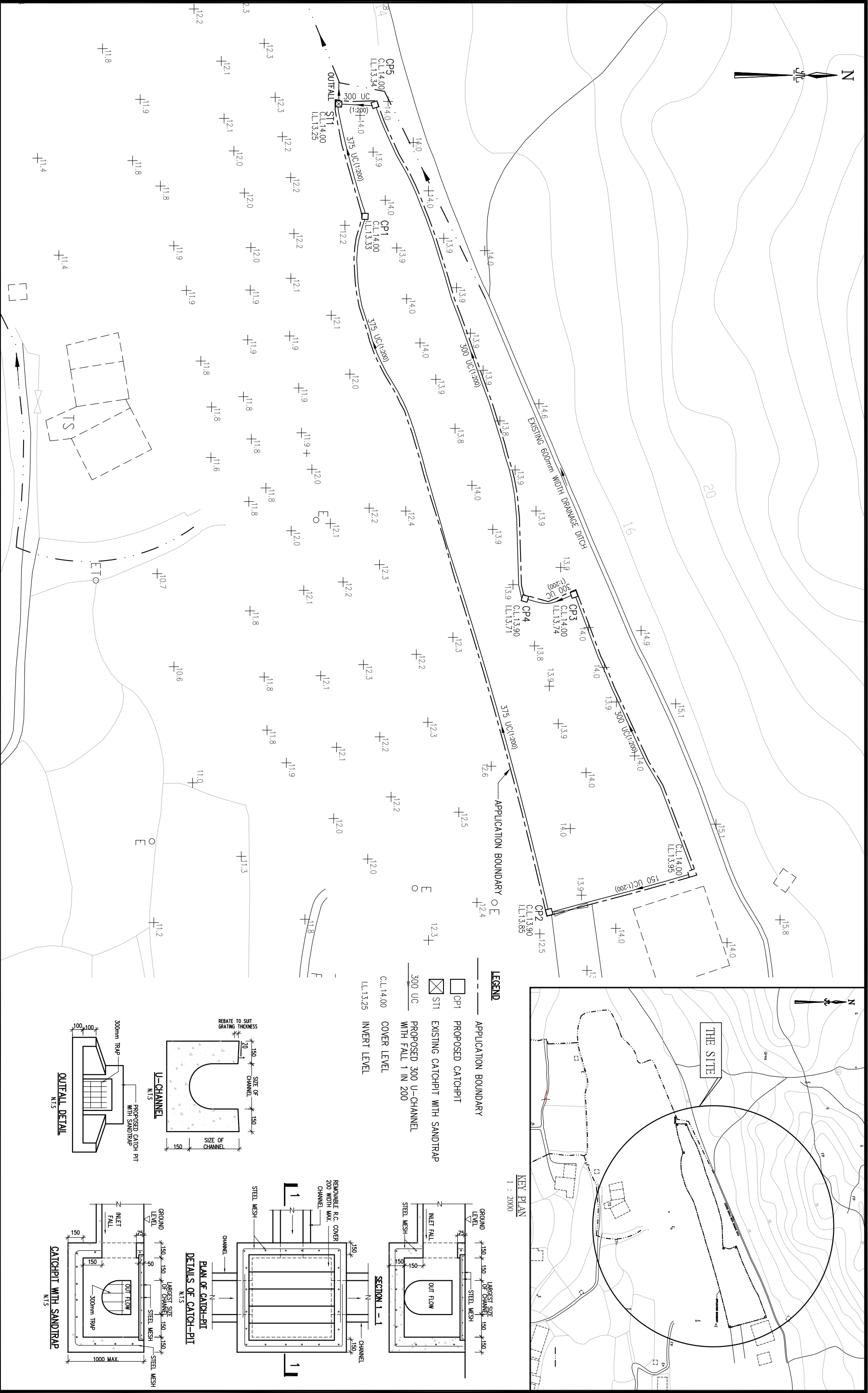
Guidelines on Hydraulic Design of U-shaped and Half-round Channels on Slopes

Issue No.: 1 Revision: - Date: 05.06.2014 Page: 3 of 3

Figure 1 - Chart for the rapid design of U-shaped and half-round channels up to 600 mm



Note: (1) Refer to the latest CEDD Standard Drawings for the details of U-shaped (U) and half-round (HR) channels.



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PROJECT

Temporary Warehouse Storage (excluding dangerous Goods) with Ancillary Facilities and Filling Works at 1041,1042 & 1047 (Part) in DD109, Kam Tin North, Yuen Long, N.T.

TITLE

PROPOSED DRAINAGE LAYOUT PLAN

DRAWN BY		CHECKED BY		DATE
PT		PT		May 2026
SCALE		JOB NO.		
1 : 500		LD/ -		
CAD / FILE		DWG NO.		
LD-L1041-D01		LD/L1041/D01		