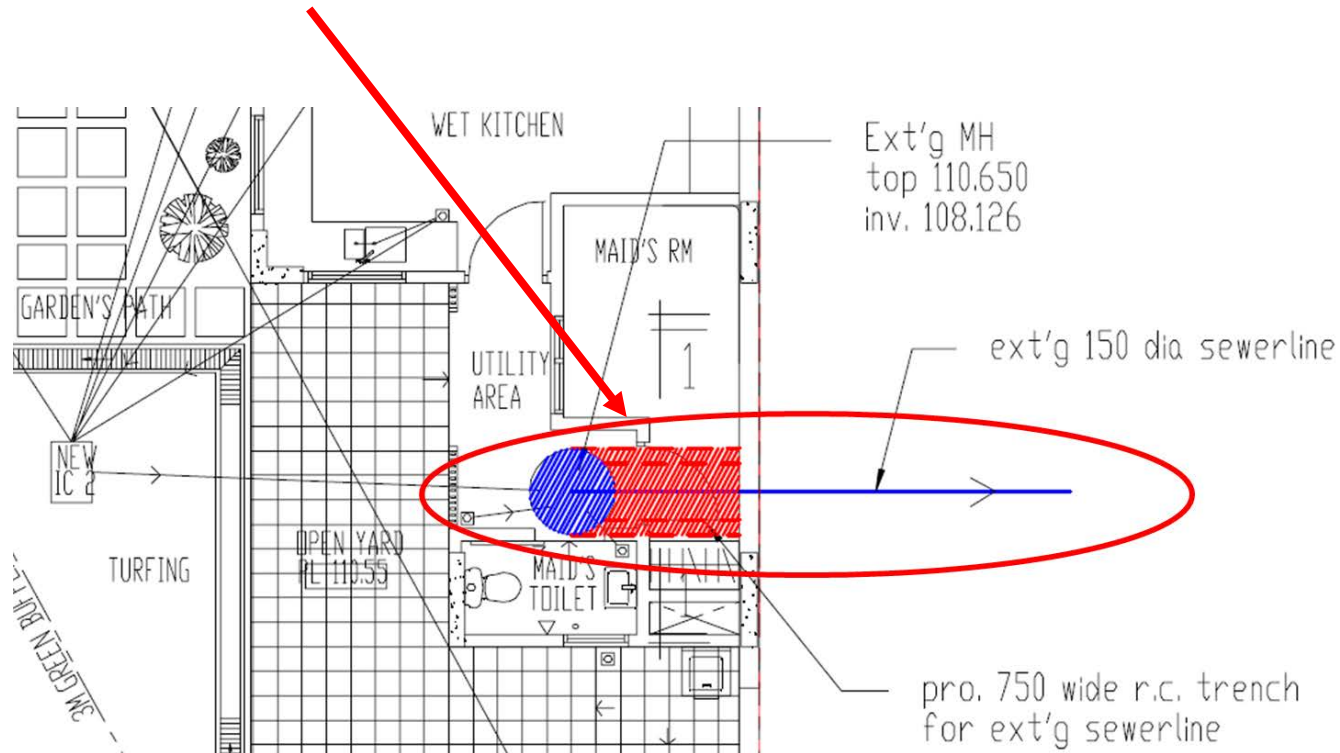




**Quick Guide to Application for  
Clearance Certificate for Detailed  
Plan on Sewerage Works  
(Minor Project - Development with  
RC Trench)**

# NO STRUCTURE ON TOP OF RC TRENCH

- You should ensure no permanent structure (e.g. kitchen cabinet) is to be erected / installed over the RC Trench to ensure readily access when maintenance is needed.

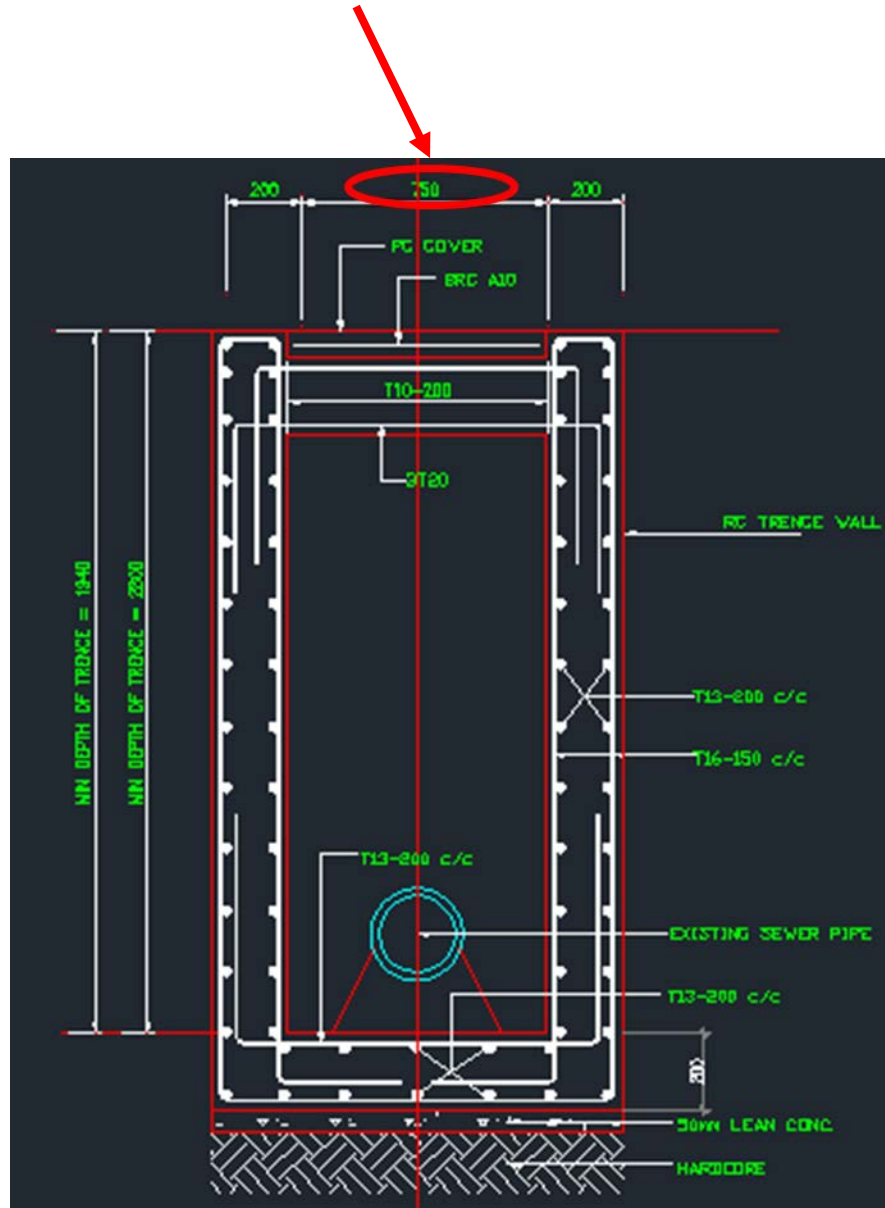


# **INTERNAL WIDTH OF RC TRENCH**

- For minor sewers that are  $\leq 3\text{m}$  deep, QP shall ensure the minimum width of RC trench is 750mm to allow a man to work within it.
- For minor sewers that are  $> 3\text{m}$  deep, the width of the trench required shall be as advised by Water Reclamation Department, PUB.




For minor sewers that are  $\leq 3\text{m}$  deep, QP shall ensure the minimum width of RC trench is 750mm to allow a man to work within it.



# RC TRENCH DESIGN CALCULATIONS

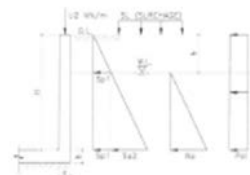
- RC Trench design calculations must be formalised with PE stamp




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Date: 12-Aug-2014  
Prepared by: GS

Project: 49 Jalan Ketumbil  
Subject: RC Trench



<b>General Input</b>		<b>Unitweight of retained material</b>	
Wall height (H)	1.05 m	Soil unitweight (γ <sub>s</sub> )	18.00 KN/m <sup>3</sup>
Wall width (a)	150.00 mm	Water unitweight (γ <sub>w</sub> )	9.81 KN/m <sup>3</sup>
Base depth (b)	1.05 mm	Surcharge Load (S <sub>1</sub> )	11.50 KN/m <sup>2</sup>
Water level from G.L. (h)	0.00 m	Friction Angle (φ)	30.00 °
Clear length of base (L)	0.75 m		
<b>Material Specification</b>			
Concrete strength (f <sub>cu</sub> )	35.00 N/mm <sup>2</sup>	Concrete unitweight	24.00 KN/m <sup>3</sup>
Tension steel strength (f <sub>y</sub> )	460.00 N/mm <sup>2</sup>	γ <sub>u</sub> conc.	1.50
Concrete cover (cc)	30.00 mm	γ <sub>u</sub> steel	1.15
<b>Loading (considering 1m strip):</b>			
Soil dry unitweight (γ <sub>2</sub> )	8.19 KN/m <sup>3</sup>	Coeff. Earth pres. @ rest (K <sub>0</sub> )	0.50
Soil pressure-1, Sp1 = K <sub>1</sub> γ <sub>1</sub> h	0.00 KN/m	Coeff. Active pressure (K <sub>a</sub> )	0.33
Soil pressure-2, Sp2 = K <sub>2</sub> γ <sub>2</sub> (H-h)	2.87 KN/m	Coeff. Passive pressure (K <sub>p</sub> )	3.00
Water pressure, Wp = γ <sub>w</sub> γ <sub>2</sub> (H-h)	10.30 KN/m	Soil behavior behind wall:	Active
Surcharge pressure, Ps1 = K <sub>1</sub> S <sub>1</sub>	3.83 KN/m	Coeff. used (K)	0.33
<b>Design of Wall</b>			
<b>Flexure:</b>			
M <sub>max</sub>	0.53 KNm	Effective depth (d)	110.00 mm
M <sub>max10%</sub>	1.89 KNm	K = M / b d <sup>2</sup> f <sub>cu</sub>	0.0150
M <sub>maxbase</sub>	2.11 KNm	Lever arm (z)	104.50 mm
M <sub>maxservice</sub>	4.53 KNm	A <sub>st,service</sub> = M <sub>max</sub> / 0.87 f <sub>y</sub> z	151.81 mm <sup>2</sup>
M <sub>max1.4</sub> = 1.4 * M <sub>max</sub>	6.35 KNm	Provide vertical reinf.	T10 - 200
		Provide horizontal reinf.	T10 - 300







Water for All: Conserve, Value, Enjoy

*Bought to you by Building Plan Unit, PUB, Singapore's national water agency.*