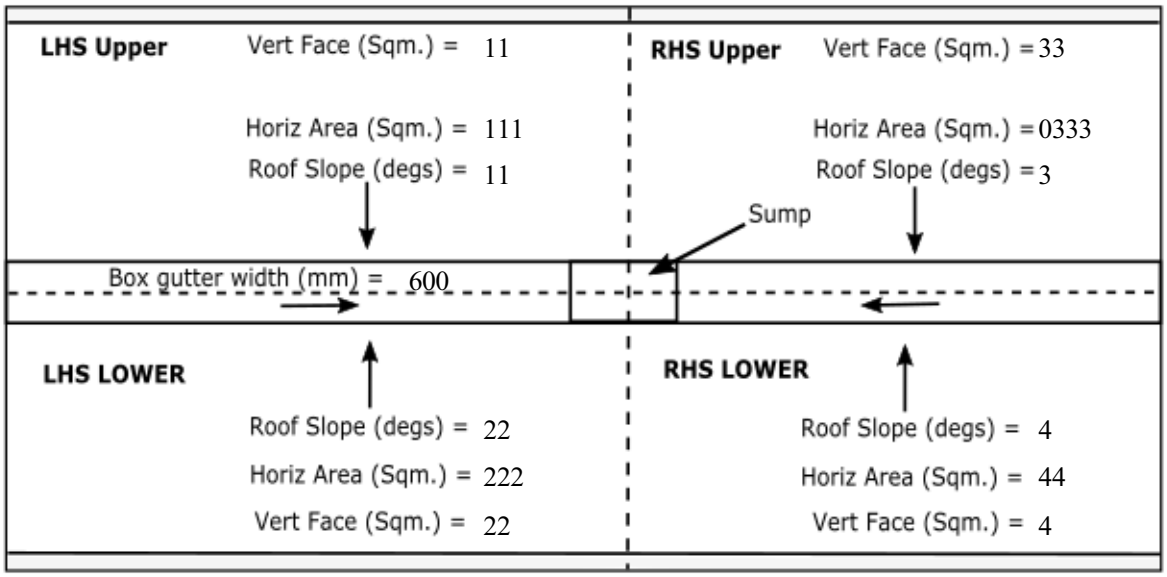
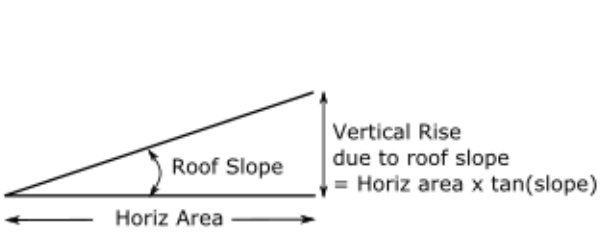
Box Gutter No 11 Job No 007
Design KKK 32 Jul 2020
Checked aaa

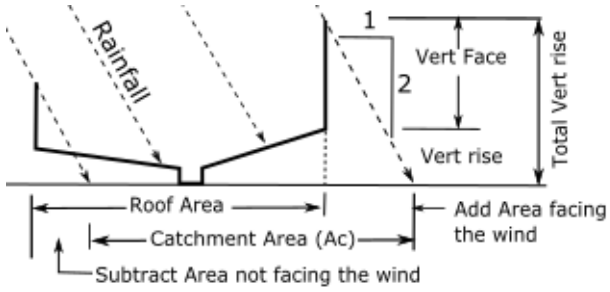
BOX GUTTER AND RAIN WATER HEAD DESIGN TO AS/NZS 3500.3:2015

Industrial Building for Joe Blogs

111 Blogs Lane Blogsville







Calc Total Vertical rise (Av)

Total Vertical rise (Av) = [Roof horiz Area * tan(roof slope)] + (Area of Vert face)

Total Vert Rise area LHS upper = [111 * tan(11)] + 11	Av_Lhs_u	=	32.6	sq.m
Total Vert Rise area RHS upper = [0333 * tan(3)] + 33	Av_rhs_u	=	50.5	sq.m
Total Vert Rise area for all upper = 50.5 + 32.6	Av_u	=	83.1	sq.m
Total Vert Rise area LHS lower = [222 * tan(22)] + 22	Av_Lhs_L	=	111.7	sq.m
Total Vert Rise area RHS lower = [44 * tan(4)] + 4	Av_rhs_L	=	7.1	sq.m
Total Vert Rise area for all lower = 111.7 + 7.1	Av_L	=	118.8	sq.m

Calculate Total Horizontal areas (Ah)

Total Horiz area for all LHS = 111 + 222	Ah_Lhs	= 333	sq.m
Total Horiz area for all RHS = 0333 + 44	Ah_rhs	= 377	sq.m

Find worst wind direction

= Largest vertical Area facing the wind			
= The larger of (Av_u) and (Av_L) = Av_L		= 118.8	sq.m
worst wind direction (blows on this face), therefore wind direction		= from Upper	sq.m

Find Cment area LHS with wind from Upper

= Ah_Lhs + 1/2(Av_Lhs_L - Av_Lhs_u))	Ac_LHS	= 372.55	sq.m

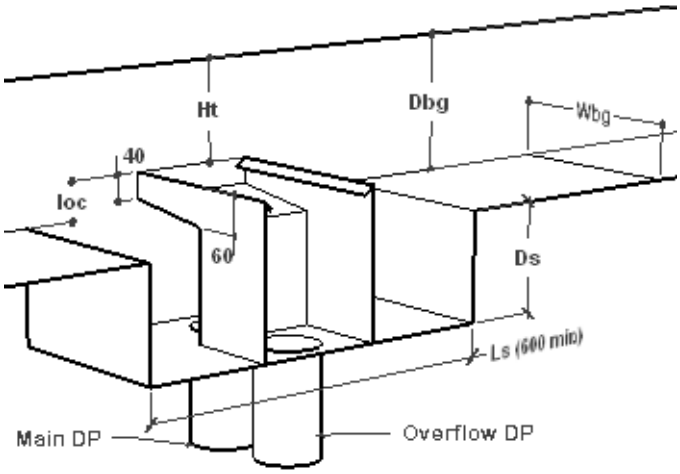
Find Cment area RHS with wind from Upper

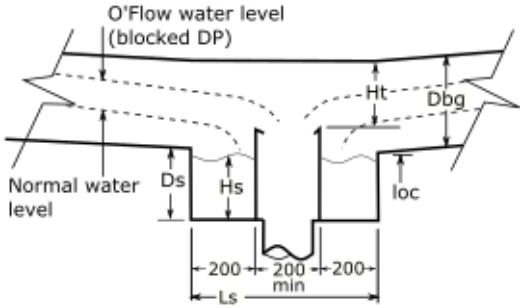
= Ah_rhs + 1/2(Av_rhs_L - Av_rhs_u))	Ac_RHS	= 398.7	sq.m
Design cment area for box gutter worst case being Ac_RHS	Ac_BG	= 398.7	sq.m
Design cment area for Sump and DP			
=(Ah_Lhs + Ah_rhs) + 1/2(Av_L - Av_u)		= 333 + 377 + 0.5 * (118.8 - 83.1)	
	Ac_DP	= 727.85	

Calculate Design Flows

Design Storm Intensity (ARI 100)	I	= 111	mm/hr
Design Flow for BG = (Int * Area) / 3600		= (111 * 398.7)/3600	L/sec
	Qbg	= 12.3	L/sec
Design Flow for DP and Sump = (Int * Area) / 3600		= (111 * 727.85)/3600	L/sec
	Qdp	= 22.4	L/sec

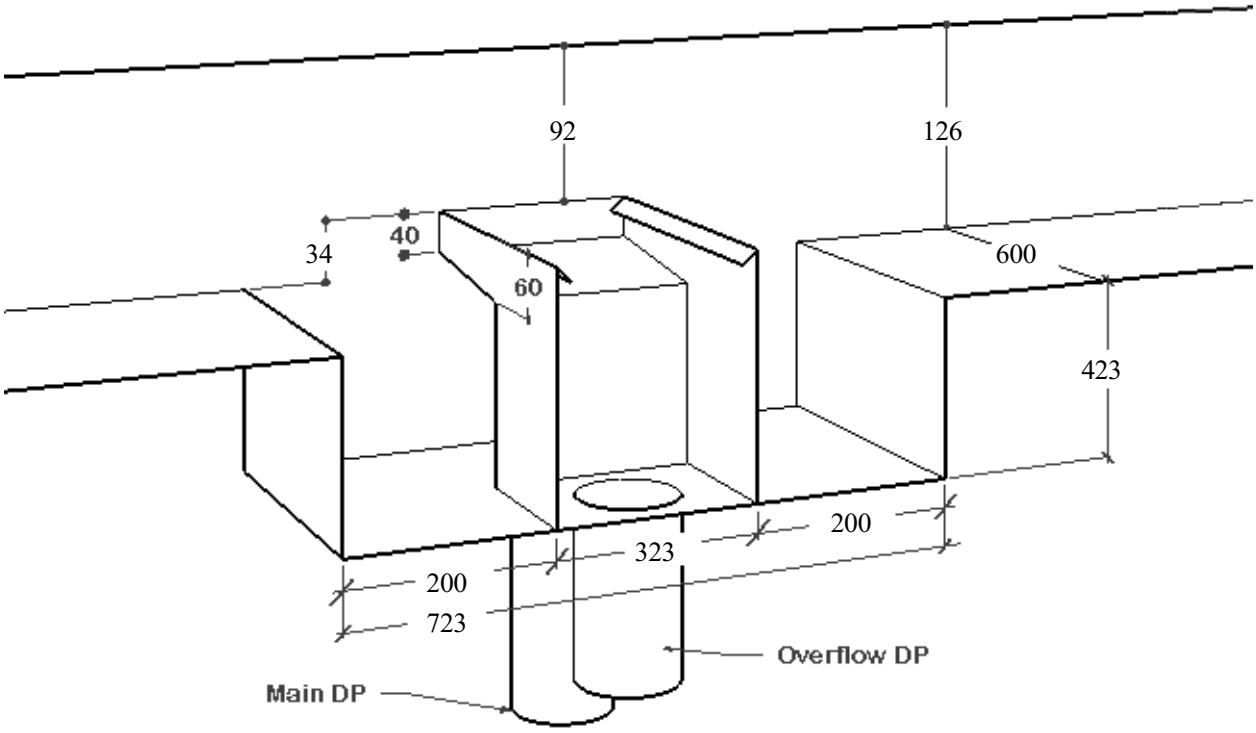
Note: Flow exceeds Code Requirement of 16 L/s. Therefore using formulas developed by CSIRO Division of Building Research, Technical Paper No 1. By K.G.Martin. And standard hydraulic formulas where applicable.





Box gutter width	Wbg	=	600	mm
Box gutter slope		=	1:200	
from CSIRO (eqn 5) + slope adjustment (fig 3) + add freeboard. Box Gutter Depth for free flow condition	Ha	=	114	mm
down pipe and Oflow pipe size	dia	=	150	mm
from CSIRO appendix IV Theoretical Sump Depth	Hs	=	397	mm
from critical depth formula (code fig I6(a), loc	loc	=	34	mm
from weir formula (code fig I8), Ht	Ht	=	92	mm
loc + Ht		=	126	mm
BG depth is the max of Ha and (loc+Ht)	Dbg	=	126	mm
loc < 60 therefore From Note1(b) Fig I7 Datum for sump depth is D/S sole of OFlow channel	Ds	=	Hs + (60-loc)	mm
	Ds	=	423	mm
from CSIRO fig4, length of outer sumps using BG max flow	Lso	=	200	mm
from CSIRO fig4, length of inner sump using 1/2 total flow from each side, increased to fit the DP	Lsi	=	323	mm
Total sump length	Ls	=	723	mm

Summary Dwg (not to scale)



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