Grate Drainage Performance Certificate ID: Slot Drain

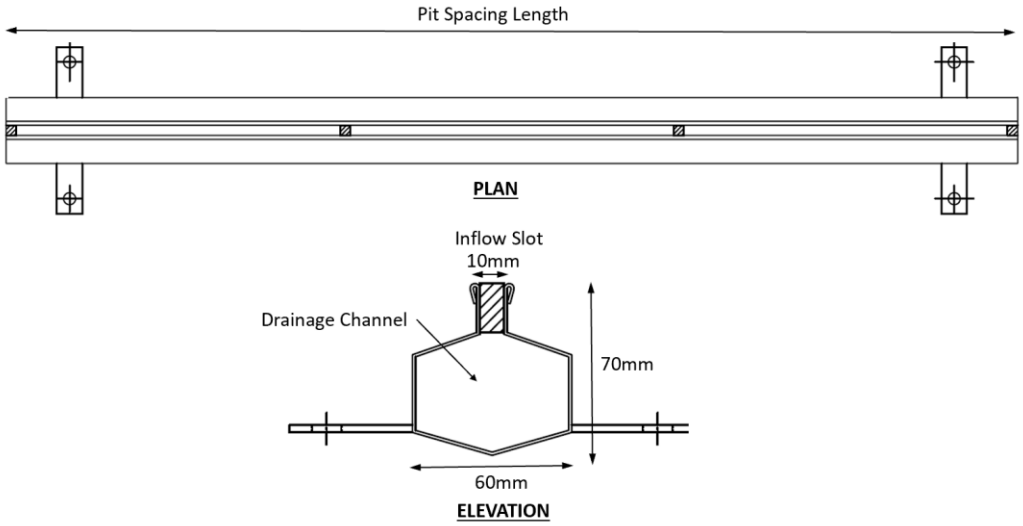
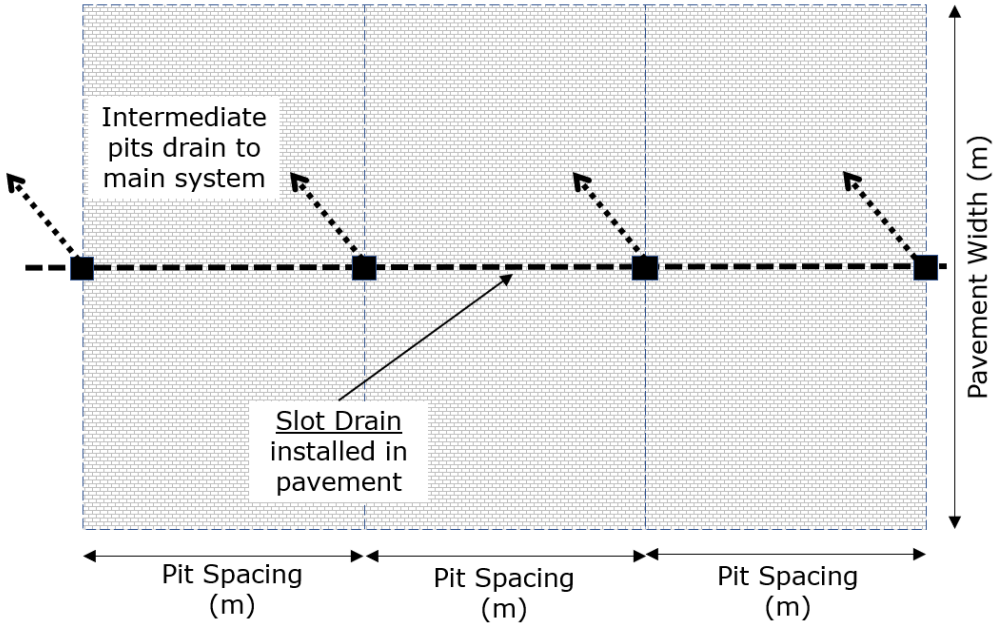
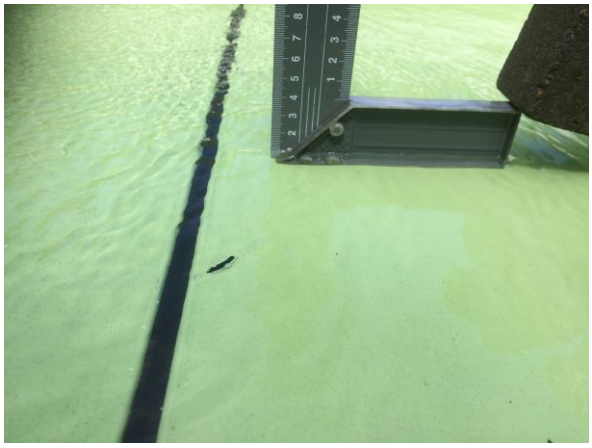
Test Results	ID: Slot Drain
Description	Paige Stainless Slot Drain
Drain Type	Slot Drain – Flush Mounted
Model	Paige Stainless Slot Drain
Test Date	3/10/2020
Grate Drawing	
Typical Installation	
Test Grate Configuration	A one metre length of the *Slot Drain* was installed flush with test rig base. One end of the *Slot Drain* was sealed and the other end discharged freely into a sump (pit). The maximum inflow rates through the slot were measured for different ponding levels (H). The drainage "channel" of the *Slot Drain* was completely full (i.e. at capacity) during all tests.

Table 1 - Slot Drain Maximum Inflowrate (L/s) per lineal metre for pit spacings

Head (mm)	Pit Spacing (m)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.000	0.500	0.333	0.250	0.200	0.167	0.143	0.125	0.111	0.100	0.091	0.083	0.077	0.071	0.067
5	1.400	0.700	0.467	0.350	0.280	0.233	0.200	0.175	0.156	0.140	0.127	0.117	0.108	0.100	0.093
10	1.600	0.800	0.533	0.400	0.320	0.267	0.229	0.200	0.178	0.160	0.145	0.133	0.123	0.114	0.107
20	1.800	0.900	0.600	0.450	0.360	0.300	0.257	0.225	0.200	0.180	0.164	0.150	0.138	0.129	0.120
30	2.000	1.000	0.667	0.500	0.400	0.333	0.286	0.250	0.222	0.200	0.182	0.167	0.154	0.143	0.133
40	2.200	1.100	0.733	0.550	0.440	0.367	0.314	0.275	0.244	0.220	0.200	0.183	0.169	0.157	0.147
50	2.400	1.200	0.800	0.600	0.480	0.400	0.343	0.300	0.267	0.240	0.218	0.200	0.185	0.171	0.160
75	2.600	1.300	0.867	0.650	0.520	0.433	0.371	0.325	0.289	0.260	0.236	0.217	0.200	0.186	0.173
100	3.000	1.500	1.000	0.750	0.600	0.500	0.429	0.375	0.333	0.300	0.273	0.250	0.231	0.214	0.200
125	3.400	1.700	1.133	0.850	0.680	0.567	0.486	0.425	0.378	0.340	0.309	0.283	0.262	0.243	0.227
150	3.800	1.900	1.267	0.950	0.760	0.633	0.543	0.475	0.422	0.380	0.345	0.317	0.292	0.271	0.253

2.4 L/s @ 50 mm Head



1.6 L/s @ 10 mm Head

Observation Comments:

- The *Slot Drain* opening was hydraulically effective and no backing up of flow was observed.
- The drainage capacity of the *Slot Drain* is governed by the conveyance capacity of the drainage channel, rather than the inflow capacity of the slot. Even at 80% blockage, the slot inflow rate was greater than the channel conveyance capacity. Typical slot blockage by debris is therfore unlikely to affect the governing hydraulic capacity of the channel.
- As the drainage channel was completely full during all tests on the 1m long *Slot Drain*, no further conveyance capacity is possible. This means that the maximum inflow rates observed for the 1m long Slot Drain must be appropriately reduced for pit spacings greater than 1m.
- See example calculations on following page for more explanation.

I hereby certify that the test results presented on this outlet performance certificate are true and correct and were obtained using recognised AHSCA Gutter Outlet Testing procedures.

Dr Terry Lucke, Chief Researcher:

Date: 6th October 2020

Mark Alexander, AHSCA Foundation Chairman:

Date: 6th October 2020

Example Calculations for Slot Drain Pit Spacing

Example 1

Design the pit spacing for the Slot Drain to satisfactorily drain the 4m wide pavement shown below during a 1 in 10-year, 20 min storm in Brisbane ($^{10}I_{20min}$ = 124 mm/h). The maximum allowable ponding level at the slot drain is 50mm.

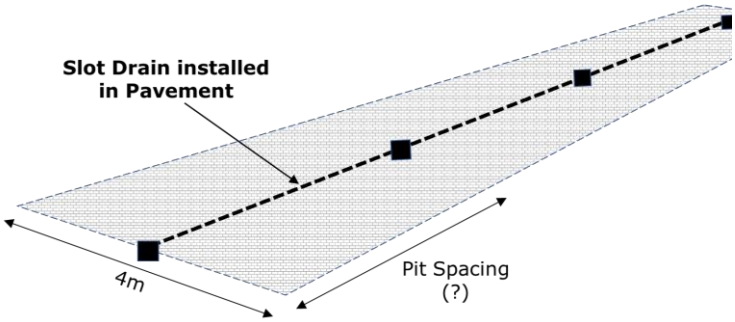


Table 2

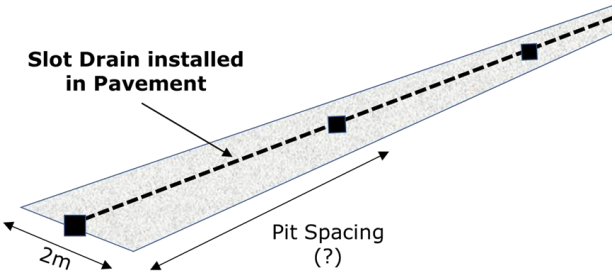
Intensity (mm/h)	runoff (L/s) per m^2
50	0.014
75	0.021
100	0.028
125	0.035
150	0.042
175	0.049
200	0.056
225	0.063
250	0.069
275	0.076
300	0.083
325	0.090
350	0.097
375	0.104
400	0.111
425	0.118
450	0.125
475	0.132
500	0.139

Solution:

- Use Table 2 to find runoff per m^2 (Q_1) for prescribed rainfall event: I = 125mm/h, Q_1 = 0.035L/s/m^2
- Calculate maximum runoff per linear metre (Q_2) of pavement (4m wide): Q_2 = 0.035 x 4 = 0.14L/s/m
- Select a desired pit spacing: start with, say, 4m…
- Calculate total runoff (Q_{Tot}) for selected pit spacing: Q_{Tot} = 4 x 0.14 = 0.56L/s
- Use Table 1 to find maximum flowrate for 50mm head and 4m spacing: Q_{max} = 0.60L/s
- Is $Q_{Tot} \leq Q_{max}$? If yes, then design OK, otherwise try another spacing.
- In this case, 0.56 < 0.60, 4m pit spacing design OK!

Example 2

Design the pit spacing for the Slot Drain to satisfactorily drain the 2m wide footpath shown below during a 1 in 2-year, 15 min storm in Melbourne ($^{2}I_{15min}$ = 41 mm/h). The maximum allowable ponding level at the slot drain is 30mm.



Solution:

- Use Table 2 to find runoff per m^2 (Q_1) for rainfall event: I = 41mm/h (use 50mm/h), Q_1 = 0.014L/s/m^2
- Calculate maximum runoff per linear metre (Q_2) of pavement (2m wide): Q_2 = 0.014 x 2 = 0.028L/s/m
- Select a desired pit spacing: start with, say, 10m…
- Calculate total runoff (Q_{Tot}) for selected pit spacing: Q_{Tot} = 10 x 0.028 = 0.28L/s
- Use Table 1 to find maximum flowrate for 30mm head and 10m pit spacing: Q_{max} = 0.20L/s
- In this case, 0.28L/s is not less than 0.20L/s, so we have to change spacing.
- From Table 1, 30mm head with 7m pit spacing = 0.286L/s.
- Therefore, use 7m pit spacing for this design.