

Tabulated Statement of Experiments on the Carrying-capacity of Clean Pipes of Various Diameters under Different Heads carried out on the Waimea-Kumara Water-races.*

Diameter of Pipe.	Kind of Pipe.	Total Length.	Total Head.	Hydraulic Gradient.	Actual Quantity of Water discharged.	Calculated from Neville's Formula. $V = 140 \sqrt{RS} - 11 \sqrt[3]{RS}$.	Calculated from Eytelwein's Formula. $V = \sqrt{RS} 10560$.
30 in.	Wrought-iron riveted	Ft. 1,188	Ft. 4.46	1 in 266	Cubic Feet per Second. 24	Cubic Feet per Second. 25.9187	Cubic Feet per Second. 24.269
21 "	Ditto ...	16,335	28.92	1 " 57	22	24.4003	21.767
18 "	" ...	2,514	32.73	1 " 77	12.5	13.9885	12.689
30 "	" ...	943.8	1.18	1 " 800	14	14.2349	14.099
30 "	" ...	943.8	1.65	1 " 572	16.75	17.1546	16.673
30 "	" ...	943.8	1.51	1 " 625	16	16.3325	15.953
36 "	Cast-iron ...	11,136	4	1 " 2,784	12	11.2204	11.922
36 "	" ...	11,621	24	1 " 484	28.75	29.9566	28.593
36 "	" ...	11,213	11	1 " 1,019	19.75	19.8111	19.703
36 "	" ...	11,975	36	1 " 333	...	36.832	34.520
4.44 "	Galvanised-iron	1,254	12	1 " 105	0.329	...	0.321

* The attached sheet shows the manner in which the calculations are made.

† Proposed pipe to carry 35 cubic feet per second.

No. 2 Hole.

Total length of pipes ...	12,500 feet.	Total head ...	...	81 feet.
Less ...	525 "	Less ...	...	45 "
Proposed length ...	11,975 "	Proposed head ...	...	36 "

$V = 140 \sqrt{RS} - 11 \sqrt[3]{RS}$
 $V A = \text{cubic feet per second.}$

Pipe, 36 in. in diameter
Radius, .750 log. 1.8750613
Sine, .003012 log. 3.4788550

2)3.3539163
2.6769581
2.1461280
A 7.0685 .8493273
47.034 log. 1.6724134
10.202
36.832 cubic feet per second.

11 in.
A 7.0685
10.202 log. 1.0086921
3)3.3539163
1.1179721
1.0412927
.8493273

$V = \sqrt{RS} 10560$
 $V A = \text{cubic feet per second.}$

A .750 log. 1.8750613
S .10560 = 31.80 log. 1.5024271
2)1.3774884
.6887442
A 7.0685 log. .8493273
1.5380715 = 34.52 cubic feet per second.

$V = 50 \sqrt{\frac{\text{dia.} \times \text{total head}}{\text{total length}}}$
 $V A = \text{cubic feet per second.}$

Diameter, 3 ft. log. .4771213
Total head, 36 ft. log. 1.5563025
2.0334238
Total length, 11975 4.0782755
2)3.9551483
2.9775741
A 7.0685 50 1.6989700
.8493273
1.5258714 = 33.564 cubic feet per second.