and at each side of these a sluice of the same water-way furnished with lifting shutters to be worked by hand from the top, which could be raised in order at any time to hasten the emptying of the reservoir, should it be found necessary.

Immediately above these eight sluices the dam itself would act as a surplus weir, with a crest 100 feet in length, the over-falling water descending the sloping wall on to the body of water about 10 feet in depth that at the same time is being discharged horizontally below with great velocity, and which would be sufficient to break the shock of the discharge over the crest and protect the masonry apron extending probably a chain below the dam.

Taking the flood discharge from the upper area as before stated, less the discharge from the Kyeburn, and the six sluices constantly discharging, the upper reservoir would require one and three-quarter days to fill, assuming that a maximum flood were flowing throughout the time, but, as a flood usually requires some hours in order to acquire its full dimensions, we may safely say two days. Should the flood at the end of these two days not have commenced to subside, the surplus weir would, combined with discharge from the sluices, be capable of passing the full quantity into the lower reservoir, where the discharge from the sluices of the upper one, together with the flood discharge from the Kyeburn area, would already have commenced to accumulate. By the time the lower reservoir was full, which would occupy the same time as the upper one, the flood would have continued for three and a half days at a full flow, which is most improbable; but supposing it to occur, the surplus weir would still be able to discharge the amount flowing in. These two reservoirs would at the end of that time, when both were full, require about eleven and a half days to discharge their contents—about double the time that would be necessary had they been on different branches of the river, and the contents of the upper one not obliged to pass through the lower one. Their effect would be (as will be hereafter shown) to reduce the amount of an extreme high flood by nearly one-half where it debouches on the plain at Outram.

We have previously estimated the daily accumulation of water upon the plain not capable of passing through the Lower Taieri Gorge at 1,883,000,000 cubic feet in twenty-four hours, but by the construction of the storage reservoirs it will be reduced thus :—

	Millions Cubic Feet per 24 Hours.	
Average flood discharge at Outram	4,020	
Withheld in the reservoirs	1,428	
Reduced flood at Outram		2,592
Average flood from Silverstream		173
Average flood from Waipori		842
Reduced flood at Taieri Gorge		3,607
Average discharge at Taieri Gorge		3,152
Daily accumulation		455

Therefore the amount of 455,000,000 cubic feet per twenty-four hours represents what the river is not capable of discharging so long as a high flood lasts. This, however, does not allow for the increased discharge through the Lower Taieri Gorge, which will probably result from the effect caused by the flood banks proposed to be constructed, which will raise the flood level over that portion of the river and the Waihola and Waipori Lakes. As this height is very problematical we will leave it out of the calculation. The above amount of 455,000,000 cubic feet must therefore disperse itself over the surface of the lakes, which, including the low swampy land between them, amounts to about nine square miles, and which will raise the surface level 1 foot 9 inches per twenty-four hours. This rise is met by the height to which it is hereafter proposed to construct the railway embankment between the bridges on the Henley Estate and the flood stop-bank, which, commencing near the Waihola Railway Bridge, skirts the lakes, and is continued to the Lea Canal, thereby entirely enclosing the whole of the land behind the railway.

With regard to the embanking of the river on the plain we have met with great difficulty. As previously stated, we recommend that a certain proportion of the floods should be stored in reservoirs, the balance being, where possible, restricted to certain limits between embankments. Having been obliged to adopt extreme high floods as the quantity to be provided against, and after intercepting nearly the whole of the water flowing off the Upper Taieri area, we still have a much larger quantity to deal with than the ordinary river can convey; consequently must protect, by embankments placed according to circumstances, as much of the land as possible.

The system of embanking flood waters would in the present case of the Taieri, without the assistance of storage reservoirs, be practically impossible. It might succeed for a few years and protect the land from a flood of the magnitude of that of 1879, but one like that experienced in 1868 would most probably obliterate the greater part of the work. We, therefore, feel bound to recommend no half measures, but only what seems capable of withstanding such a flood as that of 1868, which we take to be as follows :—

	Feet per Minute.
Running off upper area	2,083,600
„ lower „	2,569,400
Maximum discharge at Outram	4,653,000

Then, with two reservoirs capable of holding about 4,200,000,000 cubic feet, or a maximum flood of three and a-half days' duration, we have to provide against a discharge at Outram of the whole flow from the Lower Taieri area, plus the discharge of sluices in the Taieri Lake dam, which latter would only commence to discharge heavily after the upper reservoir had become full and had overflowed into the lower one, which amount, together with the flow from the Kyeburn basin, would represent the