11, Market Place,
Spalding.
4th October 1940.

To the Chairman and Members of the River Welland Catchment Board.

Mr Chairman, My Lords and Gentlemen,

In accordance with instructions received from the Clerk to the Board, we beg to present a joint report upon a proposal to pump water from the Bourne South Fen and Thurlby Fen Drainage District into the River Glen. The pumping to cease when the water in the River attains the level of 14 feet above the Liverpool Ordnance Datum.

The sources of the Rivers Glen and Eden ,which joins it above Wilsthorpe Mill, are about 300 feet higher than the land at Kates Bridge, where it enters the Fen Area. From Kates Bridge to Sir Gilbert's Tunnel there is a further fall of 4feet, below this point the flat section continues to the Outfall. The course of the River below Kates Bridge is between artificial embankments erected to restrain the flow of highland water unre--strictedly on to the lower levels of the Fenlands, and from there to the tidal outfall, a distance of 15½ miles, it is an aqueduct for the conveyance of upland water across the Fens.

No water from these Fens enters the River until about ¼ mile above the outfall sluice into the tidal section of the River Welland, where the effluent from the former Spalding and Pinchbeck Drainage District is discharged into it. This outfall is provided with a sluice which closes automatically when the water level in the River Glen is higher than in the outfall drain.

There is no traceable record of the method adopted in the early construction of the Glen Banks, but there is little doubt that they were formed by placing earth upon the level of the adjoining land, which in the Tongue End area is PEAT. The height of the banks has been increased from time to time through the centuries which have elapsed, but so far as is known, no seal has been formed between the earth of which the bank is made, and the clay or gravel underlying the peat, beyond the compression caused by the weight of the superimposed banks. This assumption is strongly supportsd by observations made during works of mainten--ance carried out in the River and more definitely still by the nature of the breach in the Bourne North Fen bank in December 1910.

The breach was not a top breach caused by erosion of the bank by overflow, for a complete section of the bank was forced bodily outward and carried into the adjoining fen. In our opinion , it was caused by the pressure of water in the River overpowering the resistanceof the peat layer underneath the bank and a consequent fracture of the unsupported portion of the structure.

About 5 miles below the site of the breach the River passes through Pinchbeck, where further improvements to the waterway are restricted,because of roads and buildings on both sides, except by piling or, alternatively, by the cutting of an additional channel and the probable enlargement of the Outfall Sluice. Owing to the constriction through Pinchbeck and the reduction of grade through the Fens, the discharge below Pinchbeck Bars Bridge is less than the volume of water entering the reach between Sir Gilbert Heathcote's Tunnel and Tongue End. This causes an accumulation of floodwater between Tongue End and Pinchbeck Bars, and this water rises faster in this section of the River by virtue of the retarding of discharge referred to above.

The present available reservoir space is just sufficient to accommodate an average flood, though the water would

have overflowed the banks above Tongue End im January 1939 if precautions had not been taken to raise places near fences where cattle had trampled down the bank top.

It is proposed to pump water into the River above Tongue End near the head of this most heavily charged section of the stream.

The normal Summer water level near Sir Gilbert's Tunnel is 10.5 feet above Ordnance Datum (Liverpool).

From observations taken in January 1939 and in February 1940 it is found that the time taken for the flood water in the River Glen at Tongue End to rise from the ordinary level of 10.5'O.D. to 14'O.D.is approximately 5 hours. In that time, with a pumping plant adequate for the district, the Bourne South Fen and Thurlby Fen Area would discharge 851,400 cubic feet of water into the section of the River mentioned above. It may be argued that, if the ordinary water level was reduced, as report--ed in relation to the February flood of this year, then the Bourne South Fen water could be accommodated without affecting the flood water arriving later. But if pumping was continued until the level of 14 feet above O.D. was reached, any advantage would be neutralised by the longer time made available for pumping.

If it was proved that by maintaining a lower ordinary water level in the River Glen at all times, for floods occur in the Summer as well as in Winter, then provision would have to be made for the lowering of freshwater tunnels and feed-drains which irrigate the adjoining lands.

Under the Agriculture (Miscellaneous War Provisions) Act 1940 application has been made for the cleansing of the Bulby stream of the River Glen beyond the present limit of the "Main River " and it may be confidently anticipated that other requests for the improvement of land drainage will arise as a wider acreage in the upper reaches is brought under the plough. These improvements, whether carried out by the Catchment Board or by the Riparian Owners will result in a more rapid discharge of water to the River in the Upper Reaches, AND IT CANNOT BE EXCLUDED OR RETARDED with the present appliances.

This probable accelerated discharge from the upper reaches alone emphasises the urgency for undertaking works for securing the foot of the banks throughout their length in the Fens at the earliest moment, though, unfortunately it is exceedingly difficult to find suitable material for this work owing to conditions arising from the War.

In view of the foregoing, we consider that the introduction of additional water - especially in the danger zone - will constitute a grave danger to the safety of the lands in Deeping Fen, the Black Sluice and the Bourne South Fen Districts.

We are, Gentlemen,

Your obedient servants,