

BOURNE SOUTH FEN AND THURLBY FEN DRAINAGE BOARD.

REPORT of MR. G. E. MATTHEWS, M.S.E., upon the condition of the Banks of the Bourn Eau and part of the River Glen, and other matters.

PART ONE.

I have made an inspection and taken levels of the Glen and Bourne Eau Banks for the lengths at present repairable by the Bourne Eau Navigation Trust.

The Glen Bank from Tongue and Doors to Thurlby Rails, a length of 93 1/3 chains, I am told, leaks very badly when the River Glen is under flood conditions, and also is at present very much lower and weaker than the lengths of bank above and below it. Above your length the Glen Bank Trustees are raising and strengthening their length and are making the top of it 2'3" above your lowest place. Below your length the Black Sluice Trust have been raising and strengthening their bank for the last three years and are going to raise it again this year to about the level of the Glen Bank Trustees, or 2'3" above your bank.

For your own protection you must make your length up in the same way, and I have shown it so made up on the sections accompanying this report. The weight of the material thus used, and the running of the light railway along the top of the bank will greatly consolidate the lower portions of the bank, and stop a considerable quantity of the leakage through the bank during floods and also insure safety against breaches through the bank.

The Bourne Eau Bank from Tongue End Doors to the Carr Dyke at Bourne measures 3 miles 25½ chains, and the first 2½ miles of this bank must be heightened and repaired, the remainder is in a very fair condition, but should have all the nettles, thistles, &c. well cut down and be kept more closely grazed, and by sheep if possible.

This Bank is composed of very light peaty soil for the most part and gets very badly charged with water, and leaks during flood conditions of the Eau. It is also much lower than the top of the opposite bank as recently raised by the Black Sluice Trust. I have shown this bank raised to a height of 18 feet above Ordnance Datum, which is the same height as the Black Sluice intend to finish their bank. This height allows about 186" of bank above the flood water when it is running 2'0" deep over the Black Sluice Overfall. I have shown a 6'0" wide top in order to get as weighty a bank as possible owing to the peaty nature of the foundation and bottom portions of this bank.

The work as shown on my sections should be done over at least twice as there is sure to be a consolidation of the lower part of the bank after it is made up for the first time, and it is preferable to make up this subsidence afterwards in, say, the following year than to allow for it by adding to the height of the first. My estimate is worked out to cover this.

I have included in my estimate for the purchase of 2 miles of light railway and 24 trucks, as Mr. Robins informs me that the Black Sluice Drainage will not take up their tracks and therefore cannot hire it out to you. I have also included for the purchase of 5 acres of land for soil pits, as I am not certain what quantity of land you have a right to use.

The Bourne Eau Channel is in a very foul state both with weeds and mud, but I should not advise you as a Board to take over the same

but rather to try and form a joint committee of all the bodies interested to jointly bear the cost. I estimate that it would cost \$1500 to properly cleanse the 3 1/2 miles from the Glen to the Staunch at Long Drove Bridge.

PART TWO.

PUMPING PLANT. Your engine and wheel are of sufficient power to drain the proposed extension of your district as well as the present area, provided that you pump night and day during heavy rainfall. The efficiency of the plant would be greatly increased if the engine foundations were strengthened so that the engine could be run at its normal speed, & if the diameter of the wheel were increased about 3'0" i.e. from 18 feet to 21 feet, and the axle centre raised to suit, the reducing gear wheels enlarged and the reduction in speed on the driving shaft of the wheel increased so as to make the circumference speed about 6 feet per second. If the strengthening of the engine foundations is not done I am afraid that it will cause you serious trouble before very long.

DRAINS. To take the Thurlby Fen water to your pump I propose that you should cut a short length of new drain with a 6'0" bottom width and on a level with the cill of the pump inlet across the triangular plot of land belonging to you at the pumping station, and so connect the Thurlby Fen Drain with the basin at the junction of your other two drains, to move the present Tunnel Bank Drain sluice above this connection, and to place two new sluices across the Thurlby Fen Drain, one above, and one below the new cut; to deepen and cleanse the Thurlby Fen Drain starting at the new cut about 2 feet deeper than at present and proceeding to the junction of the Pasture Drain or drain at present dividing the two districts; to take over and cleanse the Pasture Drain as far as where the Gravel Drain comes into it. (a 15" pipe sufficient

gateway tunnel has recently been put across this drain at the Manthorpe Drain end and this should be taken up by the owner and at least a 2'0" diameter pipe substituted.)

To prevent the water from the delivery side of the pump from returning into the Thurlby Fen Drain and to confine the flooding of the slipe necessary to cause sufficient head to force the water through the Sir Gilbert Heathcote Tunnel, I propose to build an embankment from the delivery side of the pump along the south side of the Thurlby Fen Drain for about 20 chains and to connect it across the slipe to the Glen Bank at both ends, thus forming a main around the Tunnel. For the purpose of this report I have taken it that the Sir Gilbert Heathcote Tunnel cannot be enlarged owing to the opposition that would raise from the Deeping Fen Trustees. These proposals are shown on the large scale plan accompanying this report.

It was proposed to me that the connecting drain should be made by enlarging and lengthening your present Cross Drain, but I consider that this connection would be too far from the pump, and it would be much more costly than the present proposal.

Accompanying this report is a 6" scale Ordnance plan of the district showing your present area colored red, the proposed extension colored yellow, and the Bourne Lau and Glen Banks colored green. The drains maintained by your Board are shown in Blue and also the Pasture Drain which it is proposed you should take over. The Care dyke and drains maintained by the

Kural District Council are shown in brown, and the Soke Dyke maintained by the South Fen Interior Officers in Green.

It would be advisable, should the amalgamation take place, that the Interior Officers be allowed to connect the Soke Dyke to your South Fen Pumping Drain by a 2'0" pipe and sluice as otherwise it will have no outlet during prolonged pumping. The drains in your present area have all been recently deepened

and cleaned out and are all sufficiently large and in an efficient

condition with the exception of the top end of the Tunnel Bank Drain which, I understand, will be cleansed this Autumn.

The drains in Thurlby Fen colored brown have all recently been deepened and cleaned out and are in good condition with the exception of the Weir Dyke from about 20 chains above the Junction of the Middle Drain to the top end, this length requires to be cleansed and deepened.

The Car Dyke is very narrow in places and should approximately be widened from opposite Elsea Wood to the Bourne Eau so as to make it of an even width and gradient, also the old disused inlet sluice from the Glen at Katesbridge Farm should be taken out and the bank puddled and made good to prevent leakage from the Glen.

I should advise that if the Thurlby Fen Drains and the Soke Dyke are not taken over by your Board that you obtain power to compel the parties concerned to rode these drains at least twice a year and to cleanse them out at least once in every 7 years as owing to the nature of the soil of your fens all your drains silt up very quickly.

The private dykes in the whole area are in a badly neglected state with but few exceptions and the gateway tunnels blocked. Power should be obtained to enable you to remedy this state of affairs as it is essential to have good dykes to get the water to your drains.

It would be greatly to the advantage of Thurlby Fen to be connected to your pumping system as under the present circumstances the water from this area is held up by your discharge all the time that you are pumping and can only drain during the night or other times during which you are not pumping. I do not consider this amalgamation would be in any way detrimental to your present area provided my suggestions are carried out.

SCHEDULES.

ESTIMATE COST OF WORKS MENTIONED IN PART ONE OF THIS REPORT
(being the heightening & repairing of the Glen and Bourne Eau
Banks now repairable by the Bourne Eau Navigation Trust).

PLANT. 2 miles of 2'0" gauge light railway rails	370. 0. 0
14 lb. sleepers $7\frac{1}{2}$ lb. & £185 per mile	<u>120. 0. 0</u>
24 1 yd. cube ball bearing tip wagons @ £5	490. 0. 0
GLEN BANK.	
To laying & taking up 3000 yds of track @ $2\frac{1}{2}$ d.	31. 5. 0
To excavating, tramping & trimming on bank. 13,000 cub. yds. of soil @ $1\frac{1}{3}$	812.10. 0
To making up after one year	281. 0. 0
To $2\frac{1}{2}$ acres of land for pits	<u>125. 0. 0</u>
BOURNE EAU BANK.	1249.15. 0
To laying & taking up 5280 yds. of track @ $2\frac{1}{2}$ d.	55. 0. 0
Excavating, tramping & trimming on bank, 12,000 cub. yds. of soil @ $1\frac{1}{3}$	750. 0. 0
making up after one year	300. 0. 0
$2\frac{1}{2}$ acres of land for pits	<u>125. 0. 0</u>
add for supervisions &c.	1230. 0. 0
	<u>150. 0. 0</u>
	£ 3119.15. 0

COST OF WORKS INCLUDED IN PART TWO OF THIS REPORT.

To strengthening foundations of engine, alterations to pump wheel &c. and contingencies	150. 0. 0
To cutting new drain 270 feet, and enlarging and cleansing Thurlby Fen drain & building embankment	99. 0. 0
To cleansing Pasture Drain	96. 0. 0
To 2 new sluices complete & removing & erecting old one	55. 0. 0
	<u>400. 0. 0</u>

(The item for strengthening foundations of engine &c. is only very approximate, as I have not been able to obtain any plan of the foundations as put in.)

GEO. E. MATTHEWS M.S.E.

Civil Engineer,

Spalding.

JULY 1914.

BOURNE SOUTH FEN AND THURLBY
FEN DRAINAGE BOARD.

copy

REPORT by Mr. G. E.
Mathews, M.S.E., upon the condition
of the Bourne Eau & River Glen
Banks repairable by the Bourne
Eau Navigation Trust, and also upon
the proposals for extending the
district so as to include Thurlby
Fen.

Cecil W. Bell,
Bourne.