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REPORT

TO THE

TRUSTEES OF THE LOWER BANN NAVIGATION,

UPON THE PRESENT CONDITION OF

THE LOWER BANN WORKS,

WITH

ACCOMPANYING ESTIMATE.

JULY 30th, 1881.

BY

JAMES BARTON,

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REPORT ON THE LOWER BANN RIVER.

To the TRUSTEES *of the*

LOWER BANN NAVIGATION.

DUNDALK, *July 30th, 1881.*

GENTLEMEN,

I have been delayed in reporting to you upon the Lower Bann Navigation by the exceeding difficulty of obtaining such information as would enable me to give a reliable opinion upon the extent of the liability of the Lower Bann Navigation Trust.

Mr. Crookshank's letter of the 3rd September, 1880, states that—"Besides the Navigation Works proper, the Trustees are advised that "they are bound to restore the River to the state in which they received "it from the Board of Works."

My enquiry, therefore, has been directed to ascertain what were the Sections of the Navigation Channel throughout, and what the Sections of the remainder of the River Channel in 1859, and what they are now, and this investigation has been necessary throughout every portion of the River from Toome to the Cutts, and, having with much difficulty ascertained this, I have estimated the cost of restoring it to its former condition.

When the Board of Public Works made an award in 1859, and placed in your charge this River, they furnished you with a series of Plans and Sections shewing the Works generally and the Lock Works in detail, but no Cross Sections to shew what excavations had been done, or to shew the levels and widths and depths to which each portion of the River had been brought. The award, it is true, gives in Schedule B a description of the Locks and Weirs, and the several breadths of the Navigation Channels are stated, and their depth is stated to be from 6

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to 8 feet; but as regards the general Channel of the River there is no description of the work which was done, or of what widths or depths were then supposed to have been attained. Counsel having advised that you are responsible for the maintenance of the whole River Channel, it does seem to have been a remarkable omission that the award describing accurately the Navigation Works omits any description of the general River Works.

In the year 1859 I had the honor of reporting to the then Navigation Trustees the state of the works about to be placed in their charge, but my examination was confined to the Navigation Works, those alone being supposed to be comprised in your Trust. I then made a series of Cross Sections of the Navigation Channel, by which it appeared that certain works mentioned in the award, and notably the excavations through Lough Beg, were not completed, but that generally the Navigation Works were well executed. I have now made a series of Cross Sections of the Navigation Channel again, and, comparing them with those made by me in 1859, the difference, so far as the Navigation is obtained, except in Lough Beg, where the Board of Works did some work after my examination, the amount of which is uncertain; but I have made copies of the Sections prepared for that work by Mr. Boylan, who, I understand, carried it out, and I find that the works he shewed upon those Sections as necessary were not the same as those Mr. M'Mahon proposed, but only to cut a channel, 80 feet wide and 7 feet deep below Summer water, through the Lake, and 60 feet wide and 7 feet deep between the Moles at the North end of same; and I have assumed that this amount of work was done. The result of my calculations as to the Navigation Channel are—that there are 48,610 cubic yards to be excavated in the several places shewn on the accompanying Sections to restore it to its original state.

I next come to the question of how far works were carried out in the remainder of the River. I have already stated that no official Drawings were furnished to the Trustees to shew the Channels as completed; and further, as far as I have been able to ascertain (and the Board of Public Works have given me every facility for examining into their own working drawings), there are not any Sections in their hands

which purport to have been made after the works were completed. I was therefore obliged to take copies of the Drawings of the Works as originally prepared to be carried out, and to compare the existing Channels with them, and where they differed (as they do in the majority of cases) I had to form a judgment on each Cross Section by the nature of the bottom, or the form and width of the Channel, whether there was a reasonable ground for believing either that the Work had not been done at all—or had been done in part, or in whole, and had silted up.

I submit herewith 71 Sheets of Tracings of the Drawings which are in the Office of the Board of Works containing 422 Sections of the River. I did not consider it necessary for this Report to make nearly so many new Sections of the River as these. I have made, however, 14 Sheets of Sections, shewing 156 Cross Sections of the River and a Longitudinal Section, and submit them herewith.

The positions of my Cross Sections I have also marked and numbered in blue upon your Award Plans. Upon these Cross Sections I have shewn by black lines the bed of the present River and the Navigation Channel; in dotted red lines the section of the River before any Works were done according to the Board of Works Drawings; in full red lines the Channel which the Board of Works Drawings shew they proposed; and I have coloured in pink shade the portions of the Channels which it appears to me have silted or shoaled up, and which I consider the Trustees are responsible to remove; and where this differs from the red lines I show it by a black dotted line.

I have shewn two lines in blue on each of these Cross Sections—the Low Water Summer Level, and the Level at which Mr. M'Mahon in his report stated that the surface of floods would run according to his calculations. The calculations he made of the size of the Channels to be provided under these flood levels have been referred to both by Mr. Manning and Mr. O'Neill in their examination into this question, and hence I have deemed it necessary to ascertain for you whether the Channels stated by Mr. M'Mahon to be necessary *were provided* by the Drawings prepared for carrying out the Works, and I find that in

many cases they were not. In many places the Channels shewn are not nearly as large upon the Working Drawings as those given in Mr. M'Mahon's report. And then again the Channels as carried out were often still smaller than those shewn on the Working Drawings, hence your responsibility is, I conceive, to be measured not by the Channels proposed in Mr. M'Mahon's Report, but by the Channels as far as they were completed in 1859, when the Award was made. Upon the sections annexed you will perceive by comparing them that the present Channels are in many cases larger than those proposed by the Board of Works,* and where smaller you will see that evidently in many cases there was a departure from the original Drawing, the banks in many cases having been formed of stone at a width less than that shewn on the original Drawings; and in other cases large stanks put in for the construction of the Works have been left behind, and are now seen on the Cross Sections materially hindering the flow of the River.

The result of these insufficient Channels has been to raise the flood level. I have shewn on a Longitudinal Section Mr. M'Mahon's expected flood line, and approximately the actual flood line of such a high flood as occurs often each year, and has left its flood-mark upon the masonry at several points.

The excavations of the River Channels outside the Navigation, for which, in my opinion, you are responsible, are shewn on the Cross Sections, and amount to 19,632 cubic yards. The cost of these Works is given in the annexed estimate, and amounts in all to £2,579 10s 2d, and with your own Dredger constantly at work will probably take Two Years to complete.

When these excavations are made the drainage will not be very much improved thereby, inasmuch as the excavations I have shown are not placed in the best position for drainage improvement, but are placed so as to restore the channels to the state in which they were handed over to you; and the same money might, in my opinion, be

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* This is caused in some cases by the action of floods deepening the Channel; in others by your own Dredging; and in some by a deeper Channel having been occasionally cut than was shewn in the Working Drawings.

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much more advantageously spent by putting it with a further expenditure, which, under a joint Drainage and Navigation Trust, would at a moderate cost give considerable permanent relief to much of the flooded lands, whilst maintaining a sufficient navigation between Lough Neagh and the sea.

Much having been said about the effect of the Navigation Weirs in obstructing the flood waters, and opinions by unprofessional persons given that the removal of these Weirs would at once relieve the River floods, I have for your information calculated the effect of the removal of Portna Weir *in toto*, and also the effect of lowering it two feet and introducing sluices in it.

This question has involved the consideration of what amount of water has to be provided for, which depends upon a great number of considerations ; and I think it no slur upon Mr. M'Mahon, whose report was the foundation of these Works, when I say that I am satisfied that 400,000 cubic feet per minute—the amount at which he estimated the flood to be provided for—is proved to be now very far below the reality. The quantity depends upon Lough Neagh as a reservoir and regulator of flood waters, and I am of opinion that if the weirs were lowered two feet and sluices opening a considerable area were inserted in each weir the Lake could be so controlled as that it would be sufficient to provide for Channels capable of constantly venting 580,000 cubic feet per minute at Toome and above Portna, increasing to 620,000 cubic feet at the Cutts Weir.

Taking these measures of floods, the lowering of Portna Weir two feet would effect a lowering of flood level at Portglenone of one foot, provided the Channel below the fall was so far cleared as to prevent the Weir being drowned, which would seem easily accomplished.

Again, if Portna Weir was removed entirely and the Locks, the result in the same flood at Portglenone by calculation comes out as nearly as possible the same level.

There is, therefore, no good case for the *removal* of the Navigation for Drainage purposes, whilst I would suggest that to reduce the Navigation depth to six feet might be assented to, as it would not materially

affect any Navigation likely to arise, and would only bring the channels to the level of other Navigations coming into Lough Neagh.

From the above statement, and the Drawings, you will see that the reports by Mr. O'Neill and Mr. Manning, to the effect that the Channels were in several places too small to vent properly even the amount of flood calculated on by Mr. M'Mahon, are to a great extent corroborated, whilst the inferences drawn, namely, that the original Channels have been allowed to be to a *large extent* choked up by silt are erroneous.

The facts in short being that—

1st.—Mr. M'Mahon did not propose to provide sufficiently for the floods.

2nd.—That the working drawings did not provide as large Channels as Mr. M'Mahon contemplated.

3rd.—That the work as done was in many cases short of the work shown on the working drawings; and

4th.—That some silting has since accumulated to the extent I have shown, which can be removed at the cost named in my estimate.

I am, Gentlemen, yours, &c.,

JAMES BARTON.

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LOWER BANN RIVER.

First column shews quantity to restore Navigation Channel to original state as in 1859. Second column shews quantity to restore the remainder of the River Channel to the same state.

ESTIMATE OF WORKS.

Locality.	Navigation Channel.	Drainage Channel.	Total.	Price.		Total Amount.		
	Cubic Yds.	Cubic Yds.	Cubic Yards.	S	D	£	S	D
Lough Neagh to Toome Railway Bridge, ...	2269		2269	1	0	113	9	0
Railway Bridge to Road Bridge, ...	4352	12130	16482	1	0	824	2	0
Road Bridge to Lough Beg, ...	861	2870	3731	0	10	155	9	2
Lough Beg, ...	33277		33277	0	6	831	18	6
Portglenone and Clement's Ford,	5444	1944	7388	1	0	369	8	0
Portna, ...	2296		2296	1	2	133	18	8
Kilrea, ...	111	1244	1355	1	2	79	0	10
Below Movanagher, ...		518	518	1	0	25	18	0
Loughan's Island,		926	926	1	0	46	6	0
	48610	19632	68242			£2579	10	2

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FOR NAVIGATION.

Details of Dredging necessary to restore the Navigation Channel to its full original section, from Lough Neagh to the Cutts.

No. of Cross Section.	Length in Feet.	Sectional Area. Sq. Feet.	Cubic Feet.	Cubic Yards.	Remarks.
1 to 7	360	15	5400		
7—12	320	24·7	7900		Toome Lock.
13—14	450	46·7	21000		
14—Br.	600	45	27000		
				2269	Railway Bridge.
Br.—18	500	235	117500	4352	County Rd. Br.
18—20	150	45	6750	250	
At No. 23	300	55	16500	611	Brecart.
29 to 31	1150	120	138000		
31—32	650	80	52000		
32—33	1000	80	80000		
33—34	2300	40	92000		
34—35	2000	10	20000		
35—36	1700	80	136000		Lough Beg.
36—37	1300	85	110500		
37—38	1500	80	120000		
38—39	1500	100	150000	33277	
41—42	100	80	8000		
42—43	500	80	40000		
43—Bridge	500	80	40000		
Under Br.	50	40	2000		
Br. to 44	100	110	11000		Portglenone.
44—45	400	70	28000		
46—47	300	60	18000	5444	
48G—51	500	10	5000		
51—52	300	20	6000		
52—52A	300	60	18000		
52A—52B	300	20	6000		
52B—52C	300	30	9000		Portna.
52C—52D	400	30	12000		
52D—52E	300	20	6000	2296	
At 59B	100	30	3000	111	Kilrea.
				48610	

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FOR DRAINAGE.

Details of Dredging necessary to restore the River to what it was when works were completed in 1859 (not including Navigation Channel or Weir Basins).

No. of Cross Section.	Length Feet.	Sectl. Area. Sq Ft.	Cubic Feet.	Cubic Yards.	Remarks.
At No. 18	500	655	327500	12130	From Road Bridge, Toome, to Railway Bridge.
At 21	100	775	77500	2870	Shoal above Eel Weir.
Under Br	100	345	34500		
At 44	100	180	18000	1944	Bridge.
At 59B	100	336	33600	1244	Kilrea Bridge.
At 71A	100	140	14000	518	Below Movanagher.
At 83B	100	250	25000	926	Loughan's Island.
				19632	

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