

REPORTS
— ON —
THE WORKS
REQUIRED TO IMPROVE
THE RIVER BOYNE.

BY
CHARLES D. OLIVER,

CIVIL ENGINEER.

Drogheda :
"INDEPENDENT" COMPANY, LTD., PRINTERS, 9 SHOP STREET.
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REPORT.

Engineer's Office,

2 Kildare Place, Dublin,

January 22nd, 1910.

DROGHEDA BAR.

GENTLEMEN,

In dealing with the problem of the Improvement of the Bar at Drogheda, the information available consists, in addition to the reports of the various Engineers on the subject, which, however, do not, for the most part, bear very directly on it, of (1) a plan, unsigned and undated, but endorsed on the back "Date perhaps 1834," which shows the condition of the river prior to the construction of the north and south bull walls; (2) the Admiralty Chart of 1852; (3) the large Survey made in 1863; (4) the Admiralty Chart of 1892; and (5) the very complete Survey of the Bar recently made by Messrs. Poole & Clements, Civil Engineers for the Harbour Board and the Department. We have thus a fairly complete pictorial history of the Bar for a period of some 76 years.

The first point observable is that since the construction of the bull walls there has been, assuming that the datum of the 1832 survey is identical with that adapted for the more recent plans, a slight increase of depth at the point of the walls and also on the Bar itself, where the depth is now 5 feet as against 3 feet.

This increase has, however, been obtained at the cost of diverting the channel from the straight line past the Bar Perch, now represented by the "concrete block," to its present awkward line of N.E. and S.W. This result is curious, as obviously the intention of the walls was to keep the channel straight. Whether its position in 1832 was purely temporary cannot now be ascertained. Probably the effect has been caused by the current being diverted with too much violence by the wall at the Maiden Tower.

The next point of importance is the extreme stability of the Bar, which during the whole period under observation has scarcely varied at all. While, as stated, the channel, if it can be so called, was diverted between 1832 and 1852, the total change in the Bar was almost infinitesimal, while from 1852 to the present date the surveys are almost identical.

The channel has remained absolutely in the same place and of almost absolutely the same depth; but during the period since 1852, more especially since 1863, the current has shown a distinct, though very slight, tendency to cut its way through again on the old channel line past the Bar Perch, the line which on my first inspection I laid down as that on which it was most desirable to secure a

channel, and on which the trial borings made by the dredger "Fag an Bealach" showed that such a channel was most feasible.

It now seems apparent from the 1832 plan, which I had not at that time seen, that this line actually represents the original river channel.

An interesting speculation arises as to the existence of the bank or island on which stands the Bar Perch. I had supposed that this was a rubble mound tipped for the purpose of carrying the perch, but it appears to have existed in 1832, although no indication of any kind of mark is shown on it. It appears as the nose of a bank. It would seem probable that under the rubble mound there exists a rock or perhaps a gravel spit.

The most important conclusion to be drawn seems to be that the Bar is stable: that is to say, that either the quantity of the sand travelling past the entrance is insignificant, or that at any rate the river and the tidal flow easily master it.

This clearly indicates the hopefulness of being able to maintain a channel once opened. My conclusion, then is that if a channel be cut straight out to sea, either to the north of the Bar Perch or, as I thought originally, centred on it, which it might be if the bank can be easily removed, it will not be difficult to maintain the channel, although, I have no doubt, that some maintenance dredging will be required.

That such a channel will tend to improve itself is not, I think, to be hoped, inasmuch as I believe its bottom will be in clay, though this is not certain. I am now of opinion

that it will be desirable, for the purpose of preventing the river from tending to leave the channel, to extend the south "bull" wall as far out as the Bar Perch, or more or less its present line, and possibly also to extend the north "bull" wall for a length of some 300 feet.

The extensions of the "bull" walls should be at a very low level, certainly not above half tide, as it is not desirable to induce large accumulations of sand behind them. They are for the purpose, and the sole purpose, of preventing a diversion of the river current. If funds are not available, I think it is possible that it might be omitted in the first instance. They may not be essential, though they will probably save maintenance dredging.

As regards the feasibility and cost of the work, I have been able to obtain, by the experiments of the suction dredger, information of a more reliable nature than was heretofore available, and I think that there is practically no doubt that the channel can be easily dredged to 9 feet, and a strong probability that it can be dredged to 12 feet at low water of spring tides—most of it by a suction dredger, some part of it by a self-contained ladder or grab dredger; but before the work is actually commenced on any extensive scale I would recommend further tests by dredging by the "Fag an Bealach," which would leave practically no room for doubt as to the results. A 12-foot channel was not contemplated when she was there before.

I append estimates for the work to be done in cutting a channel, one with a depth of 9 feet at L.W.S.T., and one with a depth of 12 feet at L.W.S.T. across the Bar, and

to a point 1080 feet eastward of the Maiden Tower. I have gone so far in in order that vessels passing the Bar should be able to get into shelter.

I have not in my report dealt with the question of the maintenance of the scour on the Bar, although I noticed that the removal of some with the cross walls and other modifications of the internal arrangements of the river have been suggested in the various reports; and these proposals should, I think, be very fully considered, as the continued reduction of the tidal area by silting up behind the walls may eventually lead to the destruction of the Harbour.

As to how far a channel across the Bar having 9 feet or 12 feet at L.W.S.T. will serve purpose of the town I have not expressed any opinion, as I was simply asked to report on the specific projects.

Your obedient Servant,

CHAS. D. OLIVER.

The Harbour Commissioners, Drogheda.



DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION.

DROGHEDA BAR.

ESTIMATE.

Cu. Yds.

- 249,259. Dredging in a 12' cut
through Bar, 150' bottom,
slopes 10 to 1, @ 6d. £6231, say £6300
- 128,057. Dredging in a 9' cut
through Bar, 150' bottom,
slopes 10 to 1, @ 6d. £3201, „ £3200
- 6,533. Proposed South Wall Ex-
tension, length 1,050',
@ 4s. £1306, „ £1300
- 11,018. Proposed North Wall Ex-
tension, length 300', @ 4s. £2204, „ £2200

CHAS. D. OLIVER.

22/1/1910.

REPORT.

Engineer's Office,

2 Kildare Place, Dublin,

22nd January, 1910.

BOYNE NAVIGATION.

SECRETARY,

Having been requested to furnish a Report on the possibilities of the development of the Navigation of the Boyne (1) between the Quays of Drogheda and the entrance to the Canal, and (2) from the Quays to the Bar, I have endeavoured to investigate the matter as far as was possible in the limited time at my disposal.

In the case of the upper section of the river I have been able to make a superficial survey. I will accordingly deal with this section first.

1. The difficulty above the town is, as I understand, that the Barges which use the Canal are unable to reach its entrance except at high water, and it is desired that the Navigation between these points should be non-tidal. Apparently the level of the tidal low water is about the same as that of the Sill of the Lock, and accordingly it is clear that another Lock must be provided for the purpose of getting Boats into the present one.

I understand the depth of water required to be four feet, and that it is proposed to work the service by Mechanical Propulsion, and that accordingly the position of the Channel as regards the River Banks is not important. Therefore, what is required appears to be to open a Channel having a depth of four feet below the level of the Sill of the Lock, and which will have an available depth of four feet at all states of the tide and to provide a Lock capable of leaving the Boats over the present Sill.

The amount of excavation required is not very great, provided the present Channel be followed, which is to a large extent on the North side of the River. I assume that no rock will be met with, and on this assumption I believe that the Channel can be cut for a sum of about £1,700, and that the Lock will cost about £3,000, so that it may be assumed that a sum of £5,000 will provide the accommodation required if no compensation claims arise.

I have not gone into the question of the improvement of the existing Canal, which, I take it, is one altogether for the Lessees.

2. As regards the Channel of the River, time did not permit of any survey below the town. It is extremely difficult to ascertain what work has been done since the survey was made, but from what I can gather the present condition of the River is much the same as it was then. Any work that had been done has been rather in the direction of straightening the River than of deepening it, so that probably to cut to an increased depth the amount of work to be done is now much the same as that shown on the large plan.

To increase the depth to 12 feet, with a bottom width of 100 feet and slopes of 2 to 1, would involve an excavation of some 664,000 cubic yards of material, which could probably be done for about 9d. per cubic yard, making a cost of £24,900, say £25,000. I think 12 feet should be taken as the minimum depth that would affect a material improvement in the conditions.

As to how far the banks might be affected by this deepening, I cannot speak with knowledge, and of course, if heavy slipping took place, the cost would be materially increased. I scarcely think, however, that this need be anticipated. Falling of the training walls might result, but even so, I doubt that any material harm would ensue. I am disposed to think that the walls are, for the most part, simply mischievous, and they will hardly slip enough to block the Channel.

I have not considered the question of Deep Water Quays at the Town, not having the information as to requirements. Probably these might be very cheaply met by the use of Floating Stages as at Waterford.

Your obedient Servant,

(Signed), C. D. OLIVER,

Engineer to Department, &c.