

HOUSE No. 1644

The Commonwealth of Massachusetts.

SPECIAL REPORT OF THE COMMISSION ON WATERWAYS AND PUBLIC LANDS RELATIVE TO THE COST OF DREDGING A CHANNEL AND OF CONSTRUCTING A STONE BREAKWATER IN THE TOWN OF WINTHROP.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.

The Commission on Waterways and Public Lands, as successors to the powers and duties of the Board of Harbor and Land Commissioners, in pursuance of the provisions of chapter 136 of the Resolves of 1916, submits this report as follows:—

Resolved, That the board of harbor and land commissioners is hereby authorized and directed to make the necessary surveys, examinations and estimates as to the probable cost of dredging a channel off the shore of Winthrop Highlands in the town of Winthrop, not less than one hundred feet in width and not less than six feet deep at mean low water, from a point near the shore opposite the property used by the Winthrop Highlands Yacht Club; also the probable cost of a stone breakwater extending from the westerly end of the United States government reservation on the Winthrop shore in a northwesterly direction, about one thousand feet, toward the northerly end of the breakwater built by the commonwealth and known as the Revere breakwater, for the purpose of protecting said channel and shore from damage by the sea. The board shall report its findings, with the probable cost of carrying them out, to the next general court, not later than the fifteenth day of January.

The proposed improvement will be in Broad Sound on the northerly side of Winthrop Highlands about 1 mile south-

easterly from the Revere breakwater. These waters are entirely open to northeasterly and southeasterly gales, but well protected from all other points of the compass. The proposed breakwater and the point of land known as Winthrop Highlands will furnish the required protection for the proposed channel. It is quite evident, however, that an anchorage basin should also be provided, as otherwise the boats that seek the shelter of this harbor will be obliged to anchor either in the channel or beyond the outer end of the breakwater, for the reason that the water that will be protected by the proposed structure, if it is built the length named in the resolve, is too shoal for a natural anchorage.

The area of the basin will depend upon the number and size of the boats that will use it, but as it is primarily the purpose of the improvement it should have a capacity commensurate with the cost of the breakwater and an opportunity for enlargement. The suggestion of proper dimensions is a difficult matter owing to the fact that there is no positive knowledge of the extent of the use of the improvement. The Winthrop Highlands Yacht Club has a clubhouse and pier at the shore end of the proposed channel, and about 100 members who own some 35 boats; but it is well known that the adjoining waters are frequented by a great many small craft whose owners will be interested in this improvement. It is also claimed that there is no safe small boat harbor between Marblehead and Deer Island, and that the proposed improvement is the natural location for such a harbor.

William F. Williams, engineer for the Commission, in his report on this subject says:—

As a basis for the determination of the size of a basin for this locality, I find that the small boat basin dredged by the Commonwealth in Lynn Harbor has an area of 20 acres, and the area now available for anchorage in Lake Anthony, Oak Bluffs, is 10 acres; but this is inadequate for the boats that would like to use it. In view, however, of the uncertainty as to the number of boats that may use the harbor under consideration but having in mind the cost of the proposed breakwater, it would seem that a basin of at least 10 acres should be furnished. Therefore I have included in the estimate of the cost the amount of dredging required to create a basin on the westerly side of the breakwater about 10 acres in area and 6 feet deep at mean low water, together with a short channel

of the same depth from the basin to the Yacht Club wharf. The basin will be about 700 feet long by 400 feet wide at the outer end, and 650 feet wide at the inshore end. The estimate also provides for a breakwater to extend from the shore at the westerly line of the United States reservation in a north by west course towards the southeasterly corner of the Revere breakwater built by the Commonwealth. It will be necessary, however, to build this breakwater about 1,200 feet long to secure a depth at its outer end of 6 feet at mean low water.

The top of the breakwater is designed to be at an elevation of 13 feet above mean low water and 8 feet wide, which is the same as the Revere breakwater; but it should be noted that the proposed structure will be in a more exposed location, and it is quite probable that it may be overtopped by seas in severe northeasterly gales accompanied by extreme high tides. This may not seriously affect its value if the harbor is to be used only in the summer; but if it is to be used as a winter harbor of refuge the breakwater should be built at least 5 feet higher, which will add about 50 per cent. to the cost used in the estimate.

The estimated cost of the improvement as outlined above will be as follows:—

25,000 tons of stone in breakwater at \$2,	\$50,000
95,000 cubic yards of dredging at \$0.30,	28,500
Engineering and supervision,	7,000
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Total,	\$85,500

While the above estimate of cost and the plan have been prepared to conform to the evident intent of the resolve as to location and scope of the improvement, I am of the opinion that the breakwater should be built further offshore so as to afford protection to a reasonable area of water that has a natural depth of 6 feet or more at mean low water, which will avoid the necessity for dredging a basin in such shoal water that it will require frequent redredging to maintain its depth. The inshore end of the breakwater might also be omitted above mean low water without detriment to the protective value of the outer portion of the structure. The location should be about north and south so as to take advantage of the deeper water, and at some time in the future when the final length of the breakwater is determined it may be desirable to build a short spur to the west at the outer end.

As a basis for an estimate of the cost of a breakwater further offshore, I have assumed a structure similar in design to the one used in the above estimate, about 1,200 feet long with its inshore end at mean low water about 600 feet from the shore, together with a channel 50 feet wide on the bottom and 6 feet deep at mean low water from the Yacht Club wharf to the 6-foot contour which will be the inshore end of the natural basin created by the breakwater.

The estimate of the cost will be as follows:—

50,000 tons of stone in breakwater at \$1.75,	\$87,500
15,000 cubic yards of dredging at \$0.35,	5,250
Engineering and supervision,	8,000
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Total,	\$100,750

It is also stated in the resolve that it is the purpose of the proposed breakwater to protect the shore from damage by the sea, and it has been called to my attention that the metropolitan boulevard which skirts this shore needs such protection. I am of the opinion, however, that the breakwater under consideration will not protect much of the shore front unless it is built longer and farther offshore.

It is apparent that the estimates of cost submitted call for a comparatively large expenditure, and if, in the judgment of the General Court, this project should be carried into effect, this Commission is of the opinion that it should be by means of a special act carrying an appropriation conditioned upon a generous contribution by the municipality or private parties toward the cost of the work, rather than by means of an allotment by the Commission from the limited fund at its disposal for river and harbor works.

Respectfully submitted,

JOHN N. COLE, *Chairman,*

JESSE B. BAXTER,

WILLIAM S. McNARY,

Commissioners.

FEB. 8, 1917.