

MEMORANDUM

To: Members Of The Orleans Select Board

From: Charles Carlson

Date: March 30, 2021

Re: Dredge Purchase Feasibility Study Concerns

INTRODUCTION

Woods Hole Group (WHG) recently issued its Dredge Purchase Feasibility Study, dated February 26, 2021 (the "Study") to the Town of Orleans. The purpose of this memorandum is to set forth a number of concerns about the Study, with the hope that readers will gain an appreciation of the Study's limitations and will recognize the need for substantial revisions to the Study.

The concerns expressed here are not new. They have been shared with Town officials on more than one occasion, with the request that the Study be revised to address the concerns. However, Town officials have decided to not seek revisions at this time.

This memorandum is provided in the writer's personal capacity and not in his role as Chairman of the Town's Dredge Advisory Committee (DAC). This approach is being taken because members of the DAC are not unanimous in their perceptions of the Study.

Sections 1-4 of the Study are uncontroversial and provide a variety of background information and statistics that are useful. Sections 5 and 6, the heart of the Study, describe the ingredients and the output of a financial model developed by WHG to analyze three alternatives for accomplishing the Town's dredging. These alternatives include a Town owned hydraulic dredge, the hydraulic Barnstable County Dredge (BCD), and a private contractor's dredge. WHG concludes that in the majority of scenarios, use of the BCD would be the least expensive and best solution for the Town, with a Town owned dredge being the next best choice. Following is a list of concerns about WHG's financial model and its output as reported in the Study.

PRIMARY CONCERNS

Concern1- The Study makes two key assumptions about the BCD that may be wrong. First, the Study gives the impression that the likely BCD costs are known. In actuality, the BCD costs may be substantially different from the BCD costs that are set forth by WHG. The BCD did not provide WHG with actual dredging rates, mobilization costs and other charges for its dredging of Nauset Estuary, the Pleasant Bay channels and Rock Harbor. WHG simply assumed BCD's current rates and charges will apply. The truth is these rates are subject to change at any time

and the BCD has been studying possible changes. Further, the special challenges of the Orleans dredging projects may cause the BCD to impose special or increased charges due to the need for additional equipment and/or manpower. The BCD's principal representative has stated this possibility. In addition, the BCD rate structure will certainly increase over time and while the Study assumes some increases, the amounts and timing of the increases are entirely speculative.

Second, although WHG mentions the issue, the Study does not sufficiently emphasize the problems associated with relying on the BCD to meet Orleans' dredging needs (the only attention to these problems appears briefly at the end of the Study in the listing of "pros" and "cons" to using the BCD). The Study should have put a spotlight on the fact that the BCD is in high demand, with dredging requests from many towns, and it has a backlog of dredging projects. Also, as the Study notes, scheduling of the BCD is done by County officials who are free to prioritize other projects over the needs of Orleans. In addition, the BCD's dredging equipment has experienced a variety of problems in the past, which has led to substantial downtime for the dredge and delays in completing scheduled projects.

At a minimum, given these constraints, it is questionable whether the BCD would be available when Orleans needs it. Lack of availability of the BCD could be an obstacle to completing the initial dredging of Nauset Estuary and the Pleasant Bay channels and the next scheduled dredging of Rock Harbor. The BCD's lack of availability is likely to be an even bigger issue for the projected annual maintenance dredging of the long channel behind the barrier beach in Nauset Estuary. In short, Orleans should hesitate to rely on the BCD as the solution to its dredging needs unless the BCD will make binding written commitments to Orleans (unlikely, given the BCD's historic practices).

Concern 2- The Study's estimated labor costs are too high. To begin with, the Study assumes that if the Town purchases a dredge, the Town will have to hire five new full-time staff to run the dredging program, and further, the Town may have to hire other staff who can handle administrative duties for the dredging program. In effect, WHG assumes there are no existing Town staff who could manage or support the dredge operation along with a citizen Dredge Committee. This assumption deserves further examination.

That concern aside, the dredging crew could be composed of part-time employees because a dredge program needs staff only about 6 months each year. Part-time dredge crews have been used successfully elsewhere. Also, experience elsewhere has shown it may not be necessary to provide benefits other than workmens compensation to attract part-time employees. The Town Administrator has stated that in Orleans, the additional costs of benefits equal 36% of wages. Lastly, although the Town Administrator has said the Town could not legally engage part-time employees, it is worth more effort to determine how this current barrier (if it exists) could be removed.

The Study makes a brief reference to the possibility of staffing the dredge program with part-time employees and concludes that this approach would have no material impact on labor costs.

However, if WHG's calculations produced this result, WHG must have erred in some of its calculations, because the cost of part-time staff (particularly if there are no fringe benefits) must be much less than the cost of full-time staff.

It also is unlikely a Town dredge operation would require the number of employees assumed in the Study. For example, the study assumes booster pumps will have to be staffed when they are operating. In fact, the leading dredge manufacturer (Ellicott) has confirmed these pumps only need to be manned during startup and shutdown and this work could be done by other crew members). Also, when the dredge is operating without booster pumps, fewer employees would be needed.

It is worth mentioning that three members of the DAC began developing an alternative labor costs model but halted their work when the Town decided not to revise the Study. This alternative model should be completed in the future.

Concern 3- The Study's estimated equipment costs are too high. The Study reports that if the Town purchases a dredge, the Town will need to purchase many additional pieces of equipment. For brevity's sake, the list of additional equipment is not reprinted here. However, the most likely dredge manufacturer (Ellicott) has advised that the Town would NOT need all the listed equipment and some items could be acquired at a significantly lower cost than WHG has assumed. As one example, Ellicott has advised that the Town would not need to spend \$150,000 for a primary push boat- less expensive alternatives exist. Further, it is likely only one "support boat" would be needed, not two. Other equipment could be leased and rebuilt used equipment could be purchased at a much lower cost than new equipment. Based on input from Ellicott and a member of the DAC, it also appears that the dredge pipe costs cited by WHG are substantially overstated. In short, the Study is not a reliable source of information on equipment costs and the real equipment costs could be reduced by hundreds of thousands of dollars if the Town approaches equipment acquisitions more thoughtfully.

Due to these issues, members of the DAC began developing an alternative equipment costs budget but halted their work when the Town decided not to revise the Study. This alternative equipment costs budget should be completed in the future.

Concern 4- The Study's estimate for fuel costs is too high. A dredge and booster pumps (when they are needed) consume a large quantity of fuel, creating a significant cost element. However, the Study assumes that if the Town purchases a dredge, the initial fuel cost would be \$4.00 per gallon. This is about 33% more than the actual current cost. WHG rationalizes this assumption by saying fuel costs are expected to rise over time and by referencing a possible need for remote fuel delivery. In fact, remote fuel delivery should not be necessary, plus it is certainly unclear that fuel costs will rise to the extent assumed. Moreover, all the other initial costs in the Study are based on current (not future) costs, so the assumed fuel costs also should be based on current cost. Lastly, Ellicott has advised that the Study uses fuel consumption rates for the dredge and the booster pumps that are too high.

Concern 5- The Study does not reflect the likely scope of dredging that would be done by a Town owned dredge. This concern requires some explanation.

The Study covers all of the Town's planned dredging of ocean waters. This planned dredging includes the dredging of Nauset Estuary, five channels in Pleasant Bay, and Rock Harbor (possible dredging of freshwater ponds was not included in the Study). The DAC and WHG agreed the Study should assume a single dredging method is used for all these waters, (i.e., a Town owned hydraulic dredge or the BCD's hydraulic dredge or a private contractor's dredge). This seemed to be a good assumption at the time WHG was creating its financial model.

By the fall of 2020, the DAC and WHG had concluded that (a) the initial dredging of Nauset Estuary should be done by the BCD even if the Town purchases a dredge, (b) at least two of the channels in Pleasant Bay should be dredged mechanically, and (c) the dredging of the Mill Pond Channel should be added to the likely dredging program. However, despite the DAC's request, these revisions to the dredging plan were not incorporated into the Study. The great difference between the Study's ASSUMED scope of dredging and the likely ACTUAL scope of dredging causes the output of the Study's financial model to be quite wrong. This problem must be fixed.

Concern 6- The Study fails to explore how the cost of owning and operating a Town dredge could be reduced. This memorandum has already described how WHG's projected costs for a Town owned dredge could be reduced with different assumptions for labor and equipment costs. In addition, the Town could reduce the cost of a Town owned dredge by partnering with another town. For example, Orleans and Chatham might jointly purchase a dredge and share its use. Alternatively, Orleans could lease out its dredge and dredge crew for use by another town. The Study mentions these options, but does not analyze them, saying they are beyond the scope of the Study. These options should be analyzed.

Concern 7- The Study appears to be biased. At the end of the Study, WHG sets forth "pros and cons" of using the BCD, a Town owned dredge or a private contractor to perform dredging for the Town. Unfortunately, WHG seems to go out of its way to discourage the Town from considering a Town owned dredge and to encourage use of the BCD. Here are four examples. First, in the "cons" for a Town owned dredge, WHG highlights the potential "liability and risk" associated with dredge ownership. Of course, insurance is the common way of addressing this issue and such insurance is readily available. Second, WHG highlights the need for booster pumps for dredging in Orleans. In fact, that need will exist only for dredging parts of Nauset Estuary and it is quite possible the need for booster pumps will be minimized by the use of what is called "sidecast dredging". With this dredging technique, the dredged sand is placed to the side of the dredged channel rather than pumped to a distant location. Third, WHG highlights the currents in Nauset Estuary as a safety issue. WHG fails to mention in its listing of "cons" the easy fix to this risk- i.e., one can dredge when the currents are slower and temporarily stop the dredge when the currents are at their peak. Fourth, WHG says "[B]ecause BCD rates are fixed, no minimum dredge volume would be required to achieve a cost-effective pumping rate". Of course, as noted above, the BCD rates are not fixed.

Concern 8- The Study gives very little attention to the likelihood that the overall cost of dredging the Town's waterways could be lowered significantly by reselling the dredged sand. For example, based on WHG's assumption that this sand could be sold for as much as \$20/cubic yard, and WHG's assumption that annualized dredge volume could exceed 50,000 cubic yards per year, this means that Orleans could potentially earn an average of \$1 million per year or more from sand sales.

Alternatively, the dredged sand could be used by the Town so that the Town does not need to purchase huge amounts of sand. Readers should recall that the Town spent more than half a million dollars to build the temporary dune at Nauset Beach and more such projects are predictable along with beach nourishment projects at Skaket Beach and other locations.

More research is needed regarding the potential value of the dredged sand to the Town. This is particularly true if sidecast dredging will not be used because there will be an enormous amount of dredged sand every year. And the Town would benefit regardless of whether the sand is dredged by the BCD or by a Town owned dredge.

Concern 9- WHG itself discounts the Study's conclusions. In the Study's Executive Summary, and again at the end of the Study, WHG observes that changes in a variety of facts will make it necessary to revise the Study later. Accordingly, it is essential for readers to not rely on the Study as the Town's guide to whether it should purchase a dredge.

CONCLUSION

In the Study, WHG acknowledges some of the concerns set forth here. However, WHG either fails to analyze the concerns or conveys the impression that it does not view them as important. Hopefully, this memorandum has shown the Town should seriously analyze all the listed concerns.

Ultimately, with revisions to the financial model that address these concerns, Town officials might determine that there would not be a substantial cost difference between the BCD and a Town owned dredge. At that point, Town officials (and citizens) eventually will have to weigh any cost savings from using the BCD against the limited availability of the BCD. As described above, it seems most unlikely that the BCD will be available to Orleans annually, and it is impossible to say whether the BCD will be available for initial dredging when Orleans is ready for the work to be done. With these limitations, it's possible the Town could conclude that any "savings" from using the BCD are less important than having a dredge available when it is needed.

This memorandum should not be read as an endorsement of the Town's purchase of a dredge. Indeed, it's possible that a revised financial model and more analysis will demonstrate that using the BCD remains the least expensive option for the Town and arrangements can be made with the BCD to ensure its availability. A decision on the best path forward for the Town will be possible only after the issues raised in this memo have been thoroughly addressed.

Final Note: The Study makes no mention of the substantial cost of staff and equipment needed to operate a key element of the Nauset Estuary dredging project. This element is what is known as the dewatering site. Dredged sand will be pumped to this site and allowed to dry out for several months, after which the sand can be transported for reuse elsewhere (e.g., for beach nourishment). Dewatering site costs will be an incremental project cost regardless of whether the Town uses the BCD or purchases its own dredge, because the BCD does not provide staff and equipment for large scale dewatering operations. The cost of a dewatering site also will be an issue if the Town elects to proceed with hydraulic dredging of Rock Harbor.