SELDOVIA BOAT HARBOR IMPROVEMENTS

TECHNICAL REPORT

FEBRUARY 2011

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Executive Summary

Report Purpose & Scope: This report was prepared for the Denali Commission in response to a request for assistance from the City of Seldovia (Seldovia), Alaska and presents an evaluation of harbor infrastructure improvements and/or replacement. Upon review of the existing condition of the harbor, the Corps recommended only examining float replacement including plumbing and electrical upgrades and dredging options. As requested by the community and approved by the Denali Commission, this study also includes a conceptual design of harbor expansion and an assessment of the need for harbor expansion. This report is not meant to imply funding for any of these items has been approved or is available. This report is intended to assist local, state, and Federal decision-makers in their budgetary and project prioritization process.

Study Partners: This report was a collaborative effort between the Denali Commission, the City of Seldovia, and the U.S. Army Corps of Engineers (Corps). The Denali Commission provided funding to the Corps Interagency and International Support Program for the study.

Community Profile: Seldovia is on the Kenai Peninsula across from Homer on the south shore of Kachemak Bay, about 140 air miles southwest of Anchorage. Seldovia has a population of 407 (2009 State Demographer's estimate) which includes the nearby Seldovia Village. Seldovia is not accessible by road. The state ferry operates one to three times a week from Homer during the summer with a reduced winter schedule. All other transportation is dependent on small planes and boats.

Problem Description: The floats in the Seldovia boat harbor were constructed in 1963. The floats have rot in the bull rails, decking, and the float substructure. The floats have been maintained and periodically modified and upgraded since their installation. Seldovia continues to operate and maintain the harbor facility to the best of their ability through patches and quick fixes. Safety hazards will increase as the deterioration continues. The water system, all but abandoned, has been temporarily replaced by a fire hose connected to several spigots. The electrical system has been partially upgraded but is not providing sufficient illumination and power for commercial users.

Since harbor construction, residents have noted that depth is insufficient outside of the federal basin and in the entrance channel. Insufficient harbor depth creates delays for users and reduces the functionality of the harbor. Future shoaling is expected to continue reducing harbor depth and navigable space within the basin, but outside of the federal dredge limits.

Proposed Solution: This report recommends replacement of the float facilities, dredging, and electrical and plumbing improvements. A phased approached is recommended to address the most worn areas first and then replacement of all the floats as funding becomes available. Recent upgrades to the electrical system will allow for salvage and re-use of many electrical junction boxes and pedestals. In addition, several new steel pilings recently installed could also be incorporated into the replacement plans. Also recommended is dredging in various locations throughout the harbor to 12 feet below mean lower low water (MLLW): the uniform depth of the existing harbor.

Floats: The plan to replace the floats would be best accomplished through a phased approach. Replacement of individual sections of the harbor floats has been evaluated, and a parametric cost estimate (not a detailed, design-based estimate) was prepared for each. The sections of the harbor were grouped, taking into consideration their location in the harbor: replacing the main float should

be given priority over replacing the adjoining floats based on construction sequencing. The main float should also be given priority based on construction sequencing if plumbing system and/or electrical upgrades are performed concurrently. All conceptual designs replace the wooden float systems with similar wooden systems. Plumbing and electrical systems upgrades could be performed concurrent with float replacement phases if the community is able to secure funding for such improvements; this would be the most efficient construction sequencing. All pile replacement described assumes that the piles that were not installed encountered rock and would be predrilled and socketed for installation.

- Float Improvement 1 is replacement of the north main float, replacement of the float plane dock, and installation of two galvanized steel piles at the base of the gangway. Total preliminary construction and implementation cost estimates are $2.22 million, $538,000 of which is for plumbing and electrical systems upgrades. Float replacement is anticipated in year 50 at a project cost of $1.7 million. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $538,000 each occurrence (does not include costs for mobilization/demobilization). The most effective float replacement plan in terms of construction sequencing would replace the north main float before replacement of its adjoining floats (A, B, and C floats).

- Float Improvement 2 is replacement of A float and its finger floats. Total preliminary construction and implementation cost estimates are $1.09 million, $206,000 of which is for plumbing and electrical systems upgrades. Float replacement is anticipated in year 50 at a project cost of $884,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $206,000 each occurrence (does not include costs for mobilization/demobilization).

- Float Improvement 3 is replacement of B float and its associated finger floats. The finger floats will be replaced with floats similar to the existing finger floats, but hinged. Two galvanized steel piles need to be placed during this upgrade work. Total preliminary construction and implementation cost estimates are $1.38 million, $207,000 of which is for plumbing and electrical systems upgrades. Float replacement is anticipated in year 50 at a project cost of $1.2 million. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $207,000 each occurrence (does not include costs for mobilization/demobilization).

- Float Improvement 4 is replacement of C float and its associated finger floats. The finger floats will be replaced with floats similar to the floats proposed for the B float finger floats. At the time of the finger float replacement, 18 wooden piles at the end of the existing finger floats will be removed. Three galvanized steel piles would be placed during this upgrade work. Total preliminary construction and implementation cost estimates for Float Improvement 4 are $1.49 million, $151,000 of which is for plumbing and electrical systems upgrades. Float replacement is anticipated in year 50 at a project cost of $1.3 million. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $151,000 each occurrence (does not include costs for mobilization/demobilization).

- Float Improvement 5 is replacement of D float and its associated finger floats. The finger floats would be replaced with floats similar to the floats proposed for the B float finger floats. The wood piles have been replaced; however, the wooden piles at the ends of the finger floats would need to be removed and disposed of when the finger floats are replaced. Total preliminary construction and implementation cost estimates for Float Improvement 5 are $1.03 million, $83,000 of which is for plumbing and electrical systems upgrades. Float replacement is anticipated in year

50 at a project cost of $944,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $83,000 each occurrence (does not include costs for mobilization/demobilization).

- Float Improvement 6 is replacement of E float and the south main float. The finger floats on E float would be replaced with floats similar to the floats proposed for the B float finger floats. The wood piles have been replaced; however, the wooden piles at the ends of the finger floats would need to be removed and disposed of when the finger floats are replaced. Total preliminary construction and implementation cost estimates for Float Improvement 6 are $1.56 million, $184,000 of which is for plumbing and electrical systems upgrades. Float replacement is anticipated at year 50 at a project cost of $1.4 million. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $184,000 each occurrence (does not include costs for mobilization/demobilization). The most effective float replacement plan in terms of construction sequencing would replace the south main float before replacement of D and E floats.

Dredging: Dredging the harbor has been evaluated and a parametric cost estimate (not a detailed, design-based estimate) prepared. Harbor dredging can be accomplished most efficiently by completing all dredging at once in order to minimize mobilization and demobilization costs. There are several areas of the harbor that need dredging which are identified below. The Seldovia Harbor is comprised of a 3.85 acre federally maintained basin to -12 feet MLLW and a 2.67 acre basin that was dredged to approximately -12 feet MLLW in 1983. The proposed dredging improvements in this section address improvements to the areas outside of the federally maintained basin. The dredge improvement consists of dredging the following areas to -12 feet MLLW:

- South of E Float and shoreward of the south main float
- Between D and E floats
- Between C and D floats
- Shoreward of the north main float to widen the channel
- Shallow area outside of breakwater entrance channel

Costs for initial dredging are $2.98 million with an additional $1.5 million every 15 years for maintenance dredging. Estimates assume no difficult dredging (i.e. no rock needing blasting), unless noted, dredging with a clamshell, and upland disposal.

Harbor Expansion: The proposed harbor expansion would increase the harbor basin to accommodate 230 vessels; an addition of 86 slips to the existing harbor. Each float would be lengthened and a new float would be constructed off the north main float to accommodate five large vessels. The new float and maneuvering lanes would be over the location of the existing breakwater, which appears to be built on a rock reef. It is assumed that this improvement would require hard dredging or blasting. Harbor expansion would extend the north breakwater 300 feet west and the south breakwater would be moved 280 feet west. Moving the breakwater and expanding the floats would move the harbor navigation channel outside of the federal dredging limits. The addition of a float onto the end of the main float would also block the narrow federal dredging limit that provides access to the transient float shoreward of the main float. A float extension would be added to the A, B, and C floats. Floats D and E would require more dredging to

expand and could be left to accommodate smaller boats. Preliminary construction and implementation costs for harbor expansion are $28 million.

As the Seldovia Harbor is a federally-authorized project, relocating the existing breakwaters and entrance channel would require coordination with the Corps of Engineers through the Congressional authorization and appropriation processes. This would likely include a cost-shared feasibility study.

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1.0 Introduction

This section defines the report purpose, partners, and scope and describes the general parameters of the effort undertaken to present general information regarding the community of Seldovia.

1.1 Report Purpose

This report was prepared for the Denali Commission in response to a request for assistance from the City of Seldovia (Seldovia), Alaska and presents an evaluation of harbor infrastructure replacement. Analysis performed includes a conceptual design of new floats, electrical, plumbing, and harbor dredging. Included is an assessment of the need for harbor expansion, environmental considerations, and real estate ownership[1].

1.2 Study Partners

This report was a collaborative effort between the Denali Commission, the City of Seldovia, and the Corps of Engineers (Corps). The Denali Commission provided funding to the Corps Interagency and International Support Program for the study.

1.3 Study Scope

The initial scope of study was to investigate harbor improvements in Seldovia, Alaska specifically addressing upgrade or replacement of floats including water and power, dredging portions of the harbor, and the potential need to expand the harbor. Upon meeting with the City of Seldovia and further discussions with the Denali Commission, the scope of work was refined further to more specifically describe the work to be accomplished. The refined scope includes dredging analysis, float replacement including separable items for electrical and plumbing upgrades, and harbor expansion analysis. This investigation includes a report and conceptual designs for proposed solutions. The plans present an array of options that allows the community to implement the project incrementally as they are able to secure funding. Improvements were grouped according to the most efficient construction sequencing as determined by Corps engineers based on site visit data and previous reports. This report is not meant to imply funding for any of these items has been approved or is available. This report is intended to assist local, state, and Federal decision-makers in their budgetary and project prioritization process.

1.4 Community Profile

Seldovia is on the Kenai Peninsula across from Homer on the south shore of Kachemak Bay about 140 air miles southwest of Anchorage. Seldovia has a population of 407 (2009 State Demographer's estimate) which includes the City of Seldovia and the nearby Seldovia Village. Commercial fishing and subsistence are integral parts of the local culture. Seldovia is not accessible by road. The state ferry operates one to three times a week from Homer during the summer with a reduced winter schedule. All other transportation is dependent on small planes and boats. Figure 1 illustrates the project location and Figure 2 shows the Seldovia Boat Harbor in April when most of the boats are still winterized and out of the harbor.

[1] Further scoping determined that an analysis of real estate ownership is unnecessary as all of the proposed solutions would be constructed within the existing harbor basin which is owned by the City of Seldovia. No land acquisition is necessary. Additional real estate work may be necessary in the identification of a dredged material upland disposal site, should dredging be pursued.

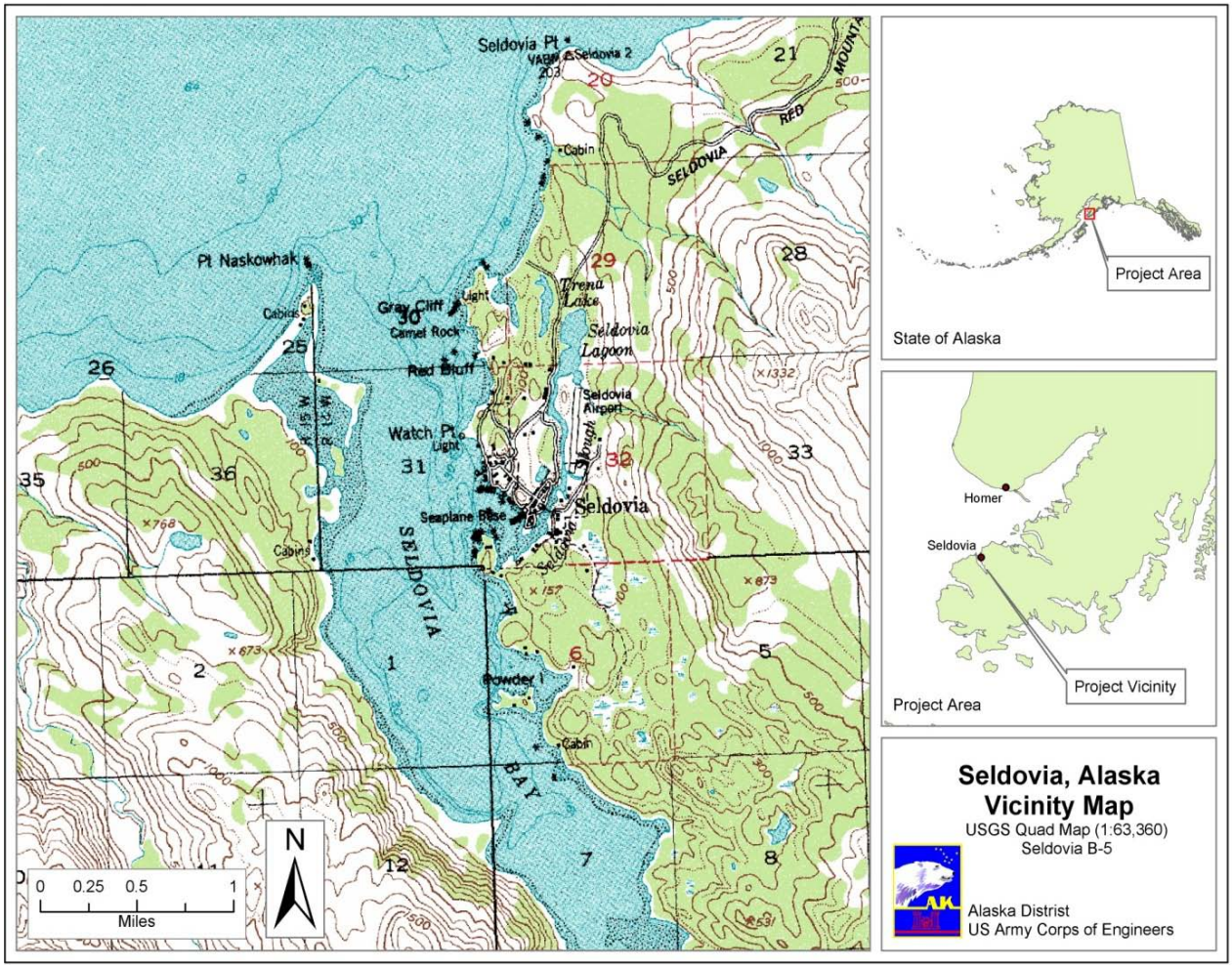

Figure 1. Seldovia Vicinity Map

Figure 2. Aerial View of Seldovia Harbor with floats annotated, April 29, 2010

2.0 Problem Description

The Seldovia Harbor was authorized as a federal project in 1958, with harbor construction completed in 1963, and some breakwater rehabilitation in 1964 after an earthquake damaged the breakwater. The floats in the Seldovia Harbor are almost fifty years old. The floats are rotting in bull rails, decking, and the substructure. The plumbing system, all but abandoned, has been temporarily replaced by a fire hose connected to several spigots. The electrical system has been partially upgraded but is lacking in providing sufficient illumination and power for commercial users. The floats have been maintained and periodically modified and upgraded since their installation. Seldovia continues to operate and maintain the harbor facility to the best of their ability through patches and quick fixes. Safety hazards will increase as the deterioration continues.

The Federally authorized harbor basin is 12 feet below mean lower low water level (MLLW) and covers 3.85 acres. In 1962, the City of Seldovia expanded the basin south of the Federal basin, creating a locally maintained portion of the new, larger harbor basin with a depth of 8 feet below MLLW. In 1983, the City and the State of Alaska deepened the local portion of the harbor to 12 feet below MLLW. Since harbor construction, residents have noted that depth is insufficient outside of the federal basin and in the entrance channel. Harbor shoaling continues to reduce harbor depth south of the C float. Insufficient harbor depth creates delays and hazardous conditions for users and reduces the functionality of the harbor. Future shoaling is expected to continue reducing harbor depth and navigable space outside of the federally maintained harbor basin.

3.0 Existing Harbor Conditions

A site visit to Seldovia was completed April 28-29, 2010. The purpose of this visit was to gather technical information needed to assess the current harbor conditions and create solutions to problems associated with the harbor. Harbor depth, the condition of harbor floats, pilings, and electrical and plumbing systems were observed. These observations are summarized below for the purpose of identifying and categorizing necessary repair work.

3.1 Harbor Depth

The city has noted that sections of the harbor were not deep enough outside of the federally maintained basin. They also noted that there is a problem area in the entrance channel between the breakwaters where boats run aground. The problem areas with shallow depth are in the local basin area and in the entrance between the breakwaters but outside of the federally designated channel. The area outside of the federal dredging limits has filled in a minor amount with depths of -6.0 to -14.0 feet MLLW. The area inside the federal dredging limits has maintained a depth of -12 feet MLLW or deeper.

From C Float southward, the harbor is shallower than the Federal harbor depth of 12 feet. This portion was never dredged as part of the federal project since the harbor floats did not extend that far back into the protected area. Figure 3 shows the Seldovia Harbor in 1982; floats D and E were not constructed at the time of federal dredging. The bathymetry between C and D floats is generally 1 to 2 feet shallower than -12 feet MLLW. This is an area with slips and transient docking. Several boats are limited in their ability to maneuver at low tides and vessel groundings have been reported. When boats are moored at the ends of the floats nearest the breakwater, deeper draft vessels cannot navigate around them because the channel is too shallow away from the floats. Moorage of vessels at the D and E floats are limited to either shallow draft vessels or to the few spots where deeper water exists. The harbormaster reports that many vessels use the channel south of the main breakwater for entrance and egress even though this channel goes dry during negative tides. The bathymetry between D and E floats is shallow, and the harbormaster has reported that there are times when boats in these slips hit bottom or need to be moved from their slips until the tide is higher. The bathymetry south of E float is very shallow, and the harbormaster has reported that there are times when boats in these slips hit bottom or need to be moved from their slips until the tide is higher. Figure 4 and Figure 5 show the shoaling in the harbor off of the south main float and E float.

Depth is also inadequate shoreward of the north main float. The federally maintained area is a narrow section adjacent to the main float. This area is used regularly by tour boats and the Seldovia Bay Ferry bringing visitors to Seldovia. When the tide is low, there is not adequate area for the boats to turn around.

The harbormaster and local users noted that there is a shallow area on which boats ground outside the harbor entrance. The exact location of the shallow area was not defined, but it appears to be adjacent to the federally maintained entrance channel. The federally maintained channel is 60 feet wide at the entrance. There is a shallow area off the nose of the north breakwater that could be the area of grounding.

Figure 3. Aerial photo of Seldovia Harbor in 1982 before harbor expansion by the State of Alaska

Figure 4. Visible ground off the end of E float

Figure 5. Visible shoaling off the south main float (foreground) and E float (background)

3.2 Float System

Overall, the harbor float system is characterized by vegetative growth that is accelerating deterioration. Sections of the harbor floats have reached the end of their design life and are in need of replacement. The bull rails along the transient floats are heavily worn, and uneven floatation was noted along the main and many finger floats. The substructure was not thoroughly inspected, but accounts from a worker on a float replacement project, and limited visual inspection indicates that the float system substructure has experienced significant deterioration. The harbormaster reports several instances of cleats pulling out and boats breaking loose because of the poor condition of the deck material on which cleats are located. Some repairs were done by a contractor but work was not completed for a variety of reasons. This work upgraded much of the B float decking, but most of the bull rails, and some of the decking still needs replacement.

The A float is approximately 10 feet wide and 225 feet long with nine 42-foot finger floats. This float is part of the original harbor that was built in 1963. Continual maintenance has allowed the float to function; however, it is showing signs of extreme wear. The deck planks are cracking and have moss growing on them. The bull rails are worn and the finger floats have deteriorating planking. In some areas, the bull rail has vegetation growing out of the cracks. The finger piers are fastened using a pin system leaving the fingers unstable. This pin system is shown in Figure 6. The slippery nature of the decking in combination with the finger pier instability provides for a potential safety hazard. The wood piles have been replaced and are not in need of further upgrade or replacement.

The B float is approximately 10 feet wide and 250 feet long with eighteen 32-foot finger floats. This float is part of the original harbor that was built in 1963. This float is also showing signs of extreme wear. The B float has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. Some sections of B float have been replaced in the previous repair effort in 2006 and the decking was upgraded. According to one of the workers on the project, the wood substructure was rotten, but the job was to replace only the decking, so good decking was put over rotting wood. The deck planks are cracking and have moss growing on them and the bull rails are worn. The finger floats have a solid connection that is integrated into the main run of B float. This configuration provides a stable finger float and uses fewer piles. The city commented that the fillet that is integrated into the finger pier connection does not allow vessels to back into their slips. The B float finger float configuration is shown in Figure 7. The previous upgrades replaced the piles on the B float, but difficult pile driving was encountered for two of the piles and they were not placed. The electrical system on B float is satisfactory.

The C float is approximately 10 feet wide and 287 feet long with twenty 32-foot finger floats. This float is part of the original federal harbor that was built in 1963. Continual maintenance has allowed the float to function; however, it is showing signs of extreme wear. The deck planks are cracking and have moss growing on them. The bull rails are worn and the finger floats have deteriorating deck planks. Evidence of deteriorating decking and bull rails on the C float is shown in Figure 8. The finger piers are fastened using a pin system leaving the fingers unstable. The slippery nature of the decking in combination with the finger pier instability provides for a potential safety hazard. The previous upgrades replaced the wooden piles on the main C float, but difficult pile driving was encountered for three of the piles. It is assumed that these three piles would need to be socketed for placement. The city reports that vessels cannot pass the end of C float at low tide when a boat is moored at the end because the water is too shallow.

The main D float is approximately 10 feet wide and 287 feet long with ten 32-foot finger floats on the south side and a transient dock on the north side of the float. The east half of D float is part of the original federal harbor that was built in 1963. Continual maintenance has allowed the float to function; however, it is showing signs of extreme wear. The deck planks are cracking and have moss growing on them. The cracked decking on D float is shown in Figure 9. The bull rails are worn and the finger floats have deteriorating deck planks. The pin system used on the finger piers creates unstable conditions on the fingers. This combined with the slippery nature of the decking creates a potential safety hazard. The wood piles along the main D float have been replaced; however, the wooden piles at the ends of the finger floats need to be removed and disposed of if the finger floats are replaced.

The E float is approximately 10 feet wide and 250 feet long with fourteen 32-foot finger floats. This float system is part of the locally maintained area. This float is showing signs of extreme wear. E float has worn decking and bull rails and a fair amount of moss, wear marks, and cracking. The finger piers are fastened using a pin system that is now loose and worn and the finger floats have deteriorating deck planks. Wood piles at the ends of the finger floats need to be removed. The E float is also in need of lighting. The floatplane dock attached to the outside end of E float is very worn and needs to be replaced. This dock is part of the original harbor system installed in 1962. The launch ramps on the sides of the float plane dock are rotting and the deck surface is worn and very slippery. Moss and grass are growing on the decking which is

accelerating its deterioration. The float plane dock is shown in Figure 10. In addition, seaplanes tend to cause navigation hazards as they enter through the main harbor entrance. There is not enough room in the harbor entrance to accommodate both vessel and plane traffic. Though the opening to the south of the main breakwater is not considered a navigable channel, seaplanes tend to utilize this access point at higher tides when the shoal is covered.

The main run of the float system has a section perpendicular to the gangway and an angled section. Both sections have worn decking and bull rails. In some areas, the bull rail has vegetation growing out of cracks. The angled wooden float section of the north main float is approximately 10 feet wide and 312 feet long, and the straight wooden section that ends at the gangway that is approximately 10 feet wide and 400 feet long. This float is part of the original harbor that was built in 1962. The angled section floatation system is uneven, and heaving is visible along the length of the float. The bull rails are worn and at locations along the transient float appear to be almost half their original thickness. Grass and moss is growing on many of the deck planks and bull rails adding to the deterioration. Warping of the north main float is shown in Figure 11 and typical bull rail wear is shown in Figure 12. The south main float is approximately 10 feet wide and 187 feet long. This float system was installed in 1984. The decking and bull rails show similar signs of wear as the north end of the main float.

Figure 6. Old finger pin connections along many floats create unstable surfaces

Figure 7. B Float Finger Float configuration only allows boaters to moor bow in

Figure 8. Vegetation and moss growing on decking and bull rail along C Float

Figure 9. Cracked decking on D Float

Figure 10. Float plane dock with vegetation growing on decking and ramps

Figure 11. Visible warping along the north main float

Figure 12. Worn bull rail along the main float

3.3 Pilings

As previously mentioned, some repair and upgrade work has already been completed. As part of that effort, many of the harbor's wooden piles were replaced by steel piles. However, as the city reports, several of the new pilings were not able to be placed. Seldovia resident Jim Hopkins worked on the project to replace the pilings and reported that several of the locations for new pilings were located on material that was far too rocky to achieve an adequate pile depth with the equipment being used. At some of these locations the piles were driven until refusal and at several other locations there was no penetration at all, so the piles were not placed. The new galvanized steel piles are missing in two locations on the main float, three on the C float, and two on the B float. Also, old wood pilings on the finger floats need to be removed and disposed of along the B float, C float, D float, and E float. Figure 13 shows the location of a missing pile.

Figure 13. An empty pile collar shows where a new steel pile could not be driven due to rocky conditions

3.4 Electrical System

Significant portions of the float power system were upgraded in June 2007. Upgrades included new shore power and lighting pedestals on Floats B, C, D, and E, new pole mounted lighting and light pedestals on the floats, three new power panels, and new circuit breakers for the existing power Panel TF. There are multiple features that are still needed to complete the upgraded electrical system.

The power distribution system on floats A, B, C, D and E consists of 208/120 Volts Alternating Current (VAC), 3 phase, and 240/480 VAC, 3 phase distributed from panel boards located at

various locations on the floats. The lighting system consists of pole mounted area lighting and lighting pedestals. Power distribution is via flexible cables from the panels to the loads.

Power pedestals located at beginning of A float, all pedestals on A float, and a walkway extending from A float into the entrance are old, and have not been replaced. These power pedestals, meters, circuit breakers, and power receptacles are decayed, corroded and unreliable for safe use. Figure 14, Figure 15, and Figure 16 are show examples of existing electrical panels, power pedestals, and overhead lighting, respectively.

Figure 14. Electrical Power Panel D near the Gangway

Figure 15. Example of existing power pedestal

Figure 16. Example of existing overhead lighting

3.5 Plumbing System

Currently the water system in Seldovia consists of a system of fire hoses that are laid out every year, then drained and stored every winter. This approach works well, but needs to be modified to be sustainable in the long-run. Before the fire hose system was implemented, public works crews were performing daily repairs to the water system and the system was described as a, "maintenance nightmare".

Plumbing features in the harbor consist of new 2-inch pipe and valve train off a recently installed 6-inch water main serving the new fire hydrant, one hose station at the end of the ramp, five hose stations at the junction of the main float and floats A, B, C, D and E, and a fish wash area near float D. Figure 17 shows the harbor fire hydrant, Figure 18 shows the valve train and Figure 19 shows the fish washing station. The valve train consists of a 2-inch water meter, check valve, backflow preventer, a valved hose connection, and a shut-off valve. The hose stations consist of a 2-inch vertical pipe with two hose connections. The water meter is located under the harbor approach ramp and is not readily accessible. Reading the water meter is challenging because of the rocky slope.

The main water source is an existing 500,000 gallon tank and chlorination facility located about 300 feet elevation in a nearby hill outside the city, near the airport. Water quality is generally good with only infrequent minor incidents according to Jordan Cameron of the Seldovia Public Works department. At the harbor, the water pressure is at 80 pounds per square inch (psi) at the nearest hydrant which was installed only about one year ago. A 2-inch Plexco Bluestripe Polyethylene pipe branch from the 6-inch water main to that hydrant is the pipe used to supply water to the harbor. The 2-inch pipe is capped awaiting final connections to the hose station.

Currently the hose stations on floats D and E are served by an under-the-boardwalk 2-inch galvanized pipe with a 2-inch branch to the hose stations and a 1-inch branch to the fish washing area. Hose stations on floats A, B, and C are served by various size flexible hoses (fire hose) with wye connections. Figure 20 shows a 2-inch hose station with connected fire hose, and Figure 21 shows a typical north float hose station. Similar 2-inch galvanized pipe that used to serve the hose stations exists in the north float but is not in use.

Water is classified non-potable at the harbor. The classification serves as a practical way to dismantle and reconnect the water supply to the harbor without the seasonal and labor intensive mandatory cleaning, flushing and testing water quality.

Figure 17. The recently installed fire hydrant where the new 2" Polyethylene pipe branched off to serve the harbor water requirements.

Figure 18. The valve train consists of a 2" meter (inside right enclosure), check valve, backflow preventer (inside left enclosure), hose connection and a shut off valve. Access to the water meter requires stepping off the stairs to the sloped rocky area. Water meter gauge can only be read on this side of the meter.

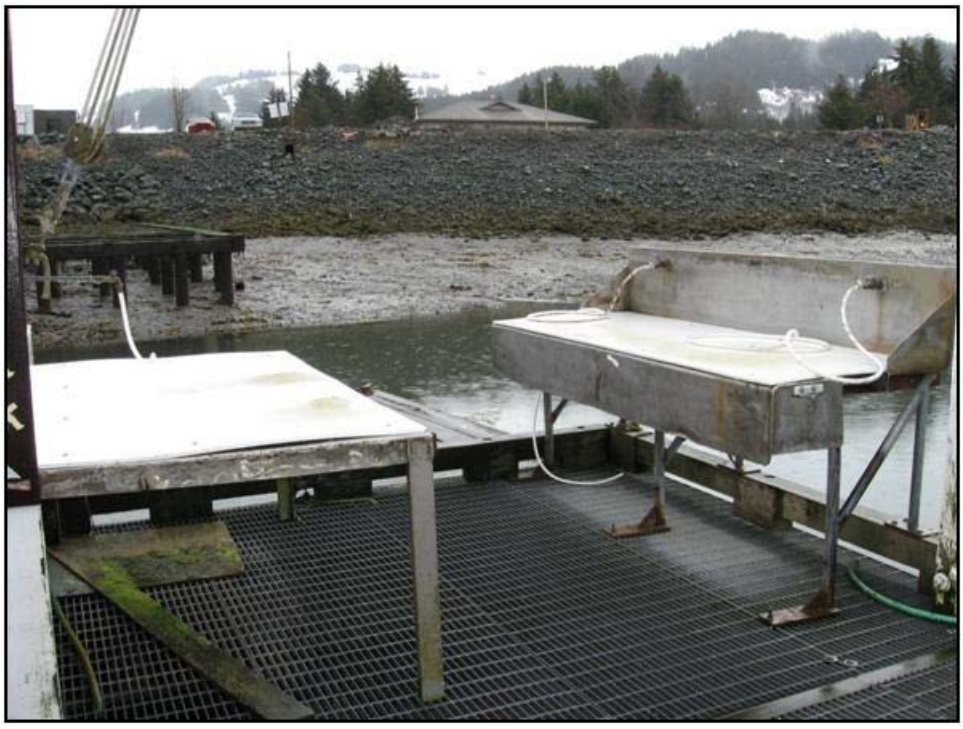

Figure 19. Fish washing area on the south float near D float junction.

Figure 20. Existing 2-inch hose station north of the ramp. The 2-inch flexible hose connection serves the north floats A, B, and C hose stations. The 2-inch pipe under the boardwalk main is abandoned in place.

Figure 21. Typical north float hose station served by the flexible hose with the original vertical hose station abandoned in place.

4.0 Description of Improvements

Based on Corps of Engineers site visits in September 2009 and April 2010 and community input, it was determined that the focus of improvements should be on replacement of the float system rather than repair given the age of the system and the extent of degradation of harbor. Incremental repairs without addressing the entire aging system will last a short period of time, but will not solve the issue of continued deterioration. Once it was determined that repair of existing facilities was not an appropriate option, work progressed to address the most efficient harbor improvement strategy, with solutions falling into three categories: float replacement including electrical and plumbing system upgrades, dredging, and harbor expansion.

Corps engineers used information gathered from site visits and previous studies to complete their analyses and break the float replacement improvements into smaller portions and group the phases of repair based on efficient construction sequencing. Conceptual plans were created on an incremental basis so the community could improve the harbor in stages rather than a complete overhaul; design solutions are presented as separable improvement categories rather than alternatives. If the community can secure funding for float replacement it is more likely that it will be done in stages, rather than replacement of the entire harbor at once. For harbor dredging improvements, it was determined that a phased approach was not the best option given the expense of mobilization and demobilization of equipment that would be required with each phase. Detailed descriptions of harbor float improvements, dredging improvements, and harbor expansion are presented in Appendix A. An assessment of the need for harbor expansion and an initial moorage demand analysis were developed to determine the necessity of expanding the existing harbor basin. This analysis is presented in Appendix B. The float improvements,

dredging improvements, and harbor expansion along with their conceptual costs are summarized below. It must be emphasized that this is a decision-making level report, not a design level report. While the information presented is believed to be representative, it is based on very preliminary information that will have to be verified at the design stage before anything is built.

4.1 Proposed Harbor Float Improvements

Replacement of individual sections of the harbor has been evaluated, and a parametric cost estimate (not a detailed, design-based estimate) was prepared for each. The sections of the harbor were grouped, taking into consideration their location in the harbor: replacing the main float should be given priority over replacing the adjoining floats based on construction sequencing. The main float should also be given priority based on construction sequencing if plumbing system and/or electrical upgrades are performed concurrently. Replacement of each float section could also include replacement of the associated electrical and plumbing system components of each section if the community is able to secure funding for improvements of this kind. This would be the most efficient means of harbor upgrade. Plumbing system and electrical upgrades could be performed separately from float improvements, but would induce increased expenses through additional mobilization and demobilization costs.

- Float Improvement 1 is replacement of the north main float, replacement of the float plane dock, and installation of two galvanized steel piles at the base of the gangway. Two galvanized steel piles need to be placed at the bottom of the gangway and one wooden pile pulled and replaced during this upgrade work. A previous upgrade project replaced the piles on the north main float, but difficult pile driving was encountered for two of the piles and they were not placed at that time. It is assumed that these two piles will need to be socketed for placement. A cost for installing socketed piles is included in the cost estimate. The existing float system has worked well and has allowed sections of the wood structure to be replaced as needed. Replacement with a similar wooden float system is recommended. This type of float construction has proven successful at many Alaska harbors.

Plumbing and electrical systems could be upgraded concurrent with the main float replacement depending on the community's ability to secure funding for these improvements. This would be the most efficient means of upgrade if funds are available. Plumbing system upgrades include replacing the existing 2-inch galvanized tee at the ramp with a new 2-inch high density polyethylene (HDPE) pipe tee to connect the north and south main float 2-inch mains. A new 2-inch HDPE pipe would be installed to serve the north main float and cap the tee that will serve the south main float. A 5-foot flexible clamped hose would be provided between the new 2-inch HDPE tee and pipe to accommodate ramp and float differential movement. The existing 2-inch north main float source of water would be capped.

The existing 2-inch galvanized pipe main of the north main float would be removed and replaced with new 2-inch HDPE water supply main. The existing varying size flexible hose currently serving as hose stations would be removed. New 2-inch HDPE water supply main would be installed where the existing 2-inch galvanized pipe main was located. Four existing hose stations would be removed and replaced with four new 2-inch hose stations.

Approximately 300 feet of 2-inch galvanized pipe installed under the boardwalk would be removed. Four hose stations at the junction of floats A, B, C and D would be removed.

Removal would include but not be limited to main pipes, branch pipes, vertical risers, valves, fittings, pipe supports and appurtenances. Approximately 300 feet of new 2-inch HDPE pipe would be installed under the boardwalk complete with pipe supports. Four new hose stations would be installed at the same location as the existing hose stations. Each new hose station consists of a 2-inch HDPE branch off the new 2-inch HDPE main, new 2-inch galvanized pipe riser connected to the new 2-inch HDPE branch, two new hose bibbs and shut off ball valves.

Electrical upgrades for Float Improvement 1 include replacing six existing 240 volt power pedestals containing General Electric (GE) kilowatt-hour meter, GE circuit breaker and National Electrical Manufacturers Association (NEMA) type IV power receptacle, and metal frame with new power pedestals such as Eaton Marina Admiral Power Pedestal. Also four existing conductor marine power cables originating at existing power Panel TF would be replaced with four new conductor marine power cables from existing Panel TF to the location of the new 240 volt power pedestals. The new cable will be Institute of Electrical and Electronics Engineers (IEEE) 1580 Type P Flexible Multi Conductor Power cable. In addition, proper support must be provided for new cable from Panel TF to each power pedestal location and power cables would be extended from the existing power Panel TF location at the intersection of the north main float and A float, along the length of the north main float for installation of 30-foot high metal light poles. Then metal Halide floodlight fixtures would be installed atop each pole to provide a minimum 10 foot-candle illumination along the north main float.

Total preliminary construction and implementation cost estimates for Float Improvement 1 are $2.2 million, $538,000 of which is for electrical and plumbing systems upgrades. Float replacement is anticipated in year 50 at a project cost of $1.7 million. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $538,000 each occurrence (does not include costs for mobilization and demobilization). The basis of this concept is to replace the wooden float system with a similar wooden system. The transformer float would be part of the main float replacement, and piles not replaced during the previous pile installation work would be replaced. The pile replacement assumes that piles not installed encountered rock and would need to be predrilled and socketed. The most effective float replacement plan in terms of construction sequencing would replace the north main float before replacement of floats A, B, and C. Figure 22 is a site plan for Float Improvement 1.

- Float Improvement 2 is replacement of A float and its finger floats. This concept replaces the wooden float system with a similar wooden system. Plumbing and electrical systems could be upgraded concurrent with A float replacement depending on the community's ability to secure funding for these improvements. This would be the most efficient means of upgrade if funds are available. Plumbing system upgrades include installing 210 feet of new 1-inch HDPE pipe under the A float boardwalk and four new hose bibb stations. New 1-inch HDPE pipe would branch off the new 2-inch pipe installed under the north main float.

Electrical upgrades include replacing the six existing 480 volt and 120 volt power pedestals with new power pedestals such as Eaton Marina Admiral Power Pedestal. Also, the four existing conductor marine power cables originating at the existing Panel TF would be replaced with four conductor marine power cables from the existing Panel TF to the location of the new 480 volt power pedestals. The new cable will be IEEE 1580 type P Flexible Multi Conductor Power cable. Also included in upgrades is providing proper support for the new cable from Panel TF to

each power pedestal location. Power cables from the existing Panel TF would be extended along the length of the north main float to each location of the new power pedestals. Power cables would also be extended from the existing power Panel TF along the length of the A float for installation of 30-foot high metal poles and metal Halide floodlight fixtures would be installed atop each pole to provide a minimum 10-foot-candle illumination along A float.

Total preliminary construction and implementation cost estimates for Float Improvement 2 are $1.09 million, $206,000 of which is for electrical and plumbing systems upgrades. Float replacement is anticipated at year 50 at a project cost of $884,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $206,000 each occurrence (does not include costs for mobilization/demobilization). Figure 23 is a site plan for Float Improvement 2.

- Float Improvement 3 is replacement of B float and its associated finger floats. This effort replaces the wooden float system with a similar wooden system. The finger floats will be replaced with floats similar to the existing finger floats, but hinged. Two galvanized steel piles will be placed during this upgrade work. A previous upgrade project replaced the piles on B float, but difficult pile driving was encountered for two of the piles. It is assumed that these two piles would be socketed for placement. A cost for removing the two remaining wooden piles on this float and installing socketed piles is included in the cost estimate.

Plumbing and electrical systems could be upgraded concurrent with B float replacement; this would be the most efficient means of upgrade if funds are available. Plumbing system upgrades include installing 270 feet of new 1-inch HDPE pipe under the B float boardwalk and five new hose bibb stations. The new 1-inch HDPE pipe would branch off the new 2-inch pipe installed under the north main float. Electrical upgrades include replacing the existing 480-volt and 120-volt power pedestals with new power pedestals. The four existing conductor marine power cables originating at the existing Panel TF would be replaced with four new conductor marine power cables to the location of the new 480-volt power pedestals. The new cable will be IEEE 1580 Type P Flexible Multi Conductor Power cable. Upgrades include providing proper support for new cables from the Panel TF to each power pedestal location. Power cables will be extended from the existing power Panel TF along the length of the north main float to each location of the new power pedestals on B float. Power cables will also be extended from the existing power Panel TF along the length of A float and into B float for installation of 30-foot high metal light poles and metal Halide floodlight fixtures will be installed.

Preliminary construction and implementation cost estimates for Float Improvement 3 are $1.4 million, including $207,000 for electrical and plumbing systems upgrades. Float replacement is anticipated in year 50 at a project cost of $1.2 million. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $207,000 each occurrence (does not include costs for mobilization/demobilization). Figure 24 is a site plan for Float Improvement 3.

- Float Improvement 4 is replacement of C float and its associated finger floats. This effort replaces the wooden float system with a similar wooden system with the exception of the finger floats. The finger floats will be replaced with floats similar to the floats proposed for the B float finger floats. At the time of the finger float replacement, 18 wooden piles at the end of the existing finger floats will be removed. Three galvanized steel piles will be placed during this upgrade work. A previous upgrade project replaced the old wooden piles on the main C float with new steel piles, but difficult driving was encountered for three of the piles. It is assumed

that these three piles will be socketed for placement. A cost for socketed piles is included in the cost estimate. Plumbing and electrical systems could also be upgraded concurrent with C float replacement; this is the most efficient means of upgrade if the community is able to secure funding.

Plumbing system upgrades include the installation of 300 feet of new 1-inch HDPE pipe under the C float boardwalk and five new hose bibb stations. The new 1-inch HDPE pipe would branch off the new 2-inch pipe installed under the north main float. Electrical upgrades include installing new 120-volt power pedestals at each alternate boat slip location on the north and south side of the float. Also included is extending new power cables from the existing power Panel D at the intersection of the north main float and the D float along the length of the north main float to each location of the new power pedestals on C float. Proper support will be provided for the new cable from Panel D to each power pedestal location. Power cables will also be extended from the existing power Panel D into C float for installation of 30-foot metal light poles and metal Halide floodlight fixtures will be installed atop each pole to provide a minimum 10-foot candle illumination along C float.

Total preliminary construction and implementation cost estimates for Float Improvement 4 are $1.49 million, $151,000 of which is for electrical and plumbing systems upgrades. Float replacement is anticipated in year 50 at a project cost of $1.3 million. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $151,000 each occurrence (does not include costs for mobilization/demobilization). Figure 25 is a site plan for Float Improvement 4.

- Float Improvement 5 is replacement of D float and its associated finger floats. This effort replaces the wooden float system with a similar wooden system while the finger floats would be replaced with floats similar to the floats proposed for the B float finger floats. The wood piles do not need replacing as part of this upgrade work; however, the wooden piles at the ends of the finger floats will be removed and disposed of when the finger floats are replaced.

Plumbing and electrical systems could be upgraded concurrent with float replacement depending on the community's ability to find funding. Plumbing system upgrades include installation of 300 feet of new 1-inch HDPE pipe under the D float boardwalk and the installation of five new hose bibb stations. Electrical upgrades include extending power cables from the existing power Panel D at the intersection of the north main float and D float along the length of D float for installation of 30-foot high metal light poles. Proper support for the new cable from Panel D would be provided. Metal Halide floodlight fixtures would be installed atop each metal light pole to provide a minimum 10 foot-candle illumination along D float.

Total preliminary construction and implementation cost estimates for Float Improvement 5 are $1.03 million, $83,000 of which is for electrical and plumbing systems upgrades. Float replacement is anticipated in year 50 at a project cost of $944,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $83,000 each occurrence (does not include costs for mobilization/demobilization). Figure 26 is a site plan for Float Improvement 5.

- Float Improvement 6 is replacement of E float and the south main float. This concept replaces the wooden float system with a similar float system while the finger floats on E float would be replaced with floats similar to the floats proposed for the B float finger floats. The wood piles have been replaced and would not be replaced as part of this upgrade work; however,

the wooden piles at the ends of the finger floats will be removed and disposed of when the finger floats are replaced.

Plumbing and electrical systems could be upgraded concurrent with float replacement. Plumbing system upgrades would be made along the E float, walkway ramp, south main float, and to the fish washing area located off the south main float. Along the E float, existing 1-inch HDPE pipe would be removed and replaced with 300 feet of new 1-inch pipe under the E float boardwalk and five new hose bibb stations would be installed. On the ramp, the existing 2-inch HDPE under the ramp would be the source of the new north and south main float pipe mains. New 2-inch HDPE would be connected from the tee to serve the south main float. The current 2-inch south main float source of water would be capped. Along the south main float, the existing 2-inch galvanized pipe main would be removed and replaced with new 2-inch HDPE water supply main. One existing hose station would be removed and replaced with a new 2-inch hose station. Also, approximately 100 feet of 2-inch galvanized pipe installed under the boardwalk and one existing hose station would be removed. Removal includes, but is not limited to, main pipes, branch pipes, vertical risers, valves, fittings, pipe supports, and appurtenances. Approximately 100-feet of new 2-inch HDPE pipe would be installed under the boardwalk complete with pipe supports. One new hose station would be installed and would consist of a 2-inch HDPE branch off the new 2-inch HDPE main, new 2-inch galvanized pipe riser connected to the new 2-inch HDPE branch, and four new hose bibbs. At the fish washing area, the existing 1-inch branch off the 2-inch main would be removed and replaced with 1-inch HDPE and connected to two 1-inch galvanized risers. The existing faucets of the fish washing area would be replaced with new faucets.

Electrical upgrades would occur along the south main float and on the E float. On the south main float, power cables would be extended from the existing power Panel D at the intersection of the north main float and D float into the south main float for installation of 30-foot metal light poles. Metal Halide floodlight fixtures would be installed atop each pole to provide a minimum 10 foot candle illumination along the south main float. Proper support would be provided for new cable from Panel D to each power pedestal location. Similar electrical upgrades would be made along E float including new light poles, floodlight fixtures, and proper support for new cable.

Total preliminary construction and implementation cost estimates for Float Improvement 6 are $1.56 million, $184,000 of which is for electrical and plumbing systems upgrades. Float replacement is anticipated in year 50 at a project cost of $1.4 million. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $184,000 each occurrence (does not include costs for mobilization/demobilization). These operations and maintenance cost estimates assume that normal harbor maintenance and repair takes place on a regular basis. The most effective float replacement plan in terms of construction sequencing would replace the south main float before replacement of its adjoining floats. Figure 27 is a site plan for Float Improvement 6.

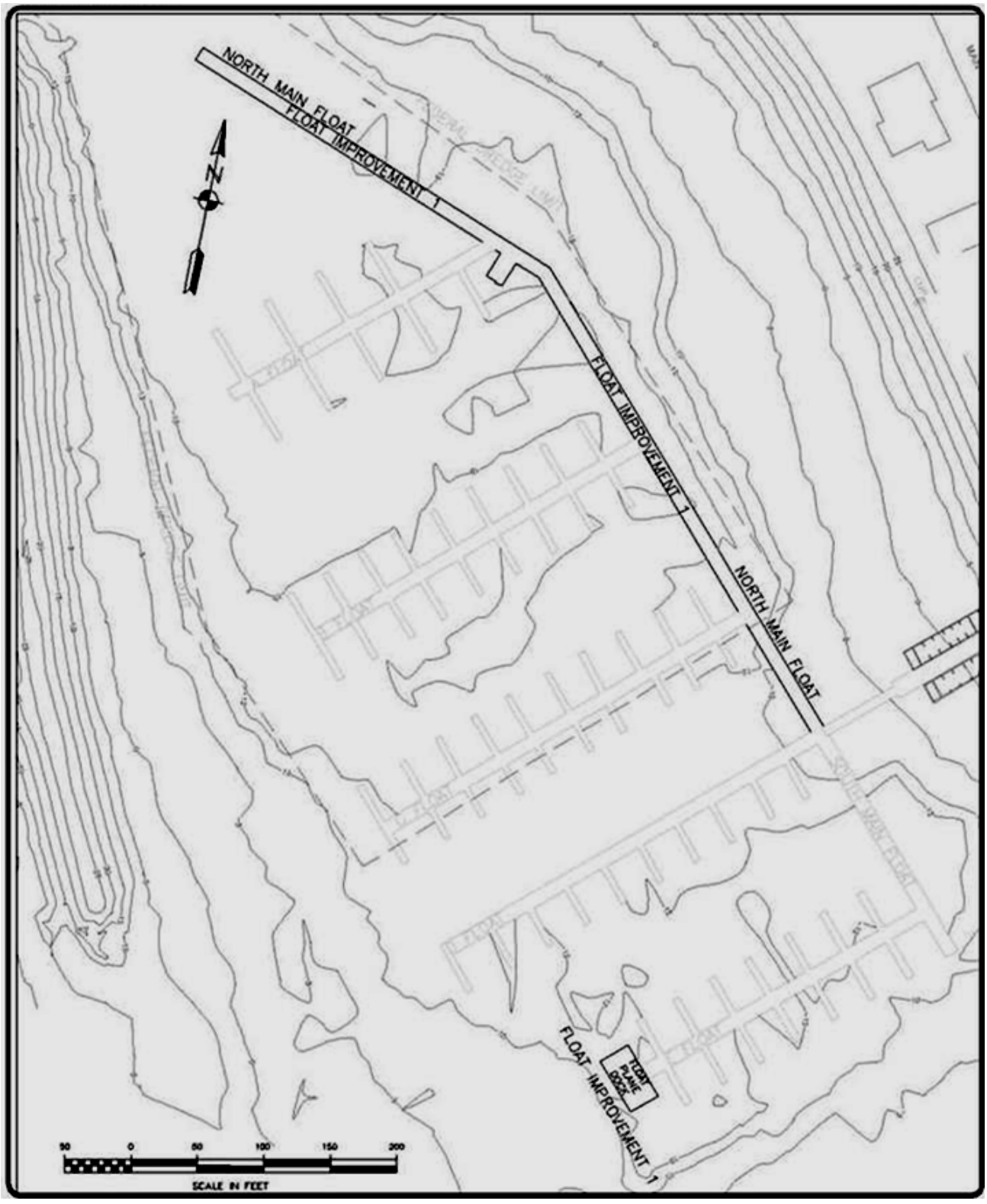

Figure 22. Float Improvement 1 Site Plan

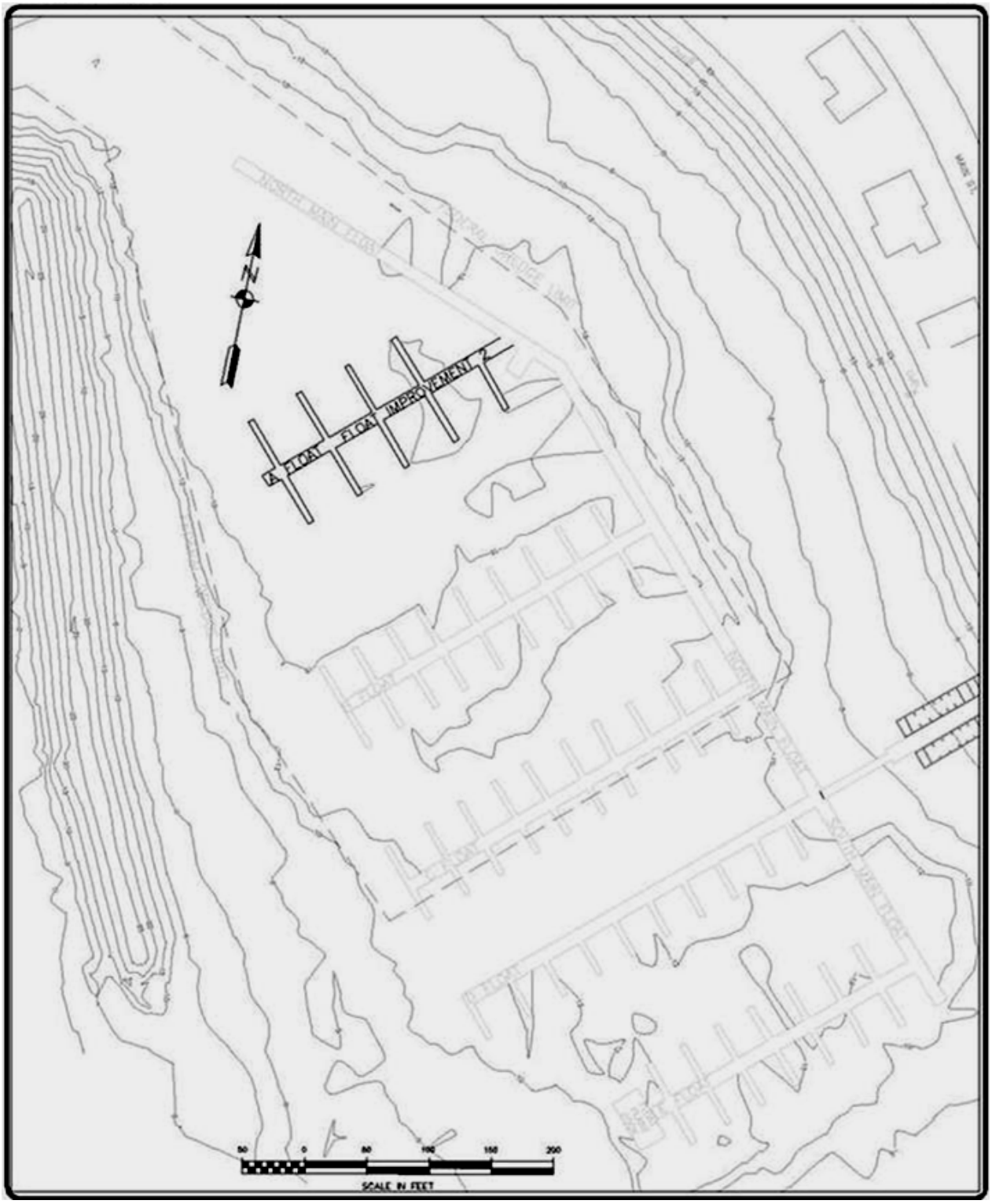

Figure 23. Float Improvement 2 Site Plan

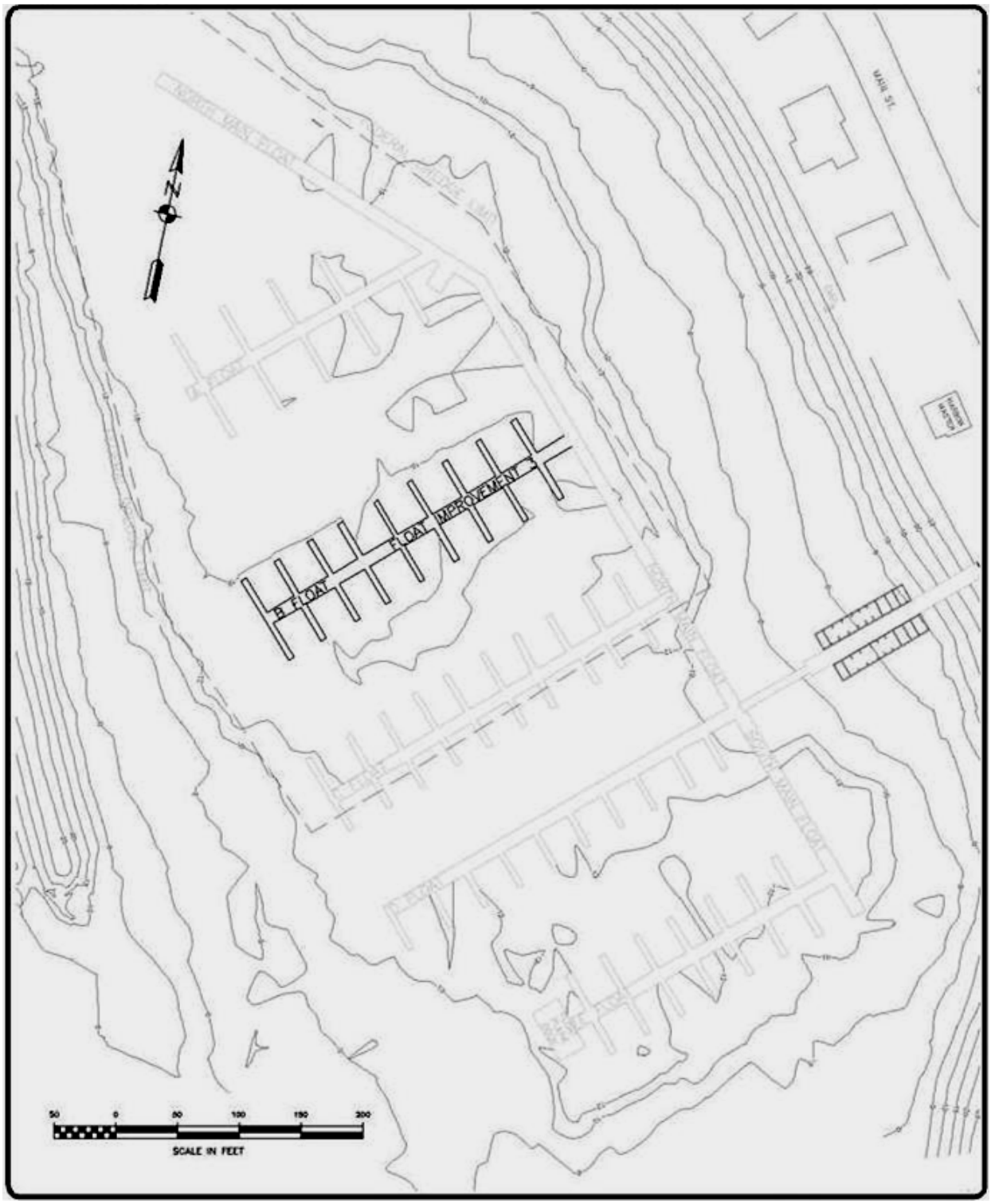

Figure 24. Float Improvement 3 Site Plan

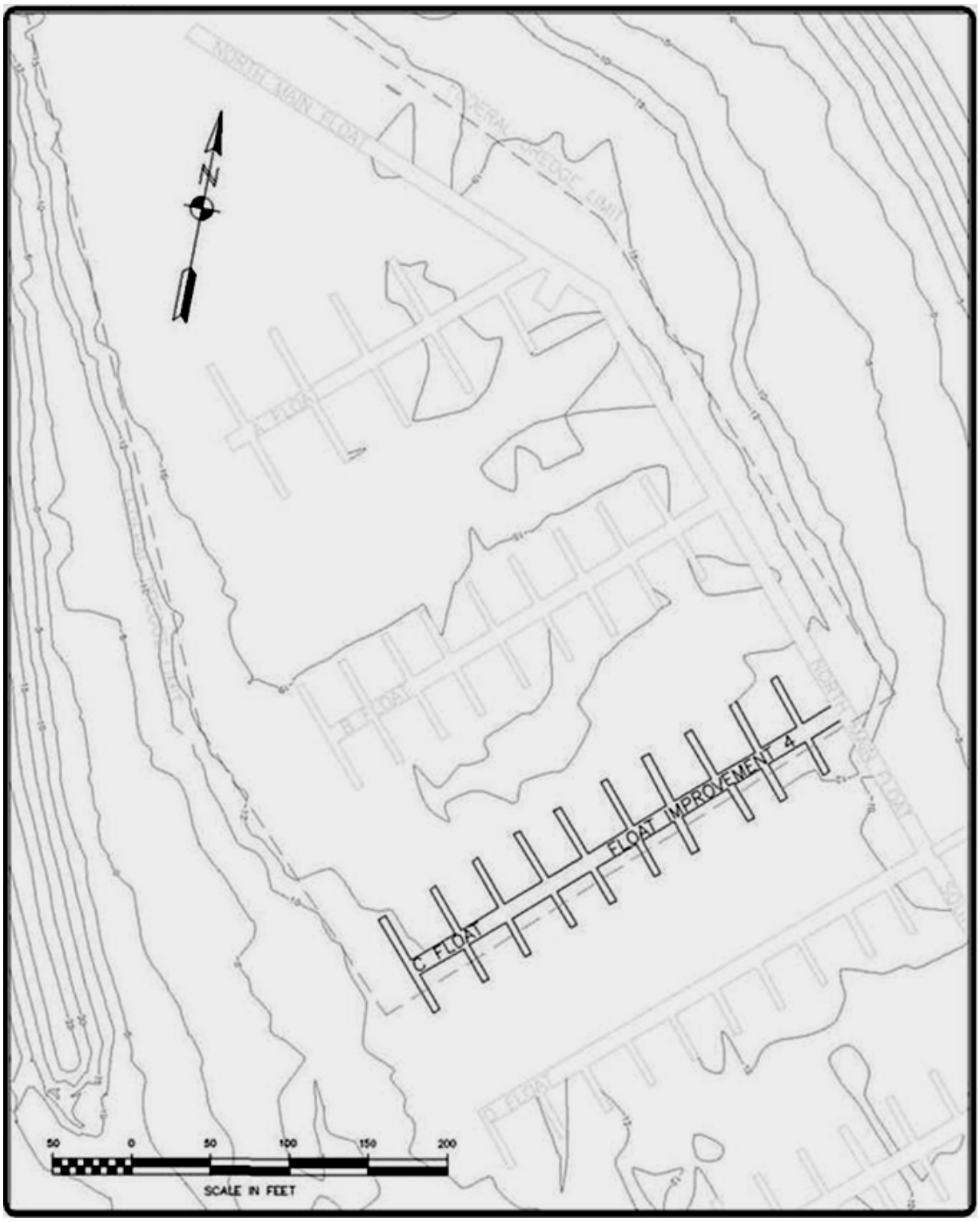

Figure 25. Float Improvement 4 Site Plan

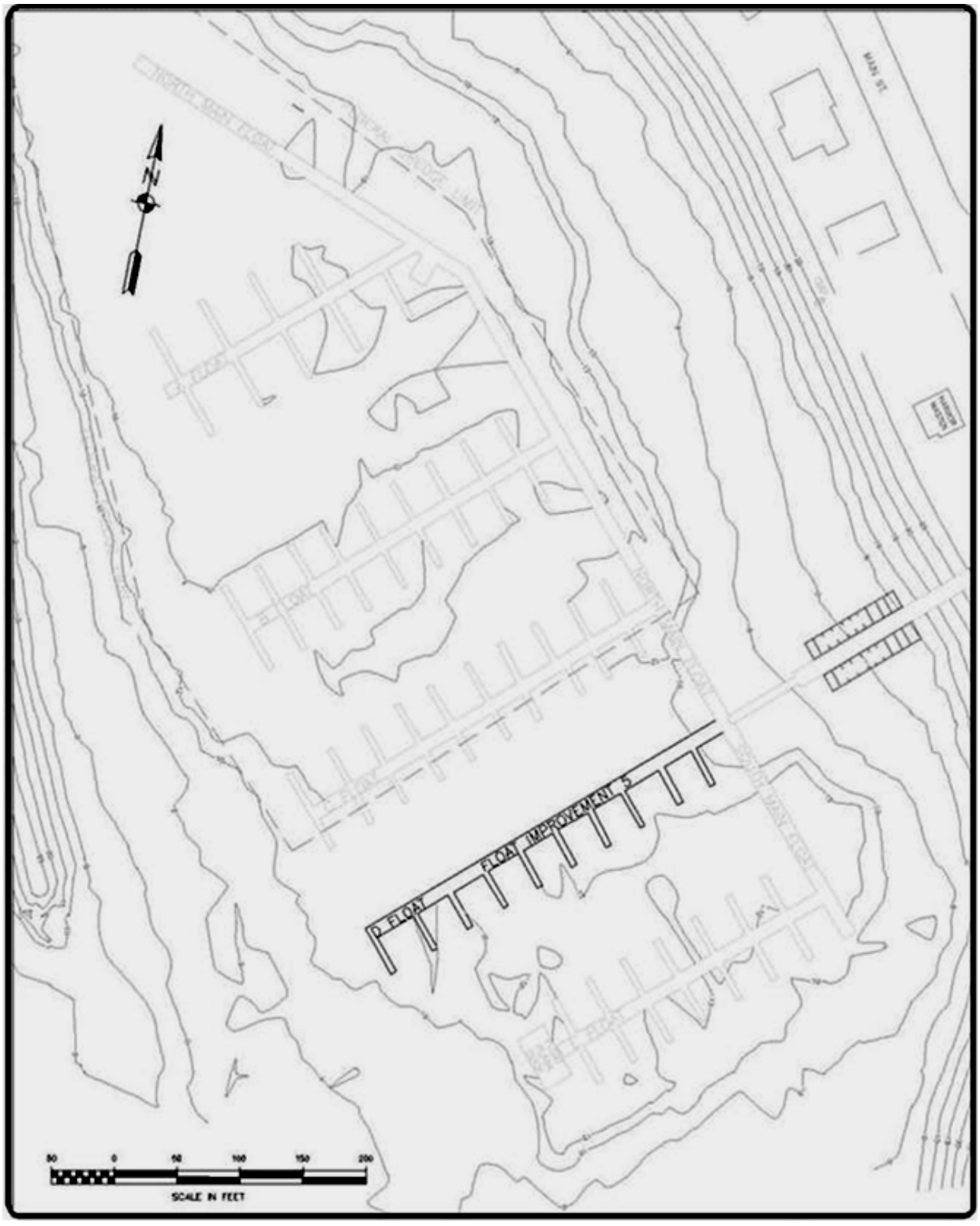

Figure 26. Float Improvement 5 Site Plan

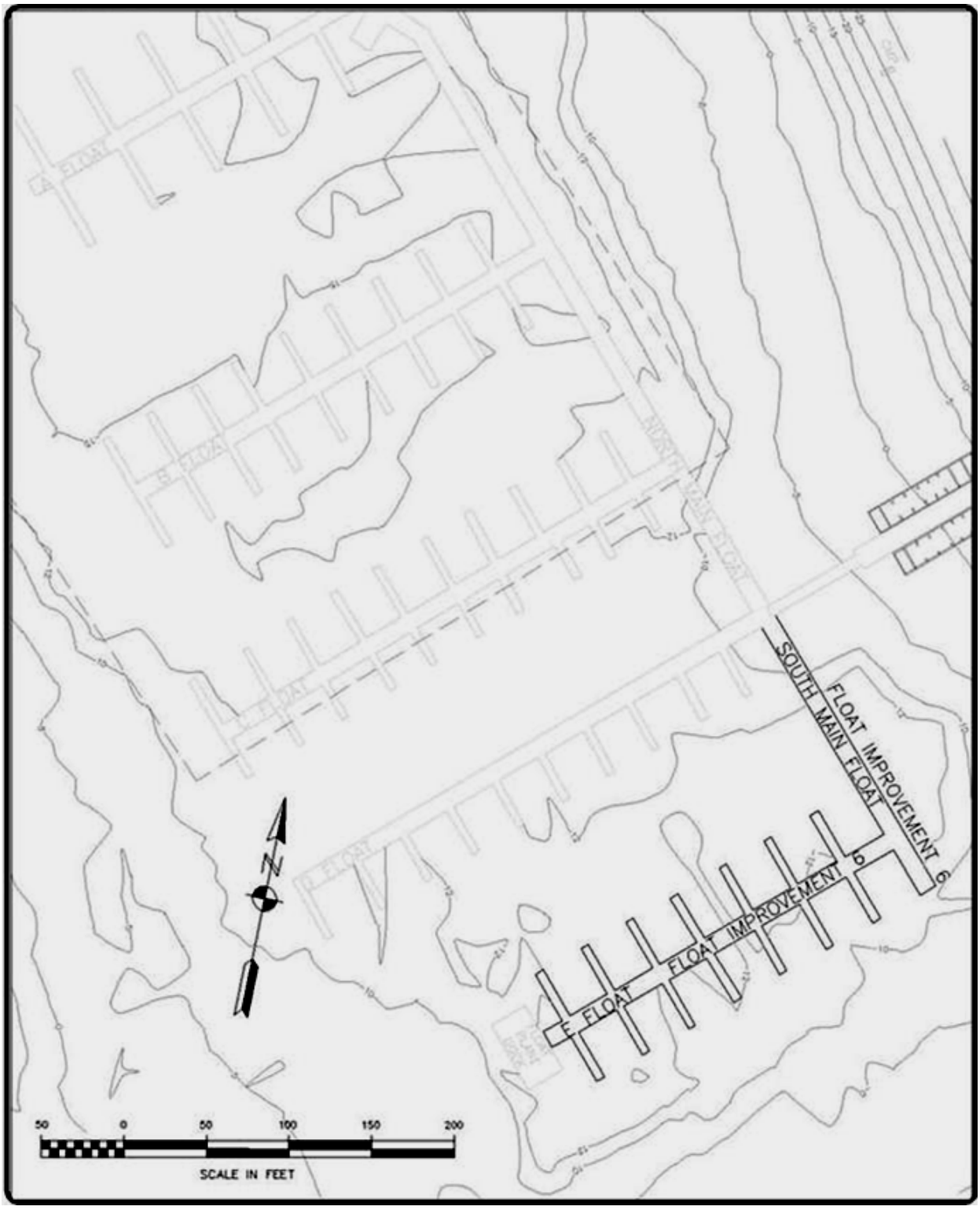

Figure 27. Float Improvement 6 Site Plan

4.2 Proposed Harbor Dredging Improvements

Dredging the harbor outside of the federally maintained area has been evaluated and a parametric cost estimate (not a detailed, design-based estimate) prepared. Harbor dredging can be accomplished most efficiently by completing all dredging at once in order to minimize mobilization and demobilization costs. There are several areas of the harbor that need dredging which are identified below.

The Seldovia Harbor is comprised of a 3.85 acre federally maintained basin to -12 feet MLLW and a 2.67 acre basin that was dredged to approximately -12 feet MLLW in 1983. The proposed dredging improvements in this section address improvements to the areas outside of the federally maintained basin. The dredge improvement consists of dredging the following areas to -12 feet MLLW:

- South of E Float and shoreward of the south main float – The floats on the south side of the E float are in the shallowest part of the harbor. Boats needing to access the south main float have to transit this area. The proposed dredging prism would widen the channel for boats that use the south main float for mooring and deepen and widen the navigable area and the mooring area south of E float.

- Between D and E floats – The bathymetry between D and E floats is shallow, and the harbormaster reported that there are times when boats in these slips hit bottom or need to be moved from their slips until the tide is higher.

- Between C and D floats – The bathymetry between C and D floats is generally 1 to 2 feet shallower than -12 feet MLLW. This is an area with slips and transient docking and the usable depth is limited due to the reduced harbor depth.

- Shoreward of the north main float to widen the channel – The area shoreward of the north main float is a narrow channel adjacent to the main float. This area is used regularly by tour boats bringing visitors to Seldovia. When the tide is low, there is not adequate area for the boats to turn around. Dredging proposed for this area widens the channel for the tour boats to turn. Boring logs from the 1961 General Design Memorandum No. 1 for Seldovia and pile driving logs from the 2007 pile installation indicate that dredging in this area could be difficult or require blasting. This would be new dredging. In the area of C float, it appears that there is a good chance of encountering rock. The risk of rock dredging could be removed from the contract by requiring the contractor to stop dredging if rock is encountered. This would result in a generally wider channel with the possibility of a shallower area if rock is encountered.

- Shallow area outside of breakwater entrance channel – The harbormaster and local users noted that there is a shallow area on which boats ground outside of the harbor entrance. The exact location of the shallow area was not defined, but it appears to be an area adjacent to the federally maintained entrance channel. A shallow area off the nose of the north breakwater could be the area of grounding, as it aligns closely with the area described by the harbormaster. A condition survey was performed in the summer of 2010 and the extent of the survey was expanded in the entrance channel area to determine the area of grounding. The survey was not available at the time of this report's publication, so the area off the nose of the breakwater was used in this report to evaluate this improvement. This area could be dredged to widen the

entrance channel. This would be new dredging, and there are no boring logs for that area. It is uncertain if dredging in this area would be difficult or require blasting, however; it appears that there is a good chance of encountering rock. The risk of rock dredging could be removed from the contract by requiring the contractor to stop dredging if rock is encountered. This could result in a generally wider channel with the possibility of a shallower area if rock is encountered. An alternative to dredging this area would be to install a navigation aid alerting users to the shallow area or range marker to aid in the channel approach. Note the quantity estimate for this area is based on an assumed area of grounding. Prior to implementing any improvement in this area, the location of the problem shallow area and volume of dredged material or depth for marker installation should be confirmed.

It is estimated that there would be 9,065 in-place cubic yards dredged to provide a prism of -12 feet MLLW. The guidance for the minimum channel widths was obtained from the American Society of Civil Engineers (ASCE) *Planning and Design Guidance for Small Craft Harbors*. Costs for initial dredging are $2.98 million with an additional $1.5 million every 15 years for maintenance dredging of 5,000 cubic yards each occurrence. Estimates assume no difficult dredging (i.e. no rock needing blasting), unless noted, dredging with a clamshell, and upland disposal. An upland disposal location will need to be identified and coordinated with the City of Seldovia. Figure 28 is a site plan for dredging improvements.

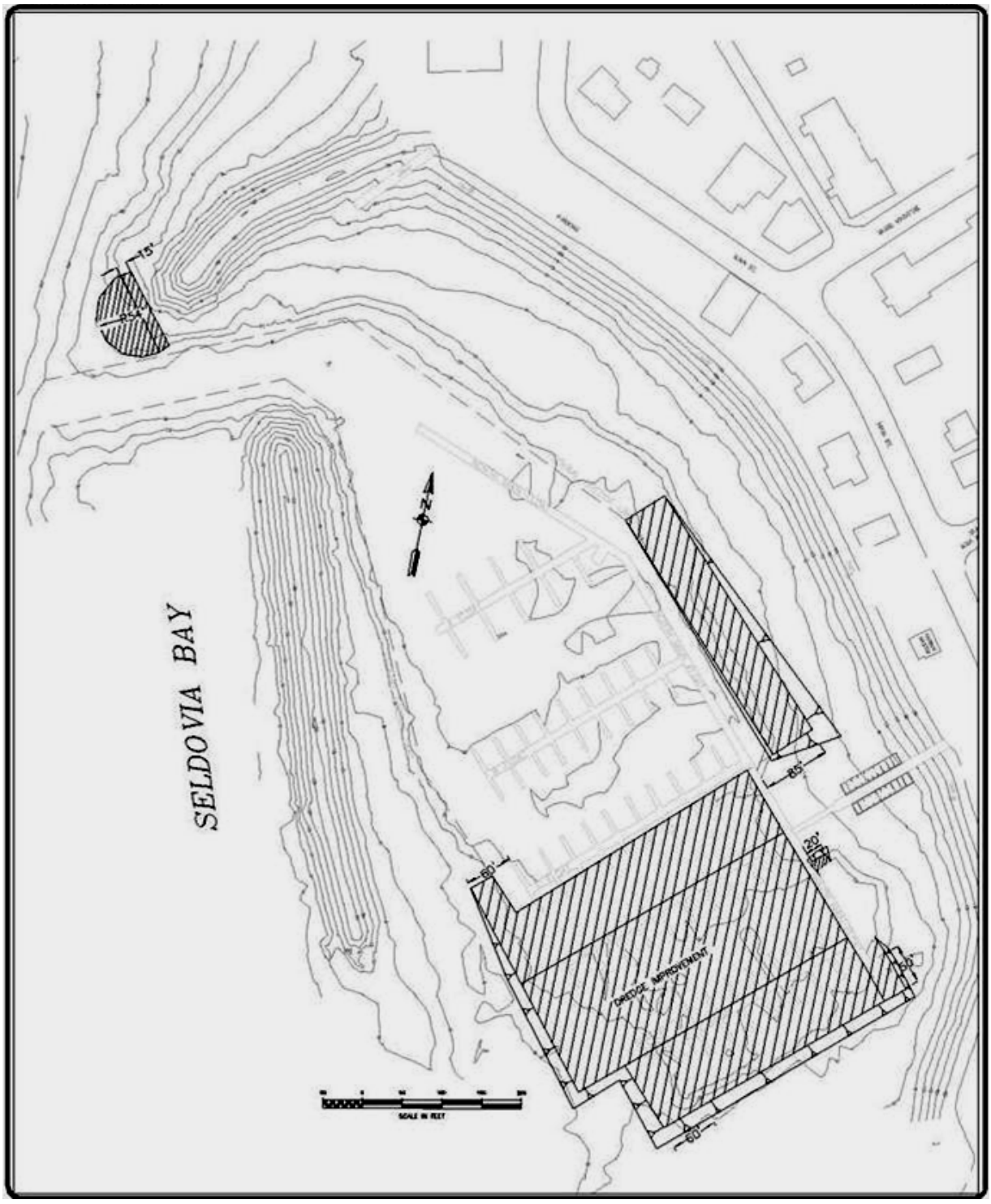

Figure 28. Dredge Improvement Site Plan

4.3 Proposed Harbor Expansion

The concept for the proposed harbor expansion is based on a 1989 Letter Report that developed a plan for harbor expansion. The concept for expansion is included in this report to develop a budget level cost estimate for harbor expansion.

The proposed harbor expansion would increase the harbor basin to accommodate 230 vessels; an addition of 86 slips to the existing harbor. Each float would be lengthened and a new float that could accommodate five large vessels would be located off the north main float. The new float and maneuvering lanes would be over the location of the existing breakwater, which appears to be built on a rock reef. It is assumed that this improvement would require hard dredging or blasting. Harbor expansion would extend the north breakwater 300 feet west and the south breakwater would be moved 280 feet west. Armor stone from the existing breakwater would be used to the maximum extent possible. A float extension would be added to the A, B, and C float. Float D and E would require more dredging to expand and could be left to accommodate smaller boats. The entrance channel and maneuvering land depth was increased to -14 feet MLLW. The maneuvering channel was increased to 100 feet inside the harbor. The mooring area depth was left at -12 feet MLLW. It should be noted that moving the breakwater and expanding the floats would move the harbor navigation channel outside of the federal dredging limits. The addition of a float onto the end of the main float would also block the narrow federal dredging limit that provides access to the transient float shoreward of the main float. This is also the area that tour ships land and load passengers. Preliminary construction and implementation costs for harbor expansion are $28 million. O&M costs for harbor expansion (not including costs for mobilization/demobilization) include: $68,000 per occurrence at years 25 and 50 for armor rock, $925,000 per occurrence at years 15, 30, and 45 for dredging, $5.6 million at year 50 for float replacement, and $3.4 million per occurrence at years 25 and 50 for electrical and plumbing systems replacement. This estimate assumes difficult dredging (i.e. rock blasting required) and upland disposal. This estimate also assumes that the float upgrades on the existing floats will be performed as part of the expansion and that dredging improvements will be performed during the harbor expansion. Figure 29 is a site plan for proposed harbor expansion.

Seldovia Harbor was authorized by the Rivers and Harbors Act of 1958, House Document 34, 85th Congress, 1st Session, as adopted. It included the construction of two breakwaters and dredging of an entrance channel and basin to a depth of -12 feet MLLW. As the Seldovia Harbor is a federally-authorized project, relocating the existing breakwaters and entrance channel would require coordination with the Corps of Engineers through the Congressional authorization and appropriation processes. This would likely include a cost-shared feasibility study.

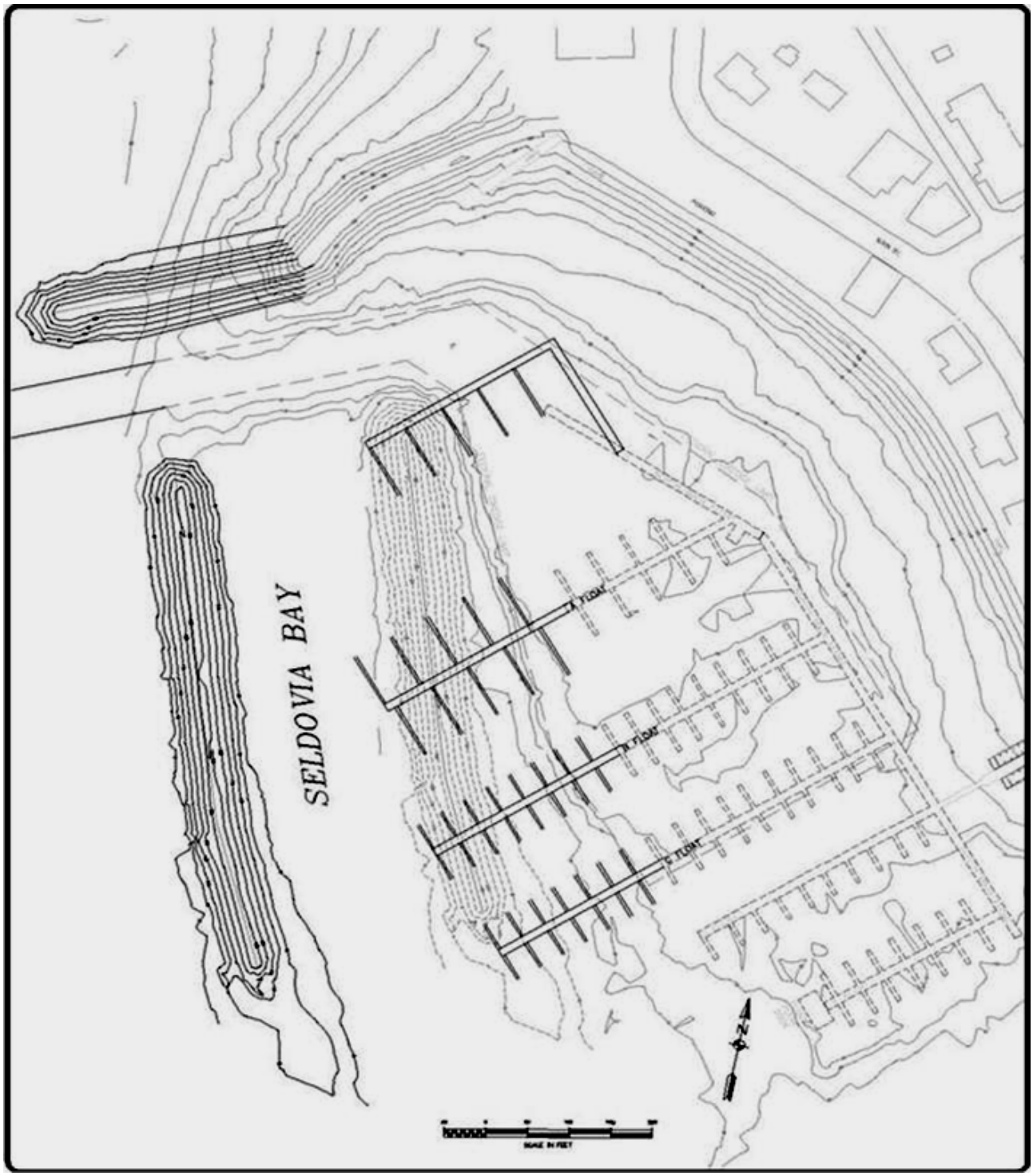

Figure 29. Harbor Expansion Site Plan

5.0 Economic Considerations

The primary focus of this technical report is to address problems associated with aging harbor infrastructure and inadequate depth through float replacement and dredging. The City of Seldovia also requested that harbor expansion be considered, and the Corps included a brief harbor expansion design and cost estimate as part of the engineering effort. On that note, the economics scope of work entailed a description of major harbor users and other related marine infrastructure in Seldovia to present an initial analysis of the need for harbor expansion. A summary of findings is presented below and a more detailed account is presented in Appendix B.

Current use of the Seldovia Harbor suggests that harbor expansion is not needed at this time. During the busy summer season, there are approximately 15 available slips and maximum transient traffic of 15 vessels. Seldovia does not maintain a waitlist or a record of transient vessel use. Some of these available slips lack an electrical connection and have poor decking conditions, suggesting that mechanical upgrades to the harbor are needed, but that adequate space exists to accommodate users. Similarly, some vessels face operational delays and the potential for vessel damage due to harbor and entrance channel depth issues and aging float infrastructure. These conditions further suggest that harbor infrastructure improvements are needed.

Recreational boats make up about 84 percent of the Seldovia fleet, with the rest of the fleet comprised of charter and commercial fishing vessels. Other harbor users include tour boats from Homer and the Seldovia Bay Ferry, which use space along the main run on a transient basis. Float planes tie off to a dock at the end of E float. This dock is in poor condition and limits maneuverability in the harbor as shoaling occurs in that location and harbor depth is reduced. All of these harbor users could benefit from improved harbor infrastructure and increased depth in the harbor and entrance channel. However, current harbor space seems adequate to accommodate these users.

The community envisions many ways in which additional boaters will be attracted to Seldovia in the future. This includes using a piece of city property as a multi-use industrial facility to include fish-processing and marine repair. The community also hopes to use existing tourist attractions and facilities to attract more visitors and recreational boaters to the community.

The need for harbor expansion relies upon increased demand in the future. The current status of the harbor does not suggest that the demand for harbor space in Seldovia outweighs supply. The necessity of harbor expansion relies upon facility improvements, upgrades, and new facilities which will draw new boaters to the community in the future and not current overcrowding and demand for additional space.

6.0 Environmental Considerations

Preliminary environmental observations were conducted on a Corps site visit on September 10, 2009. These observations are presented below. Depending on the community's ability to procure funding and the future advancement of the project, additional environmental field work may be necessary to fully consider environmental impacts. The scope of permitting, regulatory coordination, and National Environmental Policy Act (NEPA) documentation would depend on the scale of improvements. Seldovia Harbor is within the Kachemak Bay State Critical Habitat

Area and Kachemak Bay Research Reserve, which may add to the level of review and scrutiny to which the project is subjected.

If dredging is performed, options for upland placement of the dredged material should be explored exhaustively before consideration is given to in-water disposal. No dredged material disposal sites have been previously established within Kachemak Bay, and the development of a new disposal site would be a lengthy and expensive process, especially considering the relatively small amount of material that is proposed to be dredged, and the presence of Kachemak Bay Critical Habitat Area and Kachemak Bay Research Reserve. Disposal outside the Critical Habitat Area would require transporting the material roughly 8 miles from Seldovia Harbor, and either developing an inshore disposal site in Cook Inlet, or applying for a CWA Section 103 permit for open ocean disposal.

Water quality within the harbor basin appeared to be good, based on visual observations. Turbidity appeared to be low, and the large numbers of invertebrates (e.g., *Meretridium* anemones, barnacles, mussels, etc.) seen growing on substrates such as ship hulls and piers suggested a reasonably high dissolved oxygen content. Several fuel sheens were seen floating on the water around the float system.

The site visit to Seldovia began during an ebb tide, and water was observed to be flowing at a high rate out of Seldovia Slough. The water flowing out of the slough was very clear, suggesting that the slough is not a significant source of sediment for the harbor basin. At low tide, the reef that extends south from the end of the main breakwater was clearly visible.

Large blades of kelp-like brown algae were growing from the bottoms of the float systems. A large clump of uprooted bull kelp (probably *Nereocystis* sp.) was floating in the harbor basin east of the float system. The harbormaster stated the kelp did not grow in the harbor but washed in from Seldovia Bay. Clumps of eel grass (*Zostera* sp.) were seen in the water and on piers around D float and further south. The eel grass did not appear to have come from the harbor basin; the harbormaster said the eel grass grew in the Seldovia Slough estuary.

Bird life around the harbor consisted mostly of glaucous wing gulls and northwestern crows, with smaller numbers of bald eagles, fox sparrows, and kingfishers. One northern sea otter was seen resting a few dozen feet south of E float. The remains of a recently-killed northwestern crow were found on A float. The harbormaster believed that a mink had most likely killed the crow, based on the state of the carcass; she stated that she had previously seen mink hunting on the harbor floats.

The harbormaster and city manager stated that few people fished within the harbor basin, although the nearby slough was a popular fishing area, especially for king and silver salmon. Some king salmon are caught off the north end of the harbor breakwater, and off the city dock outside the harbor basin. The State of Alaska Department of Fish and Game (ADFG) fish distribution database lists chum, coho, and pink salmon as spawning in Seldovia Slough; the king salmon are stocked in Seldovia Bay as part of an ADFG program. Dungeness crab used to be caught in Seldovia Bay, but have not been actively fished in many years.

7.0 Conclusions

The Seldovia Harbor has aging infrastructure that is providing service beyond a typical design life without a major overhaul, and inadequate depth outside of the federally maintained area due to lack of maintenance dredging. The existing harbor floats are nearing or already past the end of their design life and continued degradation of the harbor will result in less demand for use of harbor facilities because of poor harbor conditions. This report finds that there are ways in which the harbor could be improved including dredging, float replacement, plumbing, and electrical work which would increase safety and efficiency of harbor use. A phased approach to float replacement work may be the best course of action for the community as smaller amounts of funding may be easier for the community to procure rather than one large lump sum for harbor overhaul. Though the community asked for an examination of harbor expansion, preliminary findings indicate that expansion is not justified at this time.

Based on the identified issues in the harbor (as stated in section 3.0 Existing Harbor Conditions), Table 1 summarizes the recommended phases of float replacement and harbor dredging, their associated costs, and the average annual cost of each improvement which takes into account O&M costs and frequency. The cost of harbor expansion is also presented, though this improvement is not recommended at this time.

Table 1. Seldovia Harbor Improvements and Cost Summary

Harbor Float Improvements[1]	Construction & Implementation Cost	O&M Cost (Frequency)[2]		Average Annual Cost
1) Replace North Main Float & Float Plane Dock				
Float Replacement	$1,685,000	$1,685,000	(50 yrs)	
Plumbing & Electrical	$538,000	$538,000	(25 yrs)	
Subtotal	$2,223,000			$129,000
2) Replace A Float & finger floats				
Float Replacement	$884,000	$884,000	(50 yrs)	
Plumbing & Electrical	$206,000	$206,000	(25 yrs)	
Subtotal	$1,090,000			$62,000
3) Replace B Float & finger floats				
Float Replacement	$1,177,000	$1,177,000	(50 yrs)	
Plumbing & Electrical	$207,000	$207,000	(25 yrs)	
Subtotal	$1,384,000			$78,000
4) Replace C Float & finger floats				
Float Replacement	$1,337,000	$1,337,000	(50 yrs)	
Plumbing & Electrical	$151,000	$151,000	(25 yrs)	
Subtotal	$1,488,000			$83,000
5) Replace D Float & finger floats				
Float Replacement	$944,000	$944,000	(50 yrs)	
Plumbing & Electrical	$83,000	$83,000	(25 yrs)	
Subtotal	$1,027,000			$57,000
6) Replace E Float, finger floats, South Main Float				
Float Replacement	$1,376,000	$1,376,000	(50 yrs)	
Plumbing & Electrical	$184,000	$184,000	(25 yrs)	
Subtotal	$1,560,000			$87,000
Total Cost, Complete Float Replacement	**$8,772,000**			
Harbor Dredging Improvements	**$2,980,000**	**$1,490,000**	**(15 yrs)**	**$213,000**
Total Cost, Float Replacement + Dredging	**$11,752,000**			
Harbor Expansion[3]	**$27,998,000**	**(4)**		**$1,492,000**

Note: Construction & Implementation and O&M Cost estimates are based on Corps estimates. Float improvements were grouped based on condition of harbor infrastructure or depth and efficient construction sequencing as determined by Corps engineers based on site visit data and previous reports. Average annual costs are calculated using the Federal Fiscal Year 2011 discount rate of 4.125 percent and a 50-year period of analysis.

(1) If all improvements were completed at once, rather than individually at different times, efficiencies are gained through the relative reduction in the expense of construction mobilization/demobilization .
(2) Operations and Maintenance costs and frequencies assume that normal harbor maintenance and repair take place on a regular basis.
(3) Harbor expansion cost estimates include the float and dredging improvements for the existing harbor.
(4) O&M costs for harbor expansion include: $68,000 every 25 years for armor rock, $924,000 every 15 years for dredging, $5.6 million every 50 years for float replacement, and $3.4 million every 25 years for electrical and plumbing systems replacement.

Harbor Improvements
Design Appendix A
Seldovia, Alaska

Prepared for:

Denali Commission

February 2011

Prepared by:

U.S. Army Corps of Engineers

Alaska District

HARBOR IMPROVEMENTS
DESIGN APPENDIX
SELDOVIA, ALASKA

CONTENTS

FIGURES

TABLES

I. Location of Project

Seldovia is on the Kenai Peninsula across from Homer on the south shore of Kachemak Bay, a 15-minute flight. Flight time to Anchorage is 45 minutes. It lies at approximately 59.44 North Latitude and -151.72 West Longitude (Sec. 32, T008S, R014W, Seward Meridian.) Seldovia is located in the Seldovia Recording District. The area encompasses 0.4 square miles of land and 0.2 square miles of water (Figure A-1). Winter temperatures in Seldovia average from 12 to 21 degrees Fahrenheit (Figure A-2); summers range from 48 to 65 degrees Fahrenheit. Annual precipitation is 34.5 inches.

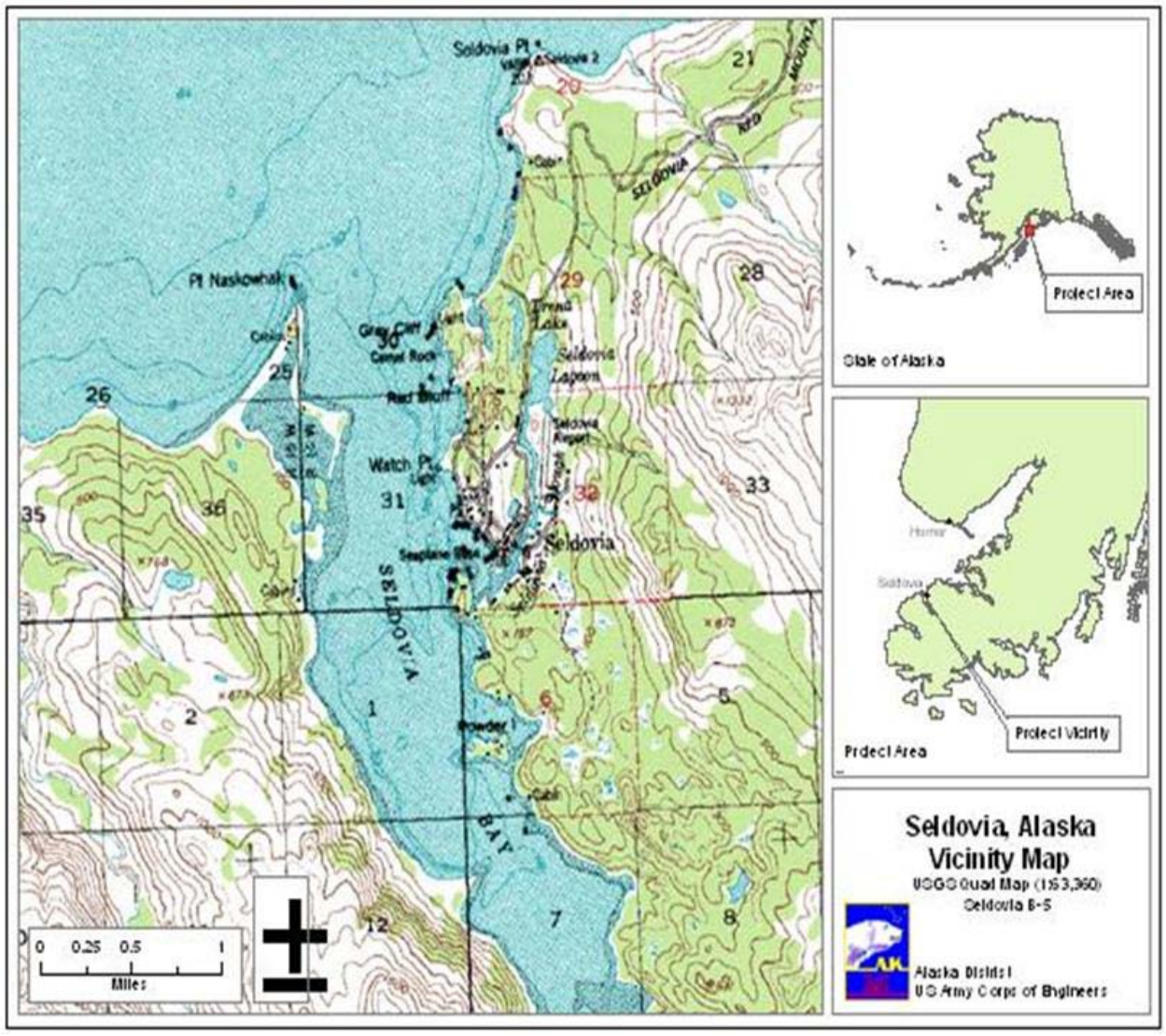

Figure A-1. Seldovia Vicinity Map

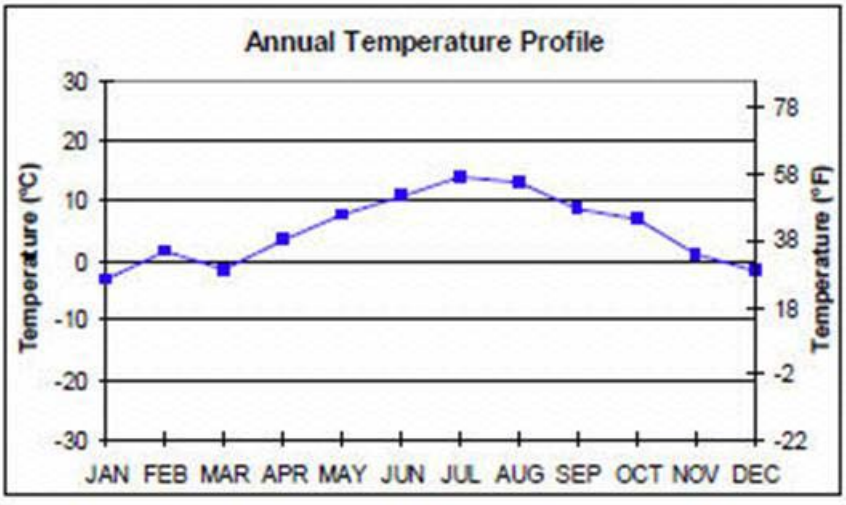

Figure A-2. Annual temperature profile for Seldovia Airport 1998-2004

A. Tides

Tide levels at Seldovia, referenced to mean lower low water (MLLW), are shown in Table A-1. Highest observed tide levels result from a combination of astronomic tides and rises in local water levels due to atmospheric pressure.

Table A-1. Tide Elevations at Seldovia

Level Type	Levels Referred to MLLW (ft)
Highest Observed Tide	25.25
Mean Higher High Water (MHHW)	18.04
Mean High Water (MHW)	17.23
Mean Tide Level	9.46
Mean Low Water (MLW)	1.70
Mean Lower Low Water (MLLW)	0.00
Lowest Observed Tide	-6.47

Source: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service

B. Mean Sea Level Trend

The mean sea level trend (Figure A-3) is -9.45 millimeters per year (mm/yr) with a 95 percent confidence interval of +/- 1.10 mm/yr based on monthly mean sea level data from 1964 to 2006, which is equivalent to a change of -3.10 feet in 100 years.

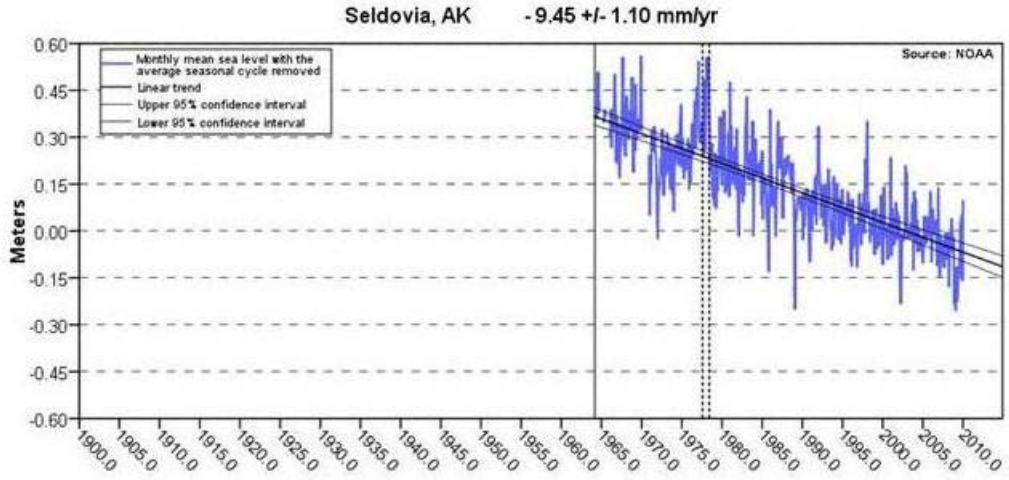

Figure A-3. Mean Sea Level Trend for Seldovia

The vertical control at the site is USCGS Tidal benchmark No 20 1968 and NOAA/NOS Tidal benchmark 5500 C 1982 for 2006 bathymetric survey work performed for the Corps of Engineers. Because of the magnitude of the sea level trends in the State of Alaska, NOAA has adopted a procedure for computing accepted tidal datums for the National Water Level Observation Network (NWLON) using the last several years of sea level data rather than the 19-year tidal epoch. The tide ranges are still based on the 1983-2001 National Tidal Datum Epoch (NTDE) and are applied to the 5-year (2002-2006) Mean Tide Level (MTL) to compute other tidal datums. The adoption of this procedure was necessary to ensure that these tidal datums accurately represent the existing stand of sea level.

II. Harbor History

Seldovia Harbor was authorized by the Rivers and Harbors Act of 1958, House Document 34, 85th Congress, 1st Session, as adopted. It included the construction of two breakwaters and dredging of an entrance channel and basin to a depth of -12 feet MLLW. Construction began in 1962 and was completed in 1963. An earthquake in 1964 damaged the breakwater and inner harbor facilities. The breakwater was rehabilitated in 1964 and the crest was raised by 4 feet. The Federal portion of the entrance channel is 423 feet long with a minimum width of 60 feet, and the Federal basin is -12 feet MLLW and covers 3.85 acres. The City of Seldovia expanded the basin south of the Federal basin and created a 2.67 acre harbor with a depth of -8 feet MLLW around 1962. The city with the State of Alaska deepened the local basin to -12 feet MLLW around 1983.

When authorized as a Federal project, the harbor had one long main float and a short finger off to the south (Figure A-4). After the harbor was constructed a larger float system was constructed which consisted of the main and angled float north of the gangway and A, B, and C floats. This is the majority of the harbor that is in place today (Figure A-5). In 1983 floats D and E were added (Figure A-6).

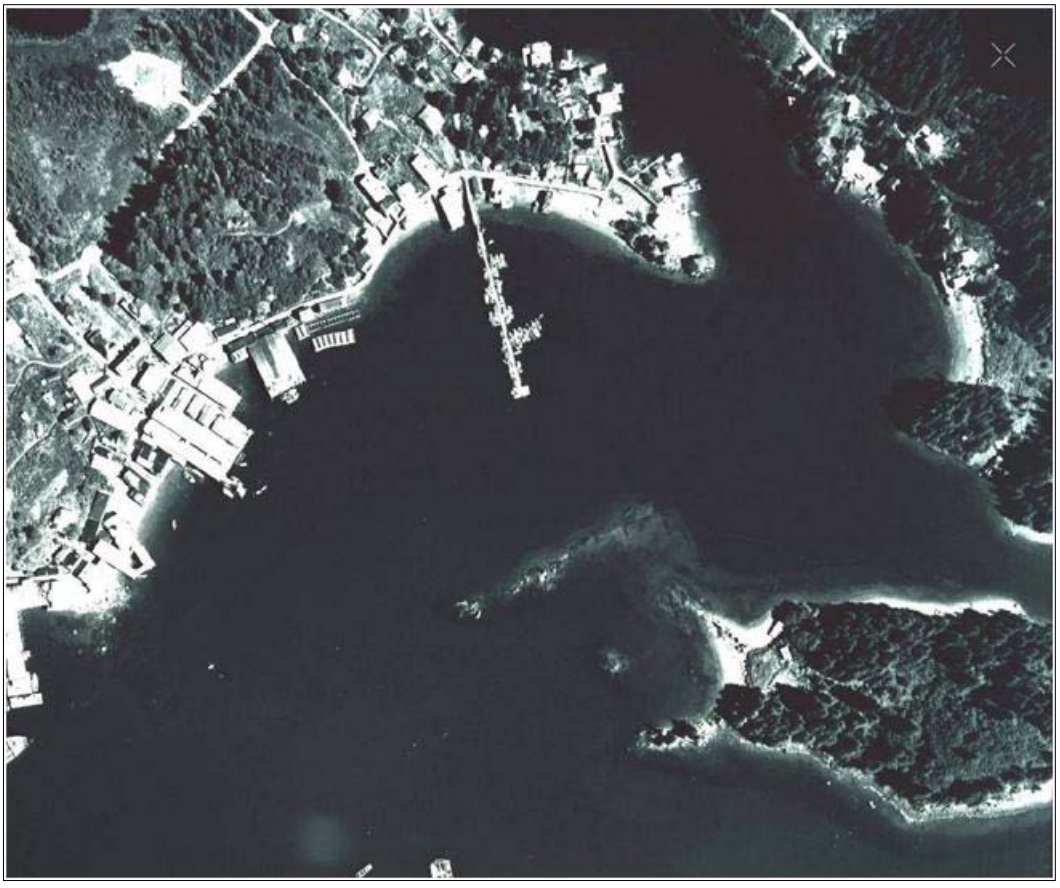

Figure A-4. 1959 Aerial Photo of Seldovia Waterfront

Figure A-5. 1982 Aerial photo of Seldovia Harbor and float layout before State expansion

Figure A-6. 2002 Aerial photo of Seldovia Harbor and float layout

III. Problem Statement

The City of Seldovia has identified three areas for harbor improvements:

- Upgrade the harbor float system
- Increase the harbor depth
- Increase the harbor size

Floats A, B, and C of the harbor float system at Seldovia were installed in 1963. Part of float D, and float E were installed in 1983. The City of Seldovia has continually worked on maintenance and upgrades at the facility; however, sections of the harbor floats are reaching the end of their design life and are in need of a major overhaul or replacement.

The city has repeatedly noted that sections of the harbor were not deep enough outside of the federally maintained basin and have requested dredging. They also noted that there is a problem area in the entrance between the breakwaters where boats run aground. Condition surveys through the years have indicated that the federal basin and entrance channel have maintained their depth with the exception of a small area off the end of C float. The problem areas with shallow depth are in the local basin area and in the entrance between the breakwaters but outside of the federally designated channel.

The City of Seldovia sees an opportunity to provide moorage and services for boats that would rather stay closer to the fishing grounds and not return to Homer. In order to facilitate this, they would like to expand their harbor to accommodate a larger fleet.

IV. General Information and Alternatives

A. General

This is a reconnaissance level report based on a site visit and information gathered from previous reports and studies. Bathymetry from a 2006 condition survey was used for the current bathymetry. This is a decision-making level report, not a design level report. While the information presented is believed to be representative, it is based on preliminary information that will have to be checked and verified at the design stage before anything is built.

Overall, the harbor float system is characterized by vegetative growth that is accelerating the deterioration of the float system. The bull rails along the transient floats are heavily worn, and uneven floatation was noted along the main float and many of the finger floats. It was not possible to inspect the substructure, but accounts from a worker on a float replacement project, and limited visual inspection indicate that the float system substructure has experienced significant deterioration (Figure A-7 through Figure A-10).

The area bounded by the federal dredging limits has maintained a depth of -12 feet MLLW or deeper. The area outside of the federal dredging limits has filled in a minor amount with depths of -6.0 to -14.0 feet MLLW.

Figure A-7. Vegetation by Decking and in Bull Rail

Figure A-8. Uneven floatation on main float

Figure A-9. Worn Bull Rail

Figure A-10. Rotting Substructure

B. Harbor Float Improvements

Replacement of individual sections of the harbor have been evaluated, and a parametric (not a detailed, design-based estimate) cost estimate was prepared for each. Replacement of each float section could also include replacement of the electrical and plumbing system components associated with each section depending on the availability of funding. This would be the most efficient means of harbor upgrade.

- Float Improvement 1 is replacement of the north main float and the float plane dock
- Float Improvement 2 is replacement of A Float and its associated finger floats
- Float Improvement 3 is replacement of B Float and its associated finger floats
- Float Improvement 4 is replacement of C Float and its associated finger floats
- Float Improvement 5 is replacement of D Float and its associated finger floats
- Float Improvement 6 is replacement of E Float and its associated finger floats and south main float

C. Harbor Dredging Improvements

Dredging the harbor outside of the federally maintained area has been evaluated, and a parametric (not a detailed, design-based estimate) cost estimate was prepared. The dredge improvement consists of dredging the following areas to -12 feet MLLW:

- South of E float
- Shoreward of the south main float
- Between D and E float
- Between C and D float
- Shoreward of the north main float
- Shallow area outside of entrance channel

D. Proposed Harbor Expansion

The concept for the proposed harbor expansion is based on a 1989 Letter Report that evaluated the need for expanding the boat harbor. The concept for the expansion is included in this report to develop a budget level estimate for harbor expansion.

V. Harbor Float Improvements

A. Float Improvement 1

Float Improvement 1 is replacement of the north main float, replacement of the float plane dock, and installation of two galvanized steel piles at the base of the gangway. The north main float consists of an angled wooden float section that is approximately 10 feet wide and 312 feet long, and a straight wooden section that that is approximately 10 feet wide and 400 feet long that ends at the gangway. This float is part of the original harbor that was built in 1963. Continual maintenance has allowed the float to function; however, it is showing signs of extreme wear. The angled section floatation system is uneven, and heaving is visible along the length of the float (Figure A-11). The bull rails are worn and, at locations along the transient float, they appear to be almost half of the original thickness (Figure A-12). Grass and moss is growing on the decking and bull rails, adding to the deterioration.

The float plane dock is part of the original harbor and also is in need of replacement. The decking is worn. Moss and grass are growing on the decking which is accelerating its deterioration and the ramps to the float are rotted (Figure A-13).

Two galvanized steel piles need to be placed at the bottom of the gangway and one wooden pile pulled and replaced during this upgrade work. A previous upgrade project replaced the piles on the north main float, but difficult pile driving was encountered for some of the piles. It is assumed that these two piles will need to be socketed for placement. A cost for installing socketed piles is included in the cost estimate.

The existing float system has worked well and has allowed sections of the wood structure to be replaced as needed. Replacement with a similar wooden float section is recommended. This type of float construction has proven successful at many Alaska harbors. A typical float section is shown in Figure A-15.

Plumbing and electrical systems upgrades could be performed concurrent with the main float replacement. This would be the most efficient means of upgrade if funds are available.

Plumbing System Upgrades

The existing 2-inch HDPE under the ramp would be the source of the new north and south main float pipe mains. The existing 2-inch galvanized tee at the ramp would be removed and replaced with a new 2-inch HDPE tee to connect the north and south main float 2-inch mains. A new 2-inch HDPE pipe would be installed to serve the north main float and cap the tee that will serve the south main float. A 5-foot flexible clamped hose would be provided between the new 2-inch HDPE tee and pipe to accommodate ramp and float differential movement. The existing 2-inch north main float source of water would be capped. (Figure A-16)

The existing 2-inch galvanized pipe main of the north main float would be removed and replaced with new 2-inch HDPE water supply main. The existing varying size flexible hose currently serving as hose stations would be removed. New 2-inch HDPE water supply main would be installed where the existing 2-inch galvanized pipe main was located. Four existing hose stations would be removed and replaced with four new 2-inch hose stations.

Approximately 300 feet of 2-inch galvanized pipe installed under the boardwalk would be removed. Four hose stations at the junction of floats A, B, C and D would be removed. Removal would include but not be limited to main pipes, branch pipes, vertical risers, valves, fittings, pipe supports and appurtenances (Figure A-17).

Approximately 300 feet of new 2-inch HDPE pipe would be installed under the boardwalk complete with pipe supports. Four new hose stations would be installed at the same location as the existing hose stations (Figure A-18 and Figure A-19). Each new hose station consists of a 2-inch HDPE branch off the new 2-inch HDPE main, new 2-inch galvanized pipe riser connected to the new 2-inch HDPE branch, two new hose bibbs and shut off ball valves.

Electrical Upgrades

- Replace six existing 240 volt power pedestal containing General Electric (GE) kilowatt-hour meter, GE circuit breaker and NEMA type IV power receptacle, and metal frame with new power pedestal such as Eaton Marina Admiral Power Pedestal. See Figure A-20.

- Replace existing four conductor marine power cable originating at existing Panel TF with new four conductor marine power cable from existing Panel TF to location of new 240 volt power pedestals. New cable shall be IEEE 1580 Type P Flexible Multi Conductor Power cable. (Figure A-21)

- Provide proper support for new cable from Panel TF to each power pedestal location.

- Extend power cables from existing power Panel TF located at intersection of north main float and A float, along the length of north main float for installation of 30-foot high metal light poles.

- Install metal Halide floodlight fixtures atop each pole to provide minimum 10 foot candle illumination along north main float.

Cost Estimate

Rough order of magnitude costs for this float improvement including all of the improvements noted above, are $2,223,000 based on construction in 2012, $538,000 of which is for electrical and plumbing systems upgrades. An itemized budget with the features broken out separately is shown in Table A-2. Float replacement is anticipated in year 50 at a project cost of $1,685,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $538,000 each occurrence (not including the costs for mobilization/demobilization). The basis of this concept is to replace the wooden float system with a similar wooden system. The transformer float would be part of the main float replacement, and piles that were not replaced during the previous pile installation work would be replaced. The pile replacement assumes that piles that were not installed encountered rock and would need to be predrilled and socketed. Figure A-22 is a site plan for this float improvement.

Figure A-11. North Main Float Needing Replacement

Figure A-12. Bull Rail on Transient Float

Figure A-13. Float Plane Dock. Note grass growing between decking and on ramp

Figure A-14. Uninstalled pile at the base of the gangway

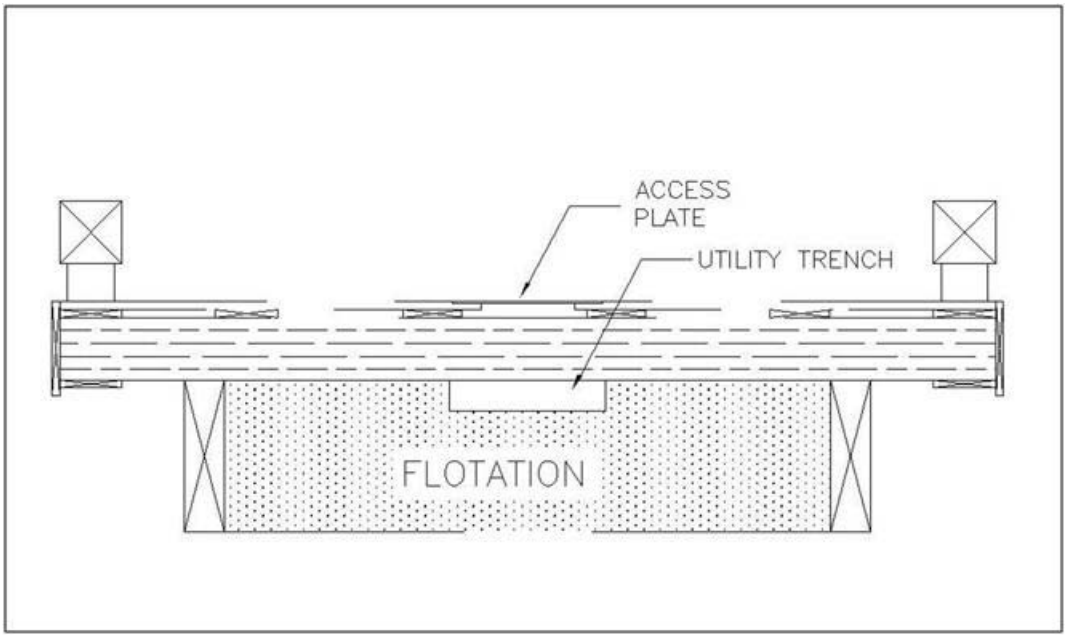

Figure A-15. Typical Float Cross Section

Figure A-16. Existing 2-inch polypropylene pipe with a 2-inch galvanized tee connection and capped ends located under the ramp. The 2-inch galvanized pipe would be replaced with new 2-inch HDPE tee. Left side of the tee would supply the north main float; right side would would supply the south main float.

Figure A-17. Typical hose station. Hose station is served by the existing under the boardwalk 2-inch galvanized pipe with a 2-inch branch to the hose stations. This hose station shows a hose bibb with a 1-inch branch connection.

Figure A-18. North Main Float and Floats A, B and C existing hose stations and flexible main water supply.

Figure A-19. Typical North Main Float hose station served by the flexible hose with the original vertical hose station abandoned in place.

Figure A-20. Admiral SS Power Pedestal

Product Construction:

1. **Conductor:**
   - 8 AWG thru 777 kcmil soft annealed tinned copper flexible strand
2. **Insulation:**
   - Polyrad® XT-125 Irradiated Cross-Linked Polyolefin (XLPO)
   - Color Code: Per IEEE 1580 Table 22
3. **Cable Core:**
   - Cabled with fillers when required
   - Core binder tape when required
4. **Sheath:**
   - Mud Oil Resistant, Black Irradiated Cross-Linked Chlorosulfonated Polyethylene
5. **Print:** (Including but not limited to)
   - MOR® POLYRAD® XT-125 (UL) E85994 BR782 110C XX/C XXAWG TC-ER[1] XHHW -- (CSA) LL 9755 SPEC 245/1309 FT4 -40C SR 600/1000V 600V RW75 XLPE TC -- IEC 1KV 60332.3A IEEE 1580 TYPE P (ETL) 109229 YEAR OF MFG SEQUENTIAL FOOTAGE MARK

   [1] ER for 3 conductors or more
6. **Option:**
   - Other color codes available upon request

Figure A-21. Power cable

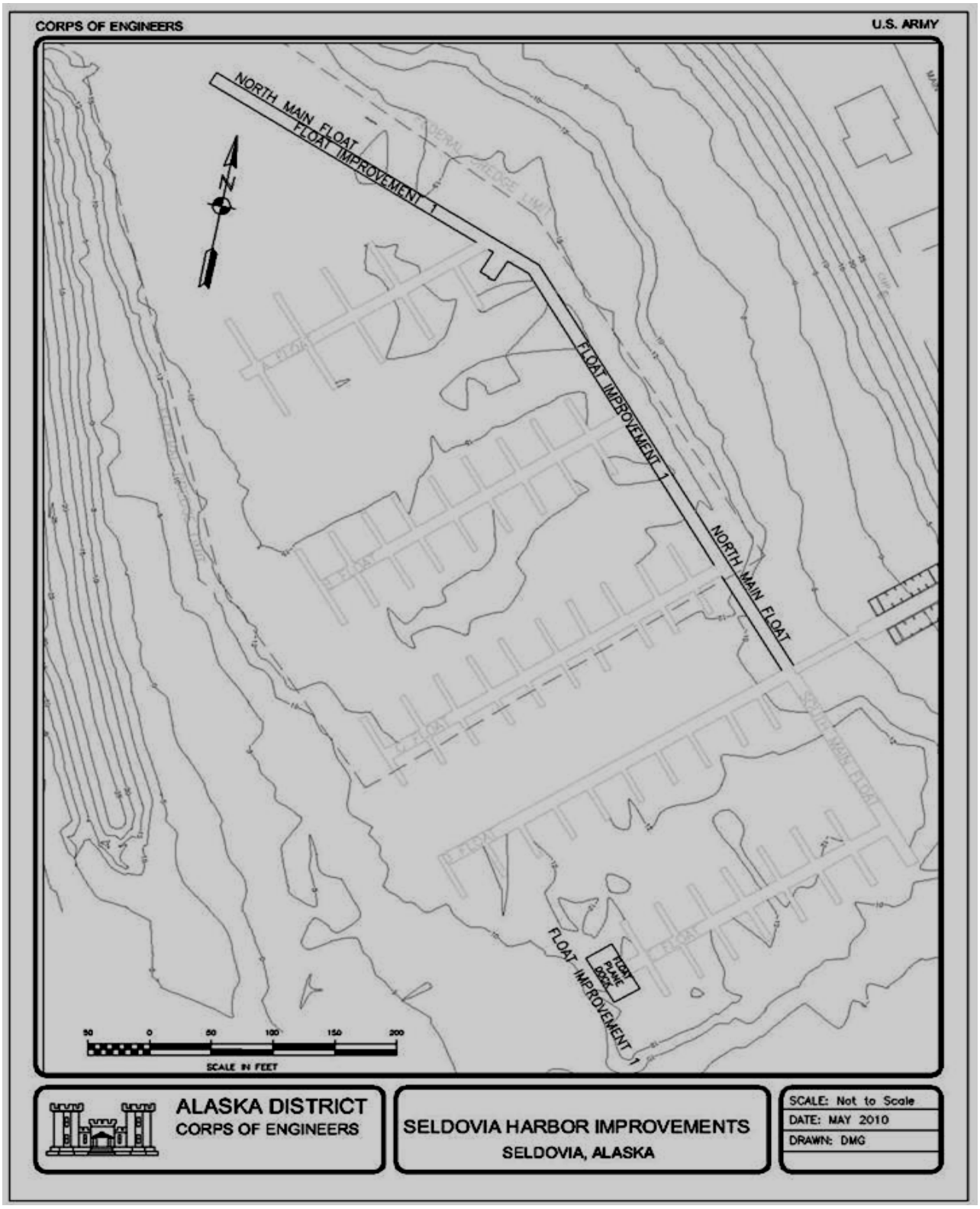

Figure A-22. Float Improvement 1 Site Plan

Table A-2. Float Improvement 1 Cost Estimate

Item	Quantity	Unit Cost	Total Cost
Mob./Demob. & Bonds			$279,000
Float Improvements	1	Lump Sum	$1,406,000
Electrical Upgrades	1	Lump Sum	$512,000
Plumbing System Upgrades	1	Lump Sum	$26,000
			$2,223,000

Note: Costs assume construction in 2012.

Note: Costs include estimates of Contingency (25%) and Construction Supervision, Inspection, and Overhead (SIOH, 10%).

Note: Cost estimates assume that float improvements, plumbing system and electrical improvements will all be performed simultaneously: this is the most efficient construction sequencing. These items can be constructed at separate times, but additional expense will be induced through mobilization/demobilization costs.

B. Float Improvement 2

Float Improvement 2 is replacement of A float. This concept would replace the wooden float system with a similar wooden system. The A float is approximately 10 feet wide and 225 feet long with nine 42-foot finger floats. This float is part of the original harbor that was built in 1963. Continual maintenance has allowed the float to function; however, it is showing signs of wear. The decking has moss growing and the main float and finger float is weathering (Figure A-23 through Figure A-26). The wood piles have been replaced with steel piles and would not need replacing as part of this upgrade work. Figure A-27 and Table A-3 are a site plan and parametric cost estimate for this alternative, respectively.

Plumbing and electrical systems upgrades could be performed concurrent with A float replacement. This would be the most efficient means of upgrade if funds are available.

Plumbing System Upgrades

Two hundred and ten feet of new 1-inch HDPE pipe would be installed under the A float boardwalk and four new hose bibb stations would be installed. New 1-inch HDPE pipe would branch off the new 2-inch pipe installed under the north main float.

Electrical Upgrades

- Replace 6 existing 480 volt and 120 volt power pedestal containing GE kilowatt-hour meter, GE circuit breaker and NEMA type IV power receptacle, and metal frame with new power pedestal such as Eaton Marina Admiral Power Pedestal. See Figure A-20.

- Replace existing 4 conductor marine power cable originating at existing Panel TF with new 4 conductor marine power cable from existing Panel TF to location of new 480 volt power pedestals. New cable shall be IEEE 1580 Type P Flexible Multi Conductor Power cable. See Figure A-21.

- Provide proper support for new cable from Panel TF to each power pedestal location.

- Extend power cables from existing power Panel TF located at intersection of north main float and A float, along the length of north main float to each location of new power pedestals.

- Extend power cables from existing power Panel TF located at intersection of north main float and A float, along the length of A float for installation of 30-foot high metal light poles.

- Install metal Halide floodlight fixtures atop each pole to provide minimum 10-foot candle illumination along A Float.

Cost Estimate

Rough order of magnitude costs for this float improvement including all of the improvements noted above, are $1,090,000 based on construction in 2012, $206,000 of which if for electrical and plumbing systems upgrades. An itemized budget with the features broken out separately is shown in Table A-3. Float replacement is anticipated in year 50 at a project cost of $884,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $206,000 each occurrence (does not include costs for mobilization/demobilization).

Figure A-23. A float

Figure A-24. Growth on Float and Bull Rail

Figure A-25. Growth on bull rail and weathered wood

Figure A-26. Weathered Float

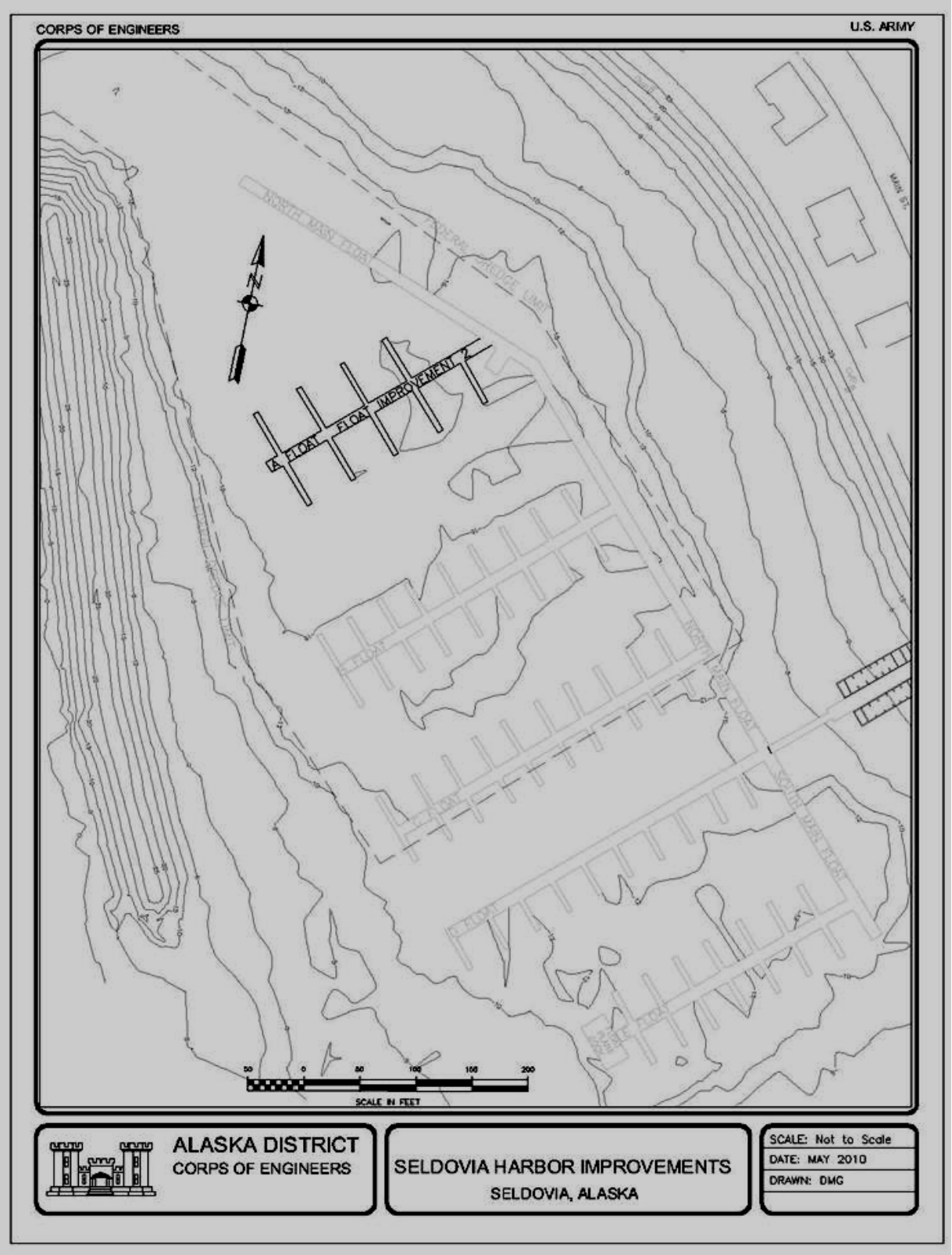

Figure A-27. Float Improvement 2 Site Plan

Table A-3. Float Improvement 2 Cost Estimate

Item	Quantity	Unit Cost	Total Cost
Mob./Demob. & Bonds			$137,000
Float Improvements	1	Lump Sum	$747,000
Electrical Upgrades	1	Lump Sum	$199,000
Plumbing System Upgrades	1	Lump Sum	$ 7,000
			$1,090,000

Note: Costs assume construction in 2012.

Note: Costs include estimates of Contingency (25%) and Construction Supervision, Inspection, and Overhead (SIOH, 10%).

Note: Cost estimates assume that float improvements, plumbing system and electrical improvements will all be performed simultaneously: this is the most efficient construction sequencing. These items can be constructed at separate times, but additional expense will be induced through mobilization/demobilization costs.

C. Float Improvement 3

Float Improvement 3 is replacement of B float. This improvement would replace the wooden float system with a similar wooden float system. The finger floats will be replaced with floats similar to the existing finger floats, but hinged (Figure A-31). The B float is approximately 10 feet wide and 250 feet long with eighteen 32- foot finger floats. This float is part of the original harbor that was built in 1963. Continual maintenance has allowed the float to function; however, it is showing signs of extreme wear. The decking on this float was recently upgraded. According to one of the workers on the project, the wood sub structure was rotten, but the job was to replace only the decking, so good decking was put over rotting wood. The deck planks where the float was not upgraded have moss growing on them (Figure A-30). The bull rails are split, vegetation is growing in the splits, and there is rot observed on the ends (Figure A-28 through Figure A-30).

Two galvanized steel piles need to be placed during this upgrade work. A previous upgrade project replaced the piles on the B float, but difficult pile driving was encountered for two of the piles. It is assumed that these two piles would need to be socketed for placement. A cost for removing the two remaining wooden piles on this float and installing socketed piles is included in the cost estimate. Figure A-32 and Table A-4 are a site plan and parametric cost estimate for this float improvement, respectively.

Plumbing and electrical systems upgrades could be performed concurrent with B float replacement. This would be the most efficient means of upgrade if funds are available.

Plumbing System Upgrades

Two hundred and seventy feet of new 1-inch HDPE pipe would be installed under B float boardwalk and five new hose bibb stations would be installed. New 1-inch HDPE pipe would branch off the new 2-inch pipe installed under the north main float.

Electrical Upgrades

- Replace existing 480 volt and 120 volt power pedestal containing GE kilowatt-hour meter, GE circuit breaker, and NEMA type IV power receptacle, and metal frame with new power pedestal such as Eaton Marina Admiral Power Pedestal. See Figure A-20.

- Replace existing 4 conductor marine power cable originating at existing Panel TF with new 4 conductor marine power cable from existing Panel TF to location of new 480 volt power pedestals. New cable shall be IEEE 1580 Type P Flexible Multi Conductor Power cable. See Figure A-21.

- Provide proper support for new cable from Panel TF to each power pedestal location.

- Extend power cables from existing power Panel TF at intersection of north main float and A float, along the length of north main float to each location of new power pedestals on B float.

- Extend power cables from existing power Panel TF at intersection of north main float and A float, along the length of A float and into B float for installation of 30-foot high metal light poles
- Install metal Halide floodlight fixtures atop each pole to provide minimum 10-foot candle illumination along B float.

Cost Estimate

Rough order of magnitude costs for float improvement 3 including all of the improvements noted above, are $1,384,000 based on construction in 2012, $207,000 of which is for electrical and plumbing systems upgrades. An itemized budget with the features broken out separately is shown in Table A-4. Float replacement is anticipated in year 50 at a project cost of $1,177,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $207,000 each occurrence (does not include costs for mobilization/demobilization).

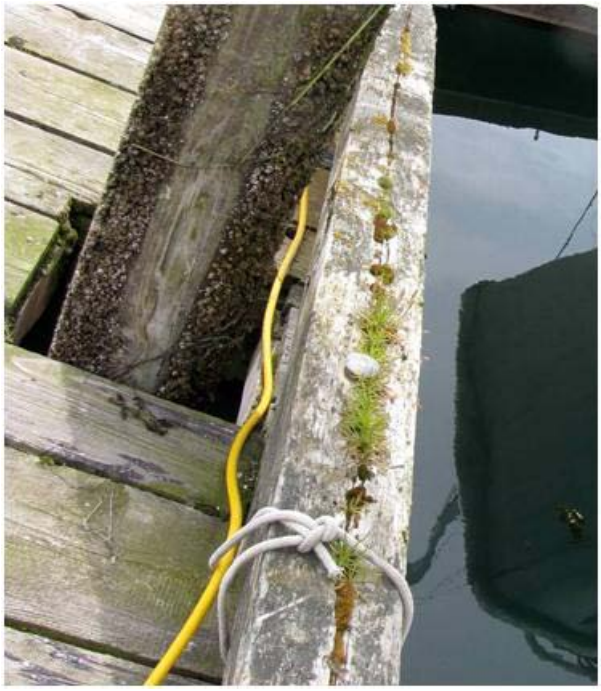

Figure A-28. B Float Splitting Bull Rail

Figure A-29. Split and Rotting Bull Rail

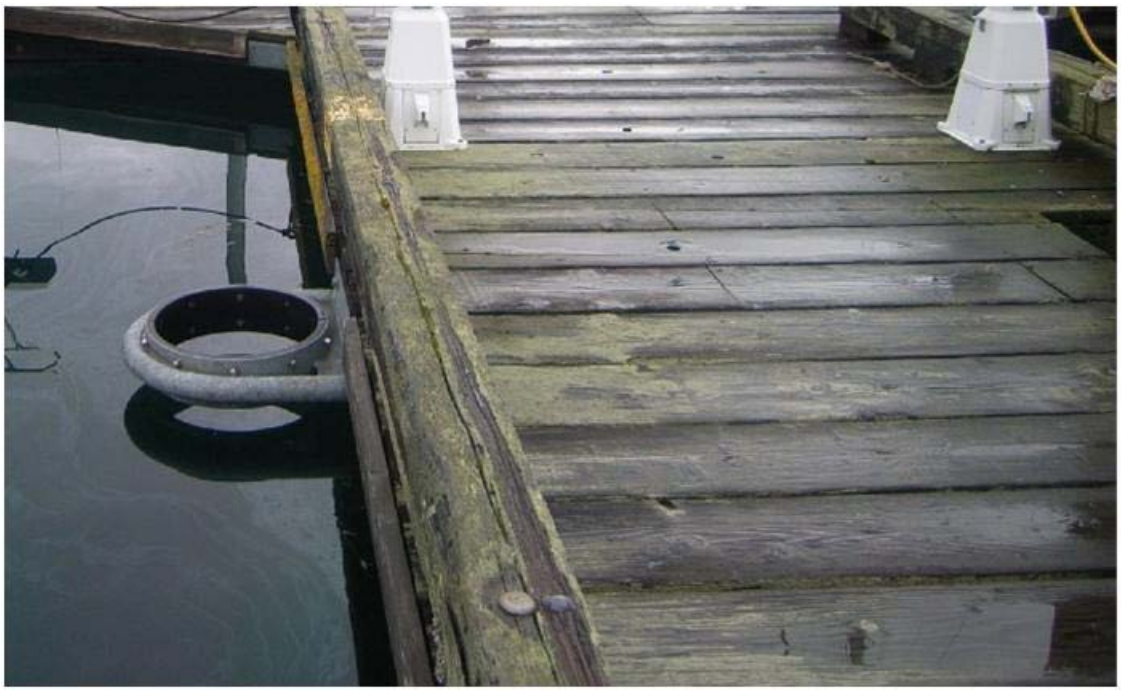

Figure A-30. Moss Growing on Decking and Bull Rail

Figure A-31. Example of proposed main float and finger float connection

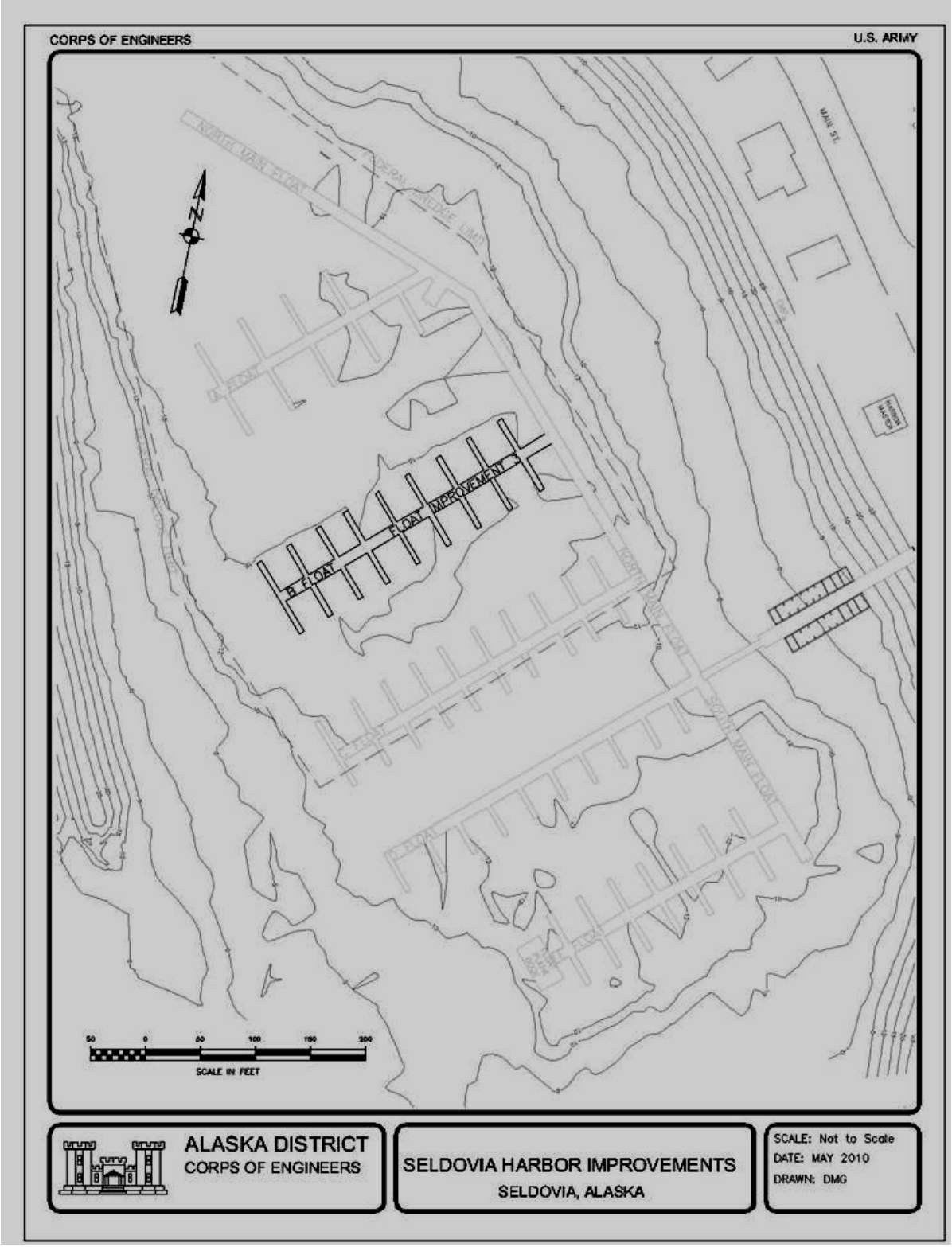

Figure A-32. Float Improvement 3 Site Plan

Table A-4. Float Improvement 3 Cost Estimate

Item	Quantity	Unit Cost	Total Cost
Mob./Demob. & Bonds			$174,000
Float Improvements	1	Lump Sum	$1,003,000
Electrical Upgrades	1	Lump Sum	$199,000
Plumbing System Upgrades	1	Lump Sum	$8,000
			$1,384,000

Note: Costs assume construction in 2012.

Note: Costs include estimates of Contingency (25%) and Construction Supervision, Inspection, and Overhead (SIOH, 10%).

Note: Cost estimates assume that float improvements, plumbing system and electrical improvements will all be performed simultaneously: this is the most efficient construction sequencing. These items can be constructed at separate times, but additional expense will be induced through mobilization/demobilization costs.

D. Float Improvement 4

Float Improvement 4 is replacement of C float. The basis of this improvement is to replace the wooden float system with a similar wooden system with the exception of the finger floats. The finger floats will be replaced with floats similar to the floats proposed for the B float finger floats (Figure A-31). At the time of the finger float replacement, 18 wooden piles at the end of the existing finger floats will be removed. The C float is approximately 10 feet wide and 287 feet long with twenty 32-foot finger floats. This float is part of the original harbor that was built in 1963. Continual maintenance has allowed the float to function; however, it is showing signs of extreme wear. The deck planks are worn and have moss growing on them (Figure A-36). The bull rails are worn and the finger floats are missing side planks and are deteriorating (Figure A-33 through Figure A-36). Three galvanized steel piles need to be placed during this upgrade work. A previous upgrade project replaced the piles on the main C float, but difficult pile driving was encountered for three of the piles. It is assumed that these three piles would need to be socketed for placement. A cost for socketed piles is included in the cost estimate. Figure A-37 and Table A-5 are a site plan and parametric cost estimate, respectively.

Plumbing and electrical systems upgrades could be performed concurrent with C float replacement. This would be the most efficient means of upgrade if funds are available.

Plumbing System Upgrades

Three hundred feet of new 1-inch HDPE pipe would be installed under C float boardwalk and five new hose bibb stations would be installed. New 1-inch HDPE pipe would branch off the new 2-inch pipe installed under the north main float.

Electrical Upgrades

- Extend power cables from existing power Panel D at the intersection of north main float and D float, along the length of north main float to each location of new power pedestals on C Float.
- Install new 120 volt power at each alternate boat slip location on the north and south side of the float. New power pedestal shall be similar to Eaton Marina Admiral Power Pedestal. (Figure A-20).
- Extend power cables from existing power Panel D at the intersection of north main float and A float, along the length of A float and into C float for installation of 30-foot high metal light poles
- Install metal Halide floodlight fixtures atop each pole to provide minimum 10-foot candle illumination along C Float.
- Provide proper support for new cable from Panel D to each power pedestal location

Cost Estimate

Rough order of magnitude costs for float improvement 4 including all of the improvements noted above, are $1,488,000 based on construction in 2012, $151,000 of which is for electrical and plumbing systems upgrades. An itemized budget with the features broken out separately is shown in Table A-5. Float replacement is anticipated in year 50 at a project cost of $1,337,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $151,000 each occurrence (does not include costs for mobilization/demobilization).

Figure A-33. C Dock Typical Deck and Bull Rail

Figure A-34. Deteriorating finger float

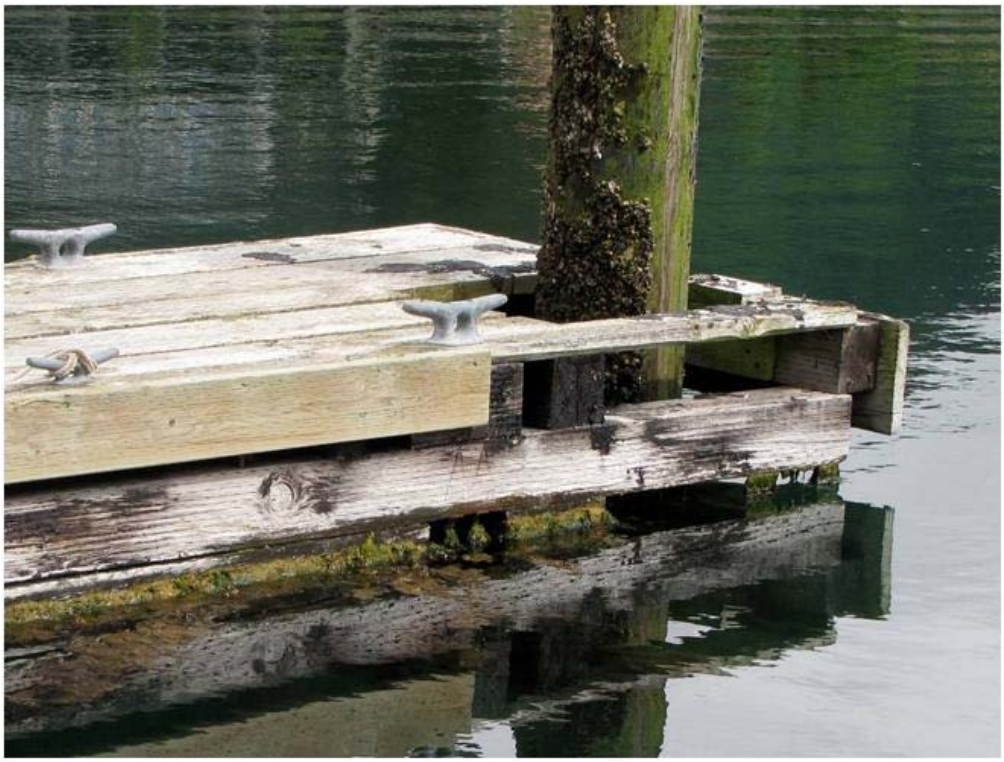

Figure A-35. Missing side plank on finger float

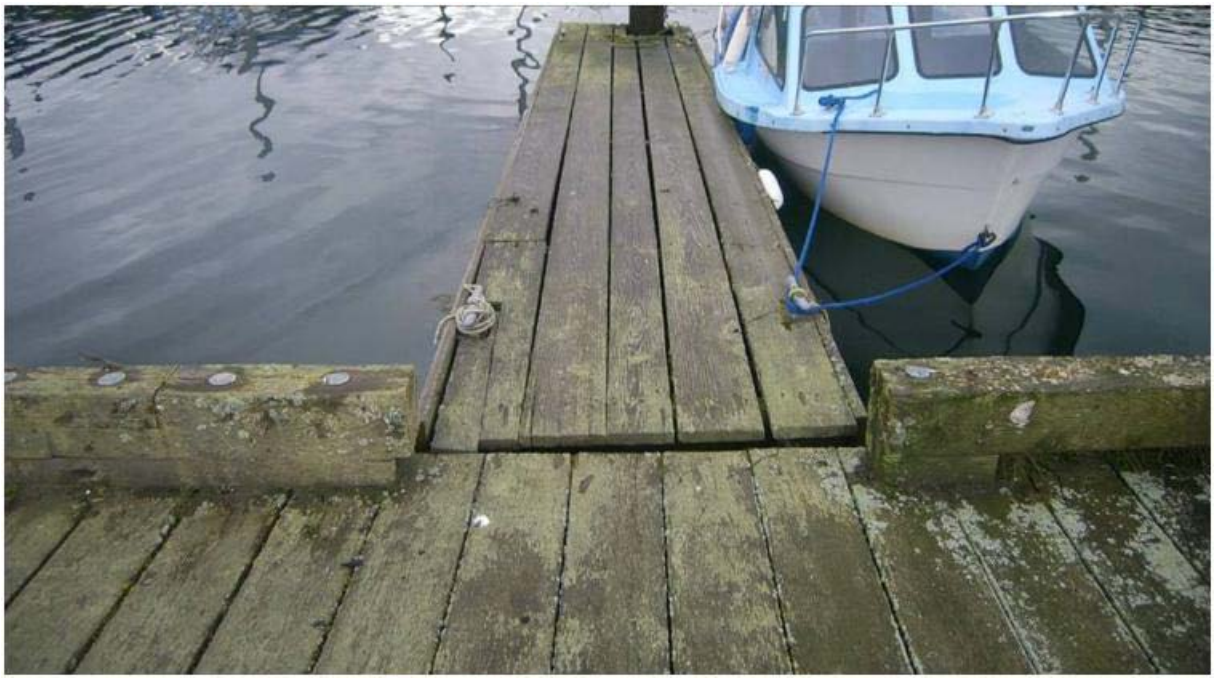

Figure A-36. Moss on decking and bull rails

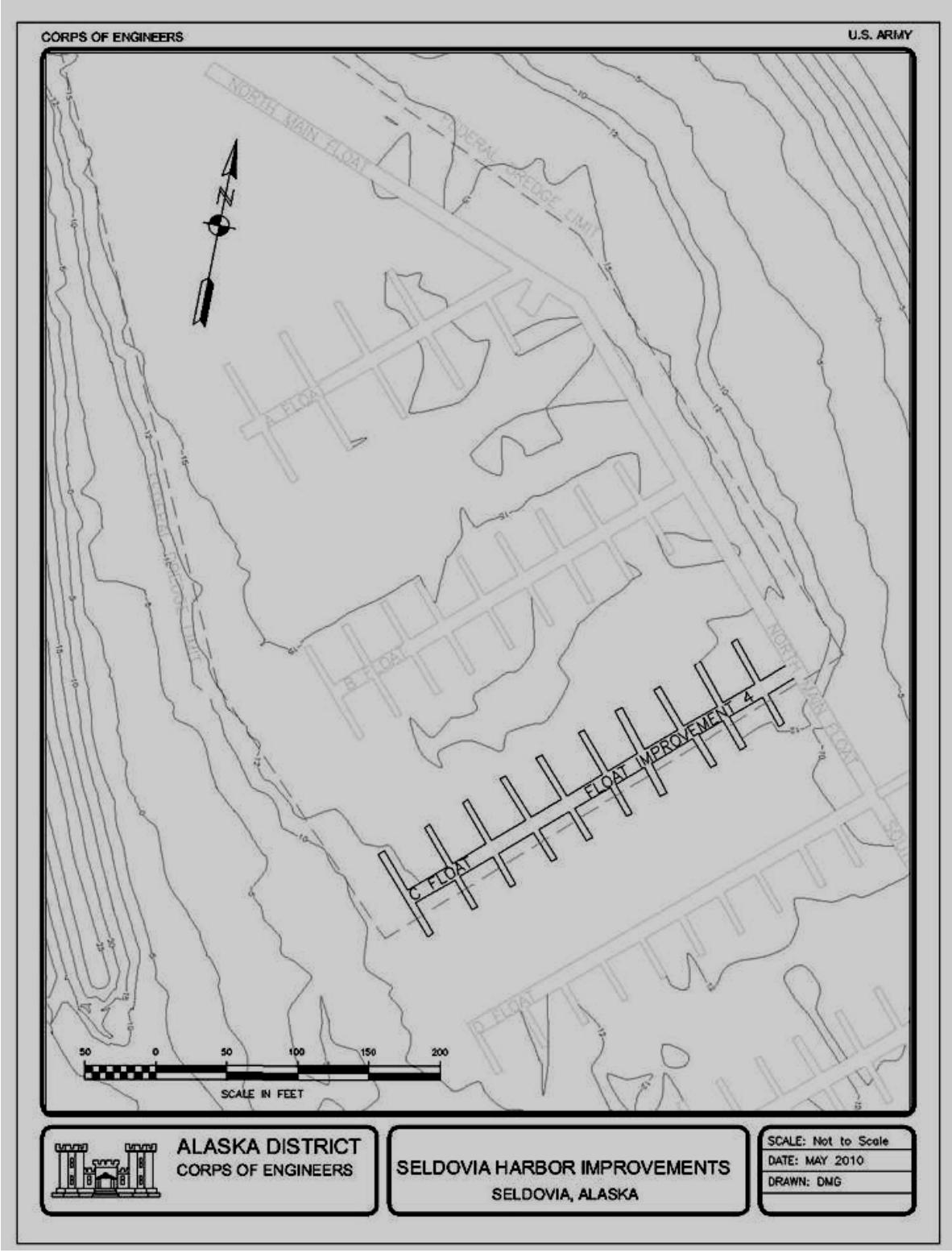

Figure A-37. Float Improvement 4 Site Plan

Table A-5. Float Improvement 4 Cost Estimate

Item	Quantity	Unit Cost	Total Cost
Mob./Demob. & Bonds			$187,000
Float Improvements	1	Lump Sum	$1,150,000
Electrical Upgrades	1	Lump Sum	$144,000
Plumbing System Upgrades	1	Lump Sum	$7,000
			$1,488,000

Note: Costs assume construction in 2012.

Note: Costs include estimates of Contingency (25%) and Construction Supervision, Inspection, and Overhead (SIOH, 10%).

Note: Cost estimates assume that float improvements, plumbing system and electrical improvements will all be performed simultaneously: this is the most efficient construction sequencing. These items can be constructed at separate times, but additional expense will be induced through mobilization/demobilization costs.

E. Float Improvement 5

Float Improvement 5 is replacement of D float. This improvement would replace the wooden float system with a similar wooden system. The finger floats will be replaced with floats similar to the floats proposed for the B float finger floats (Figure A-31).

The main D float is approximately 10 feet wide and 287 feet long with ten 32-foot finger floats on the south side and a transient dock on the north side of the float. The east half of the D float is part of the original harbor that was built in 1963. Continual maintenance has allowed the float to function; however, it is showing signs of extreme wear. The deck planks are cracking and have moss growing on them (Figure A-38 and Figure A-39). The bull rails are worn and the finger floats have deteriorating deck planks (Figure A-40 and Figure A-41). The wood piles have been replaced with steel piles and would not need replacing as part of this upgrade work; however, the wooden piles at the ends of the finger floats would need to be removed when the finger floats are replaced. Figure A-42 and Table A-6 are a site plan and parametric cost estimate, respectively.

Plumbing and electrical systems upgrades could be performed concurrent with D float replacement. This would be the most efficient means of upgrade if funds are available. If the plumbing system on D float is upgraded before the south main float plumbing system is upgraded, provisions must be made to the hose bibb stations.

Plumbing System Upgrades

Three hundred feet of new 1-inch HDPE pipe would be installed under the D float boardwalk and five new hose bibb stations would be installed.

Electrical Upgrades

- Extend power cables from existing power Panel D at the intersection of north main float and D float, along the length of A float and into D float for installation of 30-foot high metal light poles
- Install metal Halide floodlight fixtures atop each pole to provide minimum 10-foot candle illumination along D float.
- Provide proper support for new cable from Panel TF to each power pedestal location.

Cost Estimate

Rough order of magnitude costs for float improvement 5 including all of the improvements noted above, are $1,027,000 based on construction in 2012, $83,000 of which is for electrical and plumbing systems upgrades. An itemized budget with the features broken out separately is shown in Table A-6. Float replacement is anticipated in year 50 at a project cost of $944,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $83,000 each occurrence (does not include costs for mobilization/demobilization).

Figure A-38. Cracked deck plank and moss growing on decking

Figure A-39. D Float deck damage

Figure A-40. Grass and moss growing on decking and bull rail

Figure A-41. Worn bull rail

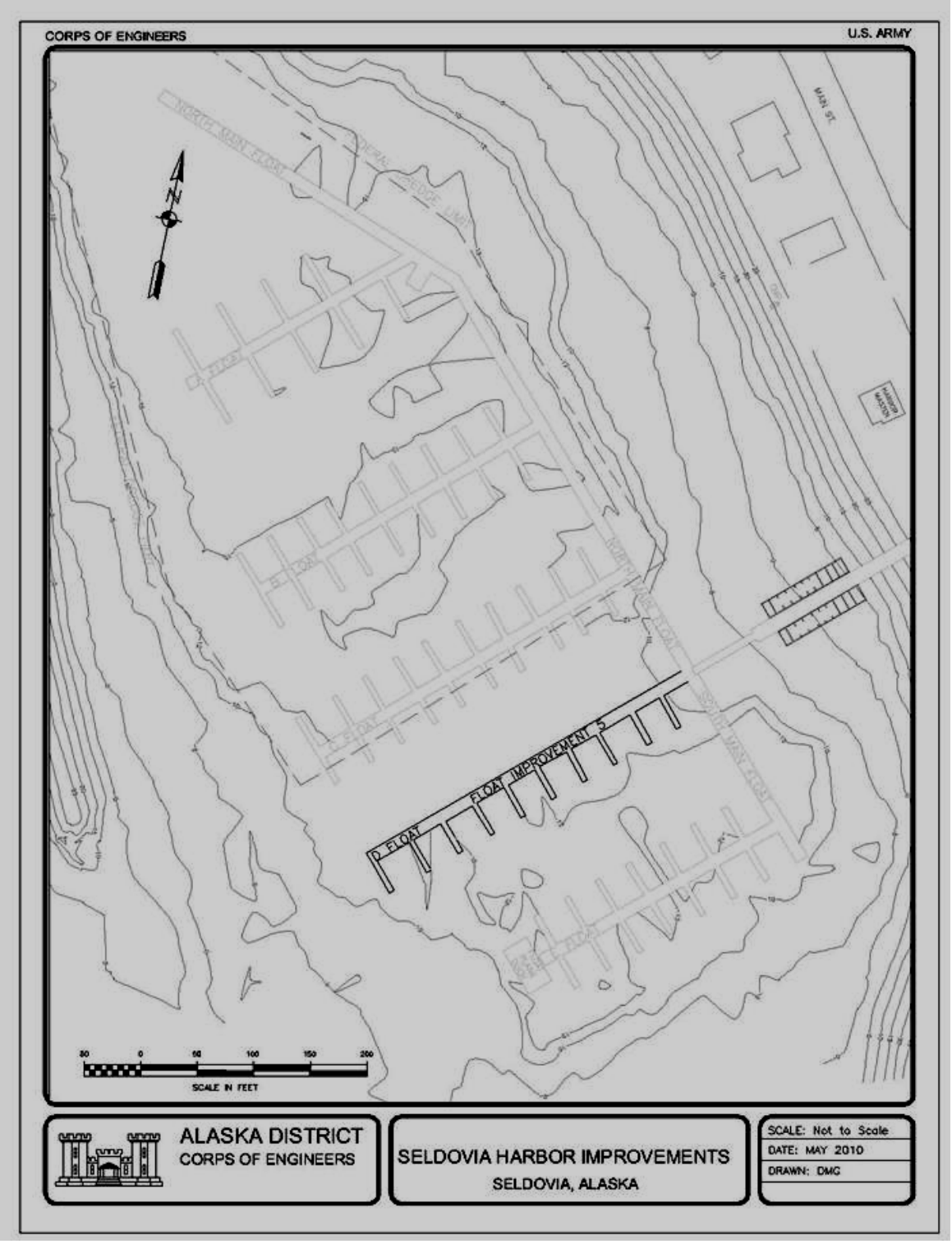

Figure A-42. Float Improvement 5 Site Plan

Table A-6. Float Improvement 5 Cost Estimate

Item	Quantity	Unit Cost	Total Cost
Mob./Demob. & Bonds			$129,000
Float Improvements	1	Lump Sum	$815,000
Electrical Upgrades	1	Lump Sum	$76,000
Plumbing System Upgrades	1	Lump Sum	$7,000
			$1,027,000

Note: Costs assume construction in 2012.

Note: Costs include estimates of Contingency (25%) and Construction Supervision, Inspection, and Overhead (SIOH, 10%).

Note: Cost estimates assume that float improvements, plumbing system and electrical improvements will all be performed simultaneously: this is the most efficient construction sequencing. These items can be constructed at separate times, but additional expense will be induced through mobilization/demobilization costs.

F. Float Improvement 6

Float Improvement 6 is replacement of E float and the south main float. This concept would replace the wooden float system with a similar wooden system. The finger floats on E float would be replaced with floats similar to the floats proposed for the B float finger floats (Figure A-31).

The E float is approximately 10 feet wide and 250 feet long with 14 32-foot finger floats. The south main float is approximately 10 feet wide and 187 feet long. These float systems were installed in 1983. Continual maintenance has allowed the floats to function; however, they are showing signs of extreme wear. The decking and bull rails have vegetation growing on them. The bull rails are worn and the finger floats have visibly deteriorating side planks and sub structure (Figure A-43 through Figure A-46). The wood piles have been replaced and would not need replacing as part of this upgrade work; however, the wooden piles at the ends of the finger floats would need to be removed when the finger floats are replaced. Figure A-48 and Table A-7 are a site plan and parametric cost estimate, respectively.

Plumbing and electrical systems upgrades could be performed concurrent with the south main float and the E float replacement. This would be the most efficient means of upgrade if funds are available.

Plumbing System Upgrades

South main float plumbing and E float

Ramp:

- The existing 2-inch HDPE under the ramp would be the source of the new north and south main float pipe mains. New 2-inch HDPE would be connected from the tee to serve the south main float. The current 2-inch south main float source of water would be capped (Figure A-16).

South Main Float:

- The existing 2-inch galvanized pipe main of the south main float would be removed and replaced with new 2-inch HDPE water supply main. One existing hose station would be removed and replaced with a new 2-inch hose station.

- Approximately 100 feet of 2-inch galvanized pipe installed under the boardwalk would be removed. One existing hose station at E float would be removed. Removal would include but not be limited to main pipes, branch pipes, vertical risers, valves, fittings, pipe supports, and appurtenances.

- Approximately 100 feet of new 2-inch HDPE pipe would be installed under the boardwalk complete with pipe supports. One new hose station would be installed. The hose station would consist of a 2-inch HDPE branch off the new 2-inch HDPE main, new 2-inch galvanized pipe riser connected to the new 2-inch HDPE branch, and four new hose bibbs (Figure A-17).

Fish Washing Area:

- The existing 1-inch branch to the fish washing area off the 2-inch main would be removed and replaced with 1-inch HDPE and connect to two 1-inch galvanized risers. The existing faucets of the fish washing area would be replaced with new faucets (Figure A-47).

E Float:

- Existing 1-inch HDPE pipe at E float would be removed and replaced with a new 1-inch HDPE.
- Three hundred feet of new 1-inch HDPE pipe would be installed under the E float boardwalk and five new hose bibb stations would be installed.

Electrical Upgrades

South Main Float

- Extend power cables from existing power Panel D at the intersection of north main float and D float, along the length of A float and into south main float for installation of 30-foot high metal light poles.
- Install metal Halide floodlight fixtures atop each pole to provide minimum 10- foot candle illumination along south main float.
- Provide proper support for new cable from Panel TF to each power pedestal location.

E Float

- Extend power cables from existing power Panel D at the intersection of the north main float and D float, along the length of A float and into E float for installation of 30-foot high metal light poles
- Install metal Halide floodlight fixtures atop each pole to provide minimum 10- foot candle illumination along E float.
- Provide proper support for new cable from Panel TF to each power pedestal location.

Cost Estimate

Rough order of magnitude costs for float improvement 6 including all of the improvements noted above, are $1,560,000 based on construction in 2012, $184,000 of which is for electrical and plumbing systems upgrades. An itemized budget with the features broken out separately is shown in Table A-7. Float replacement is anticipated in year 50 at a project cost of $1,376,000. Electrical and plumbing system maintenance are anticipated in years 25 and 50 at $184,000 each occurrence (does not include costs for mobilization/demobilization).

Figure A-43. South main float with split bull rail and grass growing

Figure A-44. Growth on decking and bull rail on E Float

Figure A-45. Deteriorating finger float substructure

Figure A-46. Deteriorating Finger Float

Figure A-47. Fish washing area on the South Main Float near D Float junction

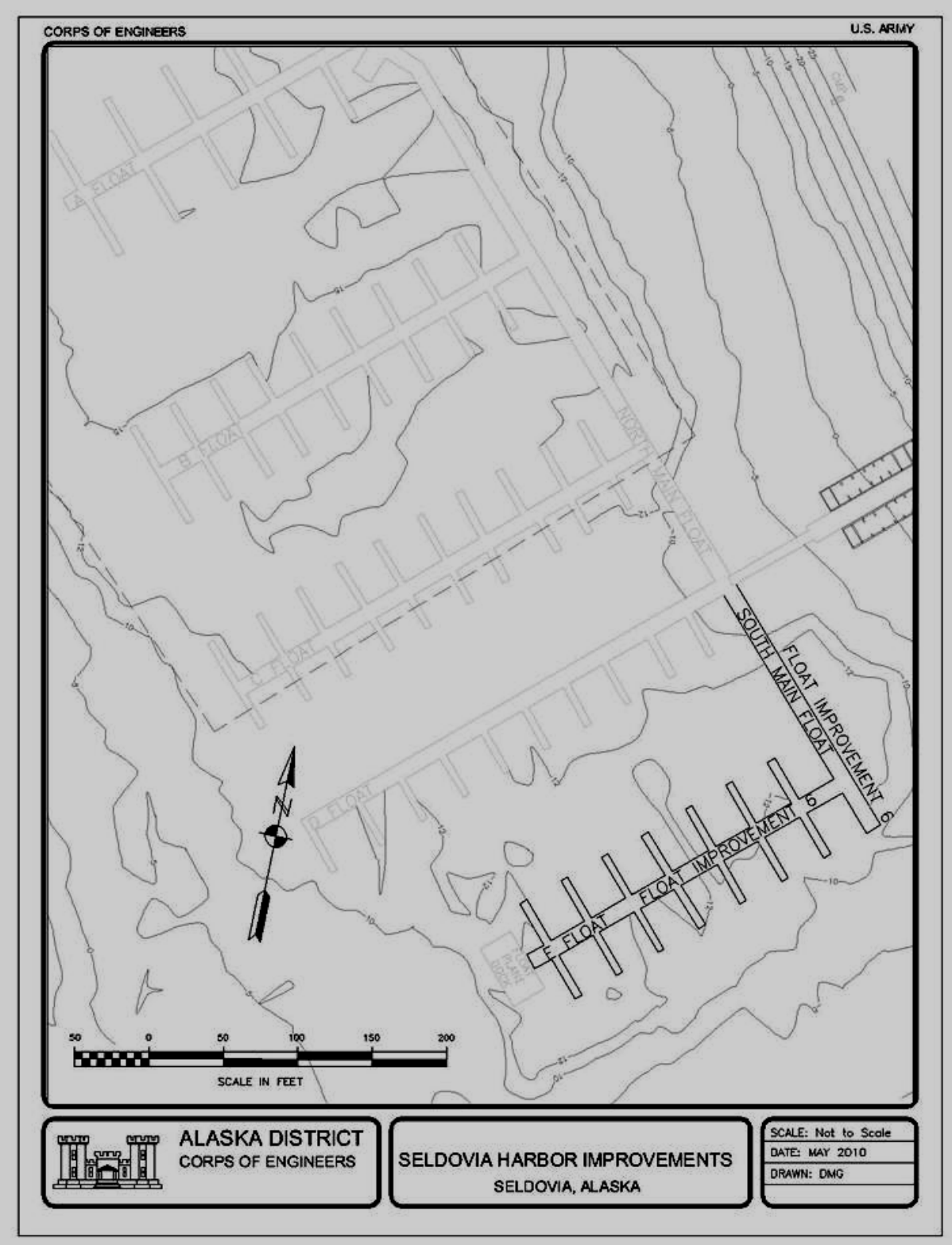

Figure A-48. Float Improvement 6 Site Plan

Table A-7. Float Improvement 6 Cost Estimate

Item	Quantity	Unit Cost	Total Cost
Mob./Demob. & Bonds			$195,000
Float Improvements	1	Lump Sum	$1,181,000
Electrical Upgrades	1	Lump Sum	$153,000
Plumbing System Upgrades	1	Lump Sum	$31,000
			$1,560,000

Note: Costs assume construction in 2012.

Note: Costs include estimates of Contingency (25%) and Construction Supervision, Inspection, and Overhead (SIOH, 10%).

Note: Cost estimates assume that float improvements, plumbing system and electrical improvements will all be performed simultaneously: this is the most efficient construction sequencing. These items can be constructed at separate times, but additional expense will be induced through mobilization/demobilization costs.

VI. Proposed Harbor Dredging Improvements

The Seldovia Harbor is comprised of a 3.85 acre federally maintained basin to -12 feet MLLW and a 2.67 acre basin that was dredged to approximately -12 feet MLLW in 1983. The proposed dredging improvements in this section address improvements to areas outside of the federally maintained basin.

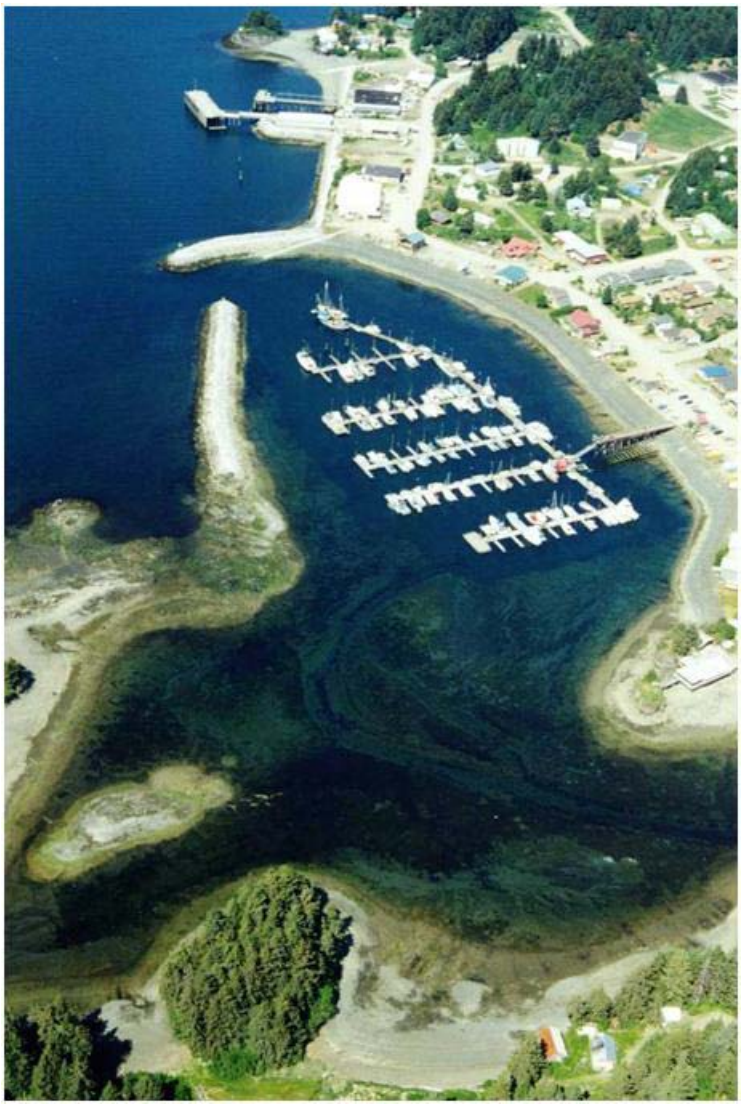

Figure A-49. Oblique view of the harbor. Dredge prism can be seen in darker blue area in harbor.

A. Dredge Improvement

The dredge improvement consists of dredging the following areas, which are outside of the federally maintained channel, to -12 feet MLLW;

- South of E float
- Shoreward of the south main float
- Between D and E float
- Between C and D float
- Shoreward of the north main float to widen the channel
- Shallow area outside of breakwater entrance channel

1. South of E float and Shoreward of the south main float

The floats on the south side of the E float are in the shallowest part of the harbor. The harbormaster has reported that there are times when boats in these slips hit bottom or need to be moved from their slips until the tide is higher. Boats needing to access the south main float have to transit this area. The proposed dredging prism would widen the channel for boats that use the south main float for mooring, and deepen and widen the navigable area and the mooring area south of E float.

2. Between D and E floats

The bathymetry between D and E floats is shallow, and the harbormaster has reported that there are times when boats in these slips hit bottom or need to be moved from their slips until the tide is higher.

3. Between C and D floats

The bathymetry between C and D floats is generally 1 to 2 feet shallower than -12 feet. This is an area with slips and transient docking and the usable depth is limited due to the reduced harbor depth.

4. Shoreward of the North Main Float

The area shoreward of the north main float is a narrow channel adjacent to the main float. This area is used regularly by tour boats bringing visitors to Seldovia. When the tide is low, there is not adequate area for the ships to turn around. Dredging proposed for this area widens the channel for the tour ships to turn. Boring logs from the 1961 General Design Memorandum No. 1 for Seldovia and pile driving logs from 2007 pile installation indicate that dredging in this area could be difficult or require blasting. This would be new dredging. In the area of C float, it appears that there is a good chance of encountering rock. The risk of rock dredging could be removed from the contract by requiring the contractor to stop

dredging if rock is encountered. This would result in a generally wider channel with the possibility of a shallower area if rock is encountered.

5. Shallow area outside of entrance channel

The harbormaster and local users noted that there is a shallow area on which boats ground outside of the harbor entrance. The exact location of the shallow area was not defined, but it appears to be an area adjacent to the federally maintained entrance channel. A shallow area off the nose of the north breakwater could be the area of grounding, as it aligns closely to a shallow area noted in the harbormaster's office (Figure A-52). A condition survey was performed in the summer of 2010 and the extent of the survey was expanded in the entrance channel area to determine the area of grounding. The survey was not available at the time of this report's publication, so the area off the nose of the breakwater was used in this report to evaluate this improvement. This area could be dredged to widen the entrance channel. This would be new dredging, and there are no boring logs for that area. It is uncertain if dredging in this area would be difficult or require blasting, however; it appears that there is a good chance of encountering rock. The risk of rock dredging could be removed from the contract by requiring the contractor to stop dredging if rock is encountered. This could result in a generally wider channel with the possibility of a shallower area if rock is encountered. An alternative to dredging this area would be to install a navigation aid alerting users to the shallow area or range marker to aid in the channel approach. Note the quantity estimate for this area is based on an assumed area of grounding. Prior to implementing any improvement in this area, the location of the problem shallow area and volume of dredged material or depth for marker installation should be confirmed.

It is estimated that there would be 9,065 in-place cubic yards dredged to provide a prism of -12 feet MLLW as shown in Figure A-53. The guidance for the minimum channel widths was obtained from the American Society of Civil Engineers (ASCE) *Planning and Design Guidance for Small Craft Harbors*. Rough order of magnitude costs for dredging are $2,980,000 for initial dredging with an additional $1,490,000 every 15 years for maintenance dredging. Estimates assume no difficult dredging (i.e. no rock needing blasting), unless noted, dredging with a clamshell, and upland disposal. Figure A-53 and Table A-8 are a site plan and parametric cost estimate for dredging improvements, respectively.

Figure A-50. Area South of E Float Needing Dredging (located in background behind visible dock)

Figure A-51. North Main Float and B and C Floats

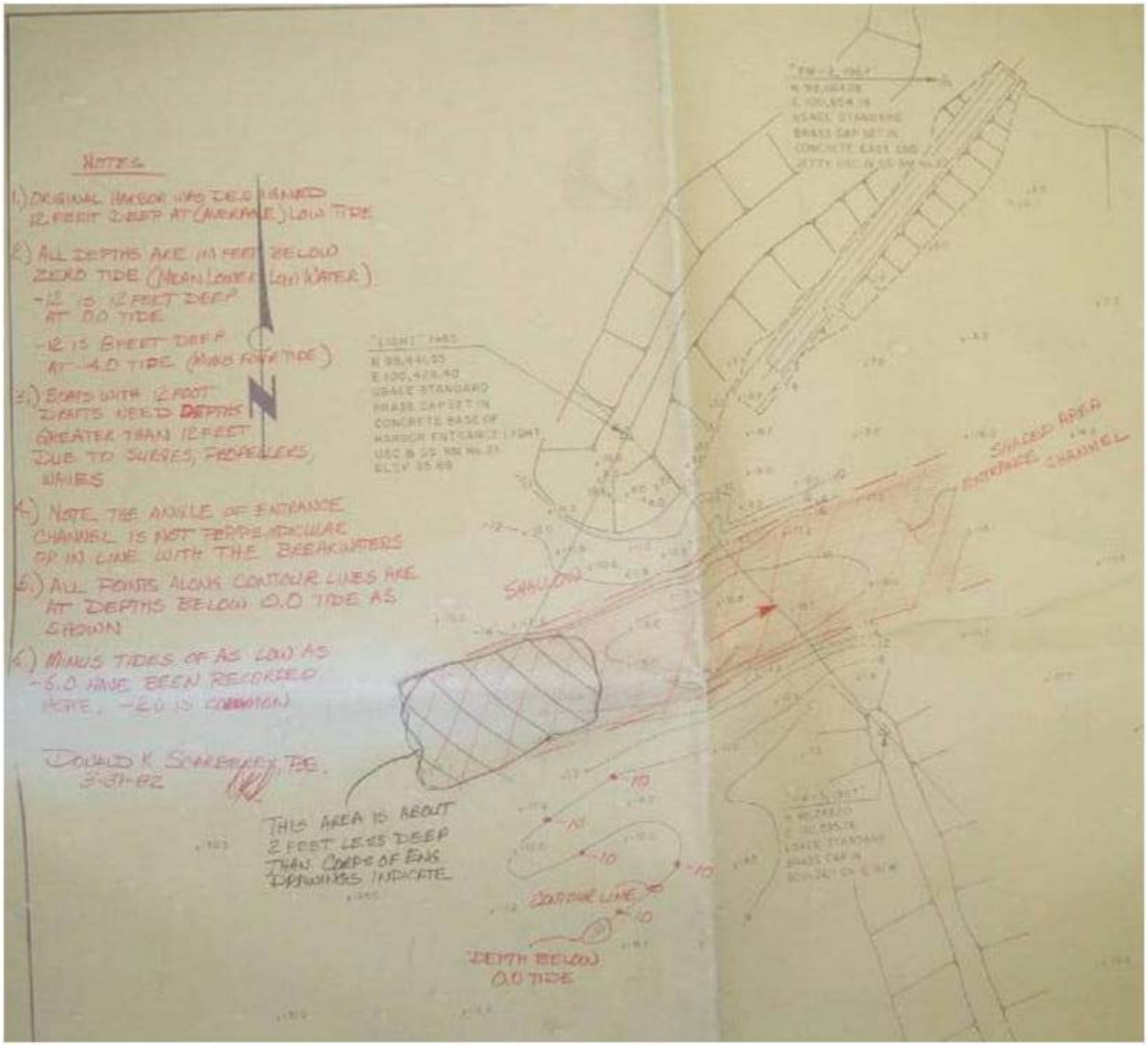

Figure A-52. Harbormaster's notation of shallow area

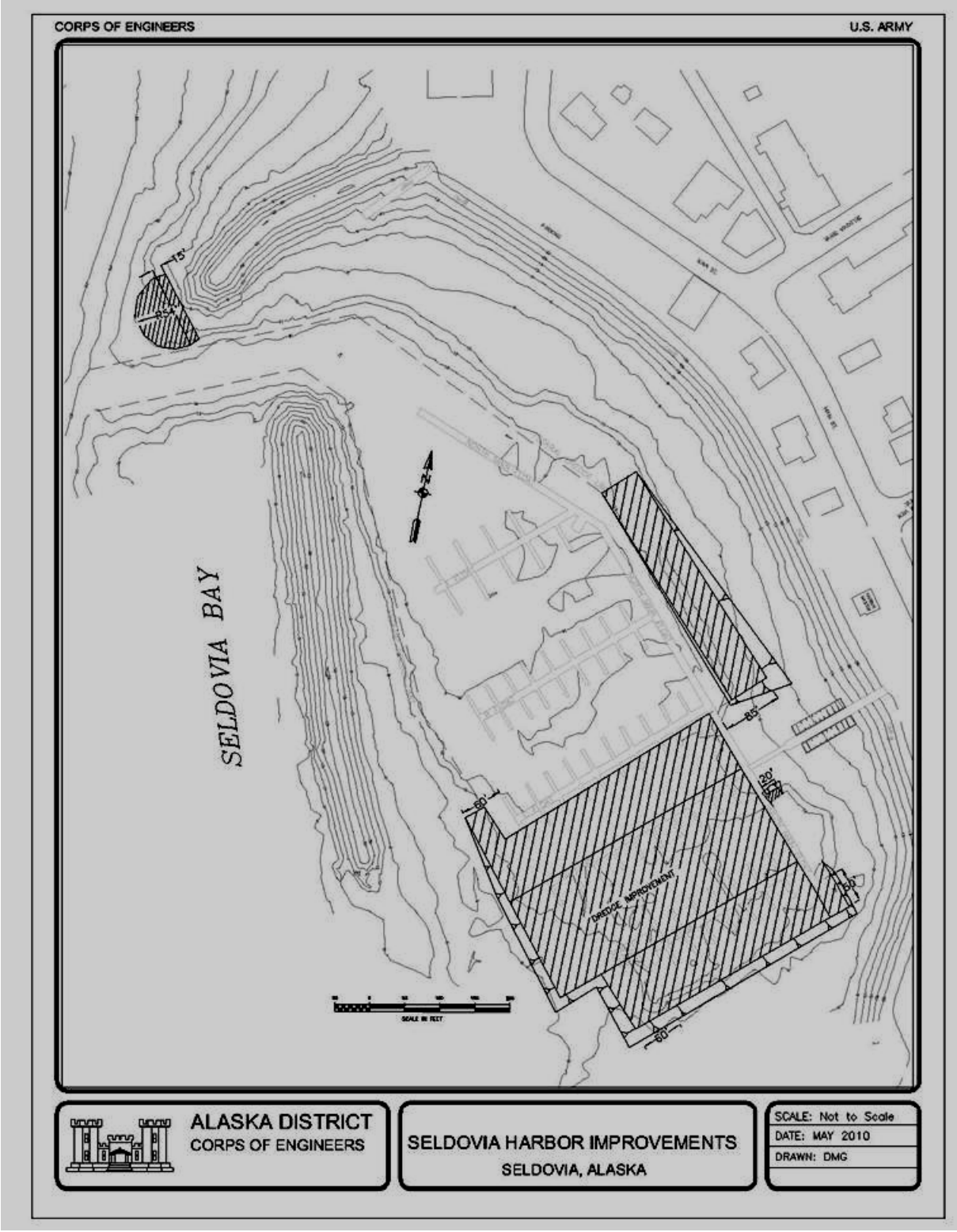

Figure A-53. Dredge Improvement Site Plan

Table A-8. Dredge Improvement Cost Estimate

Item	Quantity [CY]	Unit Cost	Total Cost
Mob./Demob. & Bonds			$600,000
Dredge & Onshore Disposal	9,065	$235	$2,380,000
			$2,980,000

Note: Costs include estimates of Contingency (25%) and Construction Supervision, Inspection, and Overhead (SIOH, 10%).

VII. Proposed Harbor Expansion

A proposed harbor expansion was examined by looking at a 1989 Letter Report by the Corps of Engineers. The Letter Report was the result of a request from the City of Seldovia to examine the need for an expansion of the harbor. The plan described in this report is the expansion that was proposed in the letter report. Quantities generated from the letter report were used for the cost estimate.

A. Basin

The proposed expansion would increase the harbor basin to accommodate 230 vessels. Each float would be lengthened. This improvement would allow boats to stay out fishing longer and use Seldovia as their home port without needing to return to Homer. The new float and maneuvering lanes would be over the location of the existing breakwater, which appears to be built on a rock reef. It is assumed that this improvement would require hard dredging or blasting.

B. Breakwater

This improvement would extend the north breakwater 300 feet west and the south breakwater would be moved 280 feet west. Armor stone from the existing breakwater would be used to the maximum extent possible.

C. Entrance Channel

The entrance channel and maneuvering lane depth was increased to -14 feet MLLW. The maneuvering channel was increased to 100 feet inside the harbor. The mooring area depth was left at -12 feet MLLW.

D. Floats

A new float that could accommodate five large vessels would be located off the north main float. Float extensions would be added to the A, B, and C floats. Floats D and E would require more dredging to expand and could be left to accommodate smaller boats.

It should be noted that moving the breakwater and expanding the floats would move the harbor navigation channel outside of the federal dredging limits. The addition of a float onto the end of the main float would also block the narrow federal dredging limit that provides access to the transient float shoreward of the north main float. This is also the area that the tour ships load and unload passengers.

E. Cost Estimate

Rough order of magnitude costs for harbor expansion are $28 million for initial construction. This estimate assumes difficult dredging (i.e. rock blasting required) and up land disposal. This estimate also assumes that the float upgrades on the existing floats will be performed as

part of the expansion and that dredging improvements will be performed during the harbor expansion. Figure A-54 and Table A-9 are a site plan and parametric cost estimate for this alternative, respectively. O&M cost estimates for harbor expansion (not including costs for mobilization/demobilization) include $68,000 per occurrence in years 25 and 50 for armor rock maintenance, $925,000 per occurrence in years 15, 30, and 45 for maintenance dredging, $5,572,000 in year 50 for float replacement, and $3,358,000 per occurrence in years 25 and 50 for electrical and plumbing systems upgrades.

Seldovia Harbor was authorized by the Rivers and Harbors Act of 1958, House Document 34, 85th Congress, 1st Session, as adopted. It included the construction of two breakwaters and dredging of an entrance channel and basin to a depth of -12 feet MLLW. As the Seldovia Harbor is a federally-authorized project, relocating the existing breakwaters and entrance channel would require coordination with the Corps of Engineers through the Congressional authorization and appropriation processes. This would likely include a cost-shared feasibility study.

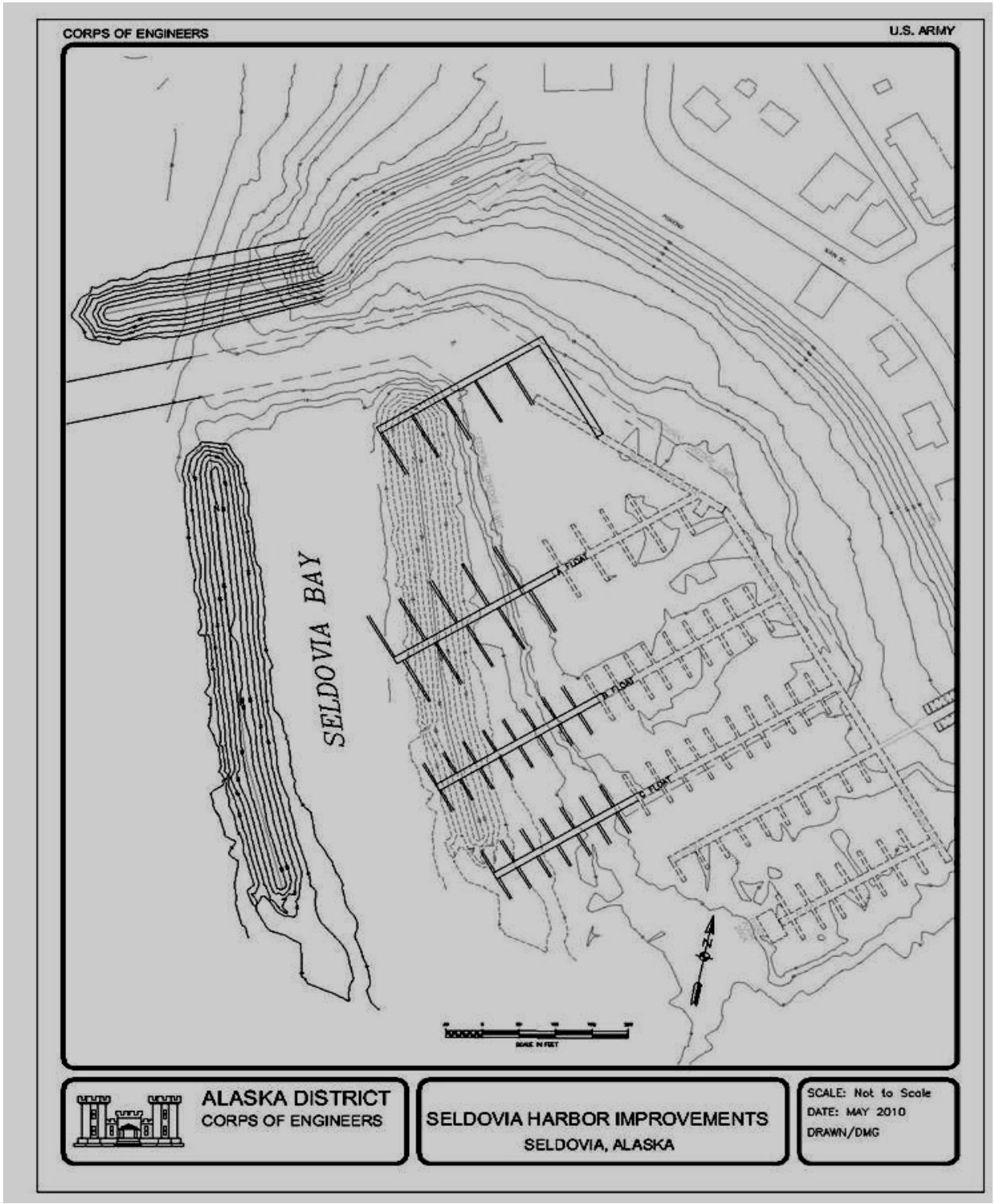

Figure A-54. Harbor Expansion Site Plan

Table A-9. Harbor Expansion Cost Estimate

Item		Total Cost
Mob./Demob. & Bonds	$	1,557,000
Extend North Breakwater		
Armor Rock	$	946,000
Filter Rock	$	381,000
Dredged Rock	$	96,000
Quarry Run	$	1,162,000
Move South Breakwater		
Armor Rock	$	423,000
Filter Rock	$	494,000
Core	$	1,255,000
Dredging		
Rock	$	504,000
Other Dredging (including disposal)	$	3,542,000
Float System		
Floats	$	893,000
Piles	$	444,000
Electrical Upgrades	$	2,247,000
Plumbing System Upgrades	$	99,000
Existing Harbor Upgrades	$	4,679,000
Existing Electrical Upgrades	$	949,000
Existing Plumbing System Upgrades	$	63,000
Subtotal	$	19,734,000
Contingency (25%)	$	4,934,000
Subtotal	$	24,668,000
Engineering & Design (7%)	$	1,727,000
Supervision & Administration (6.5%)	$	1,603,000
Total	**$**	**27,998,000**

Harbor Improvements
Economics Appendix B
Seldovia, Alaska

Prepared for:

Denali Commission

February 2011

Prepared by:

U.S. Army Corps of Engineers

Alaska District

HARBOR IMPROVEMENTS
ECONOMICS APPENDIX
SELDOVIA, ALASKA

CONTENTS

FIGURES

TABLES

I. COMMUNITY PROFILE

Seldovia is on the Kenai Peninsula on the south shore of Kachemak Bay, a 15-minute flight from Homer. Flight time to Anchorage is 45 minutes. It lies at 59.44 degrees North latitude and -151.71 West longitude (Sec. 32, T008S, R014W, Seward Meridian). Seldovia is located in the Seldovia Recording District. The area encompasses 0.4 square miles of land and 0.2 square miles of water. Winter temperatures in Seldovia average from 12 to 21 degrees Fahrenheit. Summer temperatures range from 48 to 65 degrees Fahrenheit, and precipitation averages 34.5 inches.[1] The location of Seldovia is shown in Figure B-1.

Figure B-1. Location of Seldovia

Source: Alaska Department of Commerce, Community, and Economic Development

Alaska Native residents are mixed Dena'ina Indian and Aleut and Sugpiaq Eskimo (also known as Alutiiq). Alutiiqs are an Eskimo that settled along the northern coast of the Gulf of Alaska over a thousand years ago. They are distinguished from other Eskimo groups by their language and some of their customs. The name Seldovia is derived from "Seldovoy", a Russian word meaning "herring bay". Between 1869 and 1882, a trading post was located in Seldovia. A post office was established in 1898. The village developed around commercial fishing and fish processing. The City of Seldovia was incorporated in 1945. Today, some residents of Seldovia are of Alutiiq origin. Commercial fishing and subsistence are integral parts of the local culture.[1]

A. Population

According to the State Demographer's 2009 estimate, Seldovia is now home to 407 people. This includes both the City of Seldovia and the nearby Seldovia Village (which is listed as a

[1] State of Alaska Division of Community and Regional Affairs, Community Database Online – Seldovia. http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm

distinct Census Designated Place). In 2009 the population of the City of Seldovia was 241 and the population of Seldovia Village was 166. In recent years, Seldovia has seen declining population as the 2000 Census showed the population of the City and Village combined to be 430 persons.[2] Figure B-2 shows the population of Seldovia from 2000 through 2009.

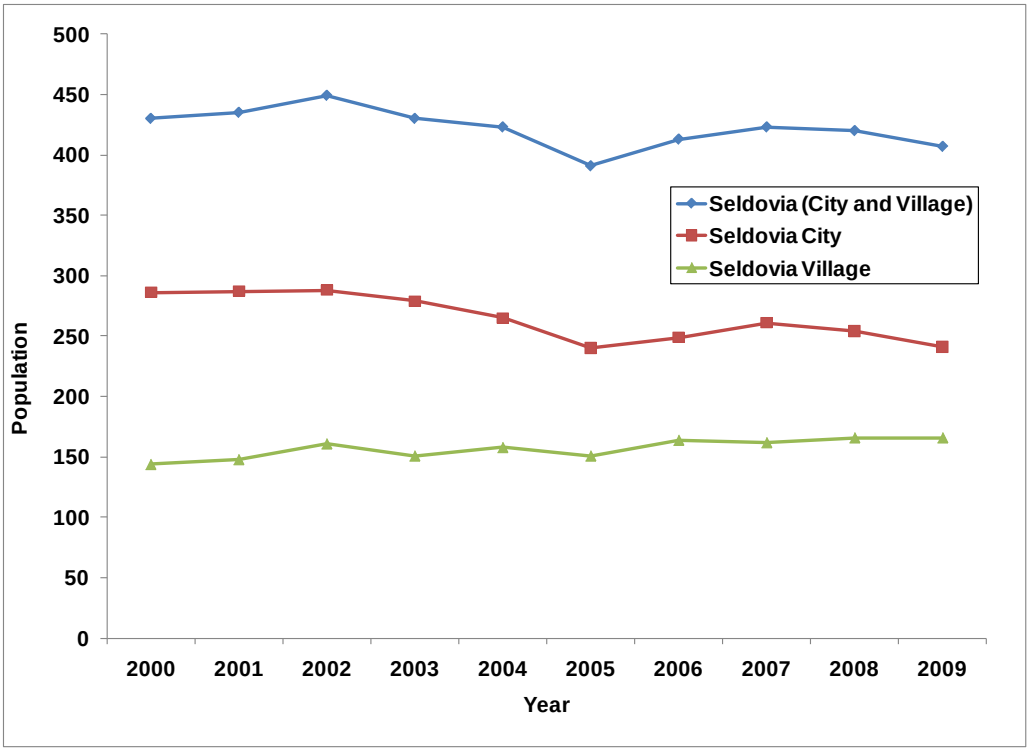

Figure B-2. Seldovia Population (2000-2009)

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section, Demographics Unit

According to the 2000 Census, the population of the City of Seldovia consists of 23.1 percent Alaska Native or part Native compared to 10.2 percent in the Kenai Peninsula Borough and 19.0 percent in the State of Alaska. Of the remaining population in the City of Seldovia, the next largest racial group was reported as white or part white at 79.7 percent (keeping in mind that individuals may report more than one race). The gender breakdown of Seldovia's population was approximately 50.7 percent male and 49.3 percent female compared to 52 percent male and 48 percent female in the State of Alaska. The median age of a Seldovia resident is 45.3 years compared to 36.3 years in the Kenai Peninsula Borough and 32.4 years in the State of Alaska.[3]

[2] State of Alaska Department of Labor, Research and Analysis Section, Demographics Unit.

[3] U.S. Census Bureau, Census 2000. Demographic Profile of Kenai Peninsula Borough, Alaska. http://labor.alaska.gov/research/census/profiles/ken.PDF

B. School Enrollment

The Susan B. English School, part of the Kenai Peninsula Schools, serves grades K through 12. Total enrollment at the Susan B. English School was 47 students in fiscal year 2010 (FY '10).[4] School enrollment in Seldovia has been steadily declining. In FY '96, enrollment at the Susan B. English School was 102 students, 117 percent higher than the enrollment in FY '10. Figure B-3 shows the school enrollment in Seldovia from FY '96 through FY '10. In rural Alaskan communities, schools are subject to closure if enrollment falls below ten students.

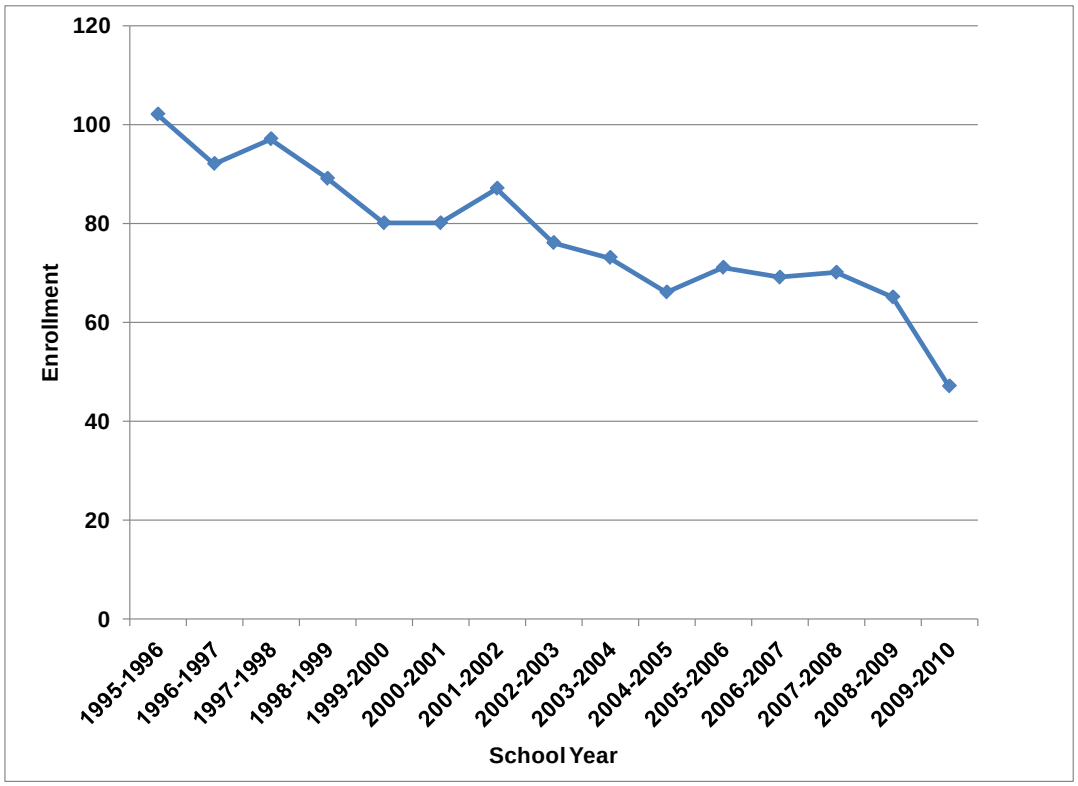

Figure B-3. Susan B. English School Enrollment (K-12), 1995-2010

Source: State of Alaska Department of Education and Early Development

C. Employment and Income

The largest employment sector in Seldovia is the agriculture, forestry, fishing, hunting and mining industry which comprises 14.0 percent of total employment. Other popular employment sectors include construction at 11.6 percent, retail trade at 10.9 percent,

[4] State of Alaska Department of Education and Early Development, Enrollment by School and Grade as of Oct. 1, 2009, FY2010. http://www.eed.state.ak.us/stats/SchoolEnrollment/2010SchoolEnrollment.pdf

transportation and warehousing at 10.1 percent, educational, health and social services at 11.6 percent, and arts, entertainment, recreation, accommodation and food services at 10.1 percent. Combined, these sectors account for 68.3 percent of total employment in the community. According to the 2000 Census, about 59.7 percent of workers in the City of Seldovia were in the private sector, 17.1 percent were government workers, and 20.9 percent of workers were self-employed. The 2000 Census also reports that Seldovia had a total potential workforce (population over 16 years of age) of 233 at that time. Of these, 144 were considered in the labor force with 129 employed and 15 unemployed. This was a civilian unemployment rate of 10.4 percent compared to the state average of 9.0 percent.[5]

The unemployment rate does not account for all of the non-working adults in Seldovia. There were also 89 residents, 38.2 percent of the potential workforce, who were considered not in the labor force according to the 2000 Census.[5] This means that they were not working and not looking for work. Many factors can play into the decision to search for jobs, including: scarce availability, informal searching (through communal connections), and seasonal shifts in job opportunities and subsistence activities. Were these individuals included, the unemployment rate for the community would be 44.6 percent rather than the 10.4 percent reported by the Census. It is important to recognize the definitional differences of the potential workforce and the actual labor force for an accurate understanding of local economic conditions.

The 2000 Census reports that Seldovia has a total of 129 households with a median income of $45,313 per year. This is compared to a statewide median of $51,571 and $46,397 in the Kenai Peninsula Borough. In the City of Seldovia, 7.6 percent of families live below the poverty level compared to the statewide level of 6.7 percent. In addition to regular income, the City had 18.3 percent of its residents collecting Social Security Income, 10.2 percent with public assistance income, and 15.5 percent collecting retirement income.[5] See Table B-1 for a complete listing of Census data.[6]

[5] U.S. Census Bureau, Census 2000. Demographic Profile of Kenai Peninsula Borough, Alaska. http://labor.alaska.gov/research/census/profiles/ken.PDF

[6] The 2000 US Census is the most recent data available for Seldovia employment and income levels.

Table B-1. Seldovia Employment and Income

Employment Category	Number	Percent
Private wage and salary workers	77	59.7%
Government workers	22	17.1%
Self-employed	27	20.9%
Industry		
Agriculture, forestry, fishing and hunting	18	14.0%
Construction	15	11.6%
Manufacturing	8	6.2%
Retail trade	14	10.9%
Transportation and warehousing	13	10.1%
Finance, insurance, real estate, and rental and leasing	5	3.9%
Professional, scientific, management, administrative, and waste management services	7	5.4%
Educational, health, and social services	15	11.6%
Arts, entertainment, recreation, accommodation, food services	13	10.1%
Other services (except public admin)	10	7.8%
Public administration	11	8.5%
Employment Status		
Potential workforce	233	100.0%
Not in labor force	89	38.2%
In the labor force	144	61.8%
Employed	129	55.4%
Unemployed	15	6.4%
Income		
Median household income	$45,313	
Per capita income	$23,669	

Source: U.S. Bureau of the Census, Census 2000

In addition to wage earning jobs, many Seldovia residents practice a subsistence lifestyle. These subsistence activities include the harvest of salmon, halibut, big game animals and many plant species.

Commercial fishing also plays an important role in the local economy. According to the Alaska Department of Fish and Game, 46 residents held commercial fishing permits in 2009 and 28 residents held crew member licenses. For 2009, the most recent year for which complete harvest data is available, the Commercial Fisheries Entry Commission (CFEC) reports that the 46 permit holders had a total of 72 permits issued, 40 of which were actually fished. The total harvest for the year for all fisheries (including crab, halibut, herring, other

groundfish, sablefish, and salmon) was 2.3 million pounds, for estimated gross earnings of $2.5 million or about $62,000 per permit fished.[7]

[7] State of Alaska, Department of Fish and Game, Commercial Fisheries Entry Commission, Permit & Fishing Activity by Year and City, 2009,Seldovia. http://www.cfec.state.ak.us/gpbycen/2009/122240.htm

II. ANALYSIS OF HARBOR EXPANSION

The community of Seldovia has a history of utilizing marine resources. According to the August 2005 Seldovia Comprehensive Plan, Seldovia has relied upon commercial fishing and fish processing as its major economic drivers since the 1800s with the first commercial cannery opening in approximately 1911. However, since the 1980s the community has faced economic downturn due to the decline of the fish processing industry and closure of the local cannery. Population and commercial fishing participation continue to decrease. In 2000, there were 104 commercial fishing permits issued, 60 of which were fished compared to 72 permits issued and 40 fished in 2009.[8]

Despite the apparent decrease in the commercial fishing and fish processing industries, the community still depends upon its waterfront infrastructure. The existing marine infrastructure in Seldovia is shown in Figure B-4. The community now relies more upon water-related tourism in addition to commercial fishing. Since Seldovia is not accessible by road, water-related transportation is vital for both residents and visitors. Seldovia has many tourist attractions to cater to these visitors including bed and breakfast establishments, stores, restaurants, festivals, and other activities.

The marine facilities in Seldovia are significant assets to the community that can be used to increase the community's economic sustainability. Community members stated that harbor improvement and expansion is important to community growth and that improved harbor facilities would entice new harbor users to the community.

The Seldovia Harbor was authorized as a Federal project by the Rivers and Harbors Act in 1945 and the Rivers and Harbors Act in 1958. The first authorization provides for removal of obstructions in the entrance channel near Watch Point to a depth of 24 feet below mean lower low water (MLLW). The second authorization provides for a small boat basin 300 feet long by 700 feet wide to a depth of 12 feet below MLLW protected by two rock breakwaters 400 and 600 feet long. Construction began in 1962 and was completed in 1963. The 1964 earthquake damaged the breakwater and inner harbor, and the breakwater was rehabilitated in 1964 with the crest being raised by 4 feet. The Federal portion of the entrance channel is 423 feet long with a minimum width of 60 feet; the Federal basin has a depth of 12 feet below MLLW and covers 3.85 acres. In 1962, the City of Seldovia expanded the basin south of the Federal basin, creating a locally maintained portion of the new, larger harbor basin with a depth of 8 feet below MLLW. In 1983, the City and the State of Alaska deepened the local portion of the harbor to 12 feet below MLLW.

In 2003, the State of Alaska transferred ownership of the Seldovia Harbor to the City. The State, as they did with other communities that took over harbors, granted Seldovia deferred maintenance funds to help bring the harbor back to good condition. The State funded approximately $2.6 million to Seldovia. This funding was used for some maintenance work

[8] State of Alaska, Commercial Fisheries Entry Commission. Permit & Fishing Activity by Year, State, Census Area, or City. http://www.cfec.state.ak.us/fishery_statistics/earnings.htm

in the harbor, however the work was not completed and much is left that needs repair or replacement.

The primary purpose of the Seldovia Technical Report is to present an evaluation of the design priorities for harbor infrastructure replacement necessitated by the problems associated with the aging harbor. The City of Seldovia requested assistance from the Denali Commission to address these issues. The community also requested that harbor expansion be considered, and the Corps has included a brief harbor expansion design and cost estimate as part of the engineering effort (see Appendix A). On that note, this economics appendix provides a description of the major harbor users and other related marine infrastructure in Seldovia to present an initial analysis of the need for harbor expansion.

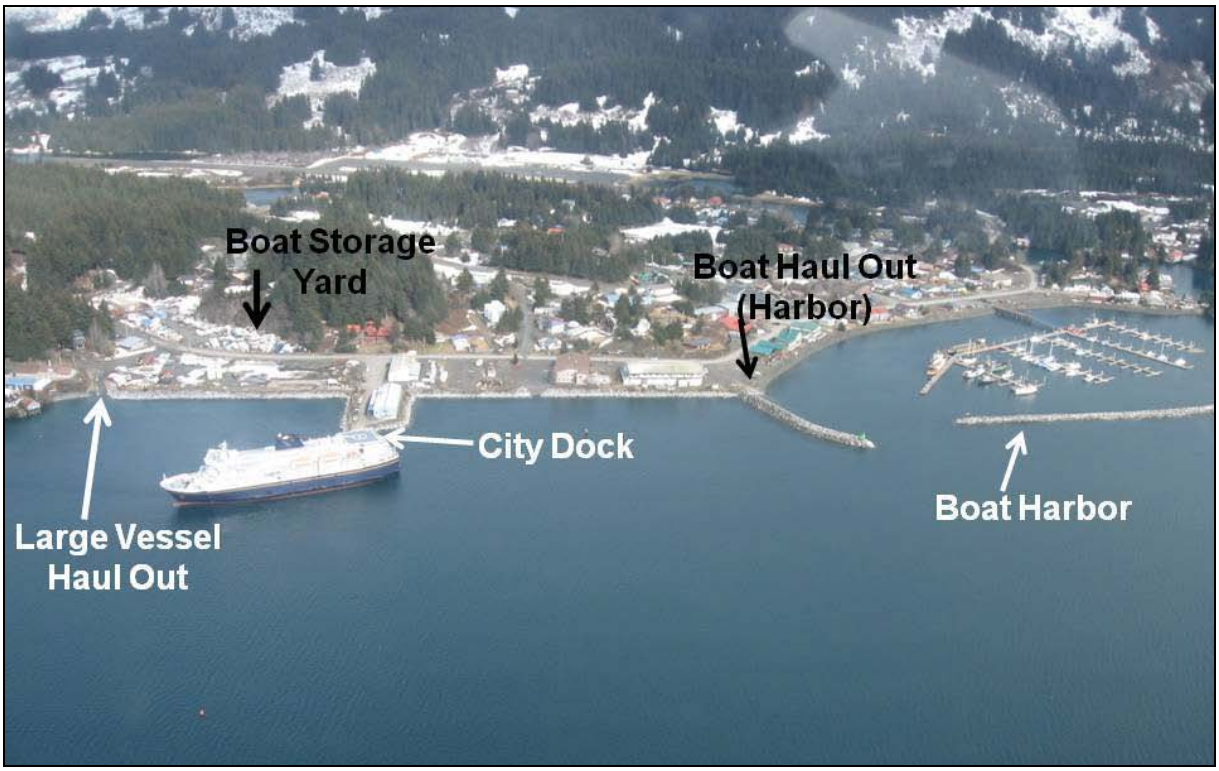

Figure B-4. Existing Marine Infrastructure in Seldovia

A. Current Harbor Use

The Seldovia Harbor has 144 slips for vessels in the 25- to 50-foot range and can accommodate several additional vessels over 100-feet along the main float. Harbor use varies depending on the season. During the winter, the typical fill is approximately one quarter of slips. This is based on the number of boats that were in the harbor during a site visit on April 29, 2010, which was described by the harbormaster as typical winter fill. During the summer busy season, almost all of the slips are full according to the harbormaster, with about 15 slips available for temporary moorage. The harbormaster reports that it is sometimes difficult to put vessels in the unfilled slips due to lack of electrical connection at these slip locations. The Seldovia Harbor does not maintain a waitlist. The busiest weekend of the summer season is

the Fourth of July when the community has a large celebration. Approximately 15 additional transient vessels come to Seldovia on that weekend.

A list of current slip usage provided by the harbormaster compared with the Commercial Fisheries Entry Commission (CFEC) permit and vessel database provide a fairly comprehensive assessment of current harbor use. According to the harbormaster's records, 122 of the 144 slips are occupied (at least seasonally). There are an additional 3 vessels which moor along the main float, for a total of 125 vessels using the Seldovia Harbor. Of these 125 vessels, 15 are currently registered to participate in commercial fishing, 5 are charter vessels, 2 are combination vessels or used for other purposes, and the remaining 103 vessels are recreation vessels.

The harbormaster reported that a few of the skiffs that permanently moor in the harbor are commercial setnetters. There are also at least two barges owned by local residents that frequent the harbor. These barges are used mainly to haul construction equipment and supplies for local projects.

The harbormaster provided anecdotal evidence regarding transient harbor use, as no formal records are maintained. In terms of commercial transient use, the harbormaster stated that there were four to five commercial drifters from the Cook Inlet area which occasionally use the harbor during the summer. In terms of transient recreational boaters, there are usually a few in the harbor during the summer season, with a maximum of 15 transient vessels using the harbor during the summer's busiest weekend.

Most of the boaters who use Seldovia Harbor are seasonal residents or summer-only boaters. This means that during the winter off-season, many local boats are hauled out of the water using one of the two local boat haul-out ramps and stored in the local boat storage yard, or on trailers at boaters' homes. Seldovia experiences large shifts in population based on the season. Local residents reported the summer population to be 250 to 300 people, only 160 to 180 of which live in Seldovia year-round. As such, many of these summer residents remove their boats from the water during the winter off-season. The mayor and harbormaster reported that some residents store their boats in storage yards in Homer rather than the facility in Seldovia. However, both the mayor and harbormaster stated that there were no local residents who moor their boats in other harbors. This likely means that there are no local residents who choose to moor elsewhere based on overcrowded conditions in the Seldovia Harbor or poor harbor conditions.

These factors regarding current harbor use indicate that there is insufficient demand to necessitate harbor expansion. However, a change in harbor conditions or improvement to existing marine infrastructure and support facilities could encourage boaters from other communities to stop in Seldovia and cause an increase in the number of vessels seeking moorage space.

B. Delays

Currently, conditions at the Seldovia Harbor create delays and reduce the desirability of the harbor for new users. Residents report that under certain tidal conditions, the water is too shallow for large boats to enter the harbor. As a result of the water depth, these boats will

occasionally have to wait outside the breakwater until tidal conditions change to allow entrance. Also due to these depth issues, some boats cannot enter the harbor fully loaded. Residents report that this includes not only large commercial fishing boats, but some larger recreational boats as well.

According to local residents, the problem tides are minus 2 ½ feet, occurring about 5 days each month. This means that on 60 days of the year, vessels are subject to delays and additional time may be spent idle waiting for tidal conditions to change, or the boat's schedule must be adjusted. However, local residents report that the issue of depth and associated delays are a problem that everyone knows about and has become a "work-around" issue. Residents reported that the entrance channel has had insufficient depth since it was constructed: this is not a new issue. For many this does not result in significant delay time because they can plan for conditions and adjust as necessary. The possibility of delays makes the harbor less attractive for potential future harbor users. Commercial fishermen and processors do not have time in their schedule to wait for changes in tidal conditions and likely choose to moor at harbors other than Seldovia given the potential for lost time.

There are also harbor depth issues inside the harbor basin. Residents report that shoaling of the harbor has reduced the navigable depths and the usability of some of the floats. From C float southward, the harbor is shallower than the Federal harbor depth of 12 feet below MLLW. The areas in the locally maintained portion of the basin around the D and E floats in particular are reported to be too shallow. Residents report that the shoaling problem is getting worse every year and that shoaling is slowly cutting off use of the back of the harbor. When boats are moored at the ends of the floats nearest the breakwater, deeper draft vessels cannot navigate around them because the channel is too shallow and narrow. Figure B-5 and Figure B-6 shows the E float at low tide; Figure B-7 shows the harbor at high tide. Moorage on the D and E floats is limited to shallower draft vessels. Vessels can become stuck on the exposed ground during low tides and residents report pulling two boats off the shoals in the past few years.

Figure B-5. Exposed ground visible off of the E float at low tide

Figure B-6. Exposed ground visible at the end of the E float at low tide

Figure B-7. Seldovia Harbor at high tide--E float is closest to foreground

There are also rocks off the end of the corner of the E float that vessels have to be careful to avoid. Even small recreational vessels with relatively shallow drafts have to be cautious of these rocks. There is a harbor entrance on the south end of the main breakwater that can only be used by shallow draft vessels during higher tides. During low tide, this entrance channel goes dry. The lack of adequate depth in the harbor is problematic as it restricts which vessels can use slips at the south end of the harbor.

C. Damage to Vessels

Vessels are subject to damage as a result of the conditions within the harbor. Inadequate depth and shoaling in the harbor create conditions which can cause damage to vessel hulls. Residents pulling vessels off the shoals can damage the hulls of both the boat being towed and the boat that is towing. Also, vessel hulls can suffer damage when coming into contact with the silt and rocks present in the harbor during low tide. Larger commercial vessels report waiting outside the harbor entrance during certain tidal conditions in order to avoid hitting a reef in the entrance channel. If an inexperienced captain were to unknowingly enter the harbor under the wrong tidal conditions, serious damage could be done to the vessel hull which would induce additional expense upon the vessel owner to repair. Improved harbor conditions through dredging would reduce the likelihood of potential vessel damage as a result of inadequate depth.

The degraded condition of the floats can also present a hazard to vessel owners. Local boaters reported that during strong wind and storm conditions, cleats holding vessel lines which hold boats in place in their slips have pulled out of the decking. Residents reported that in past instances, no vessel damage has resulted from cleats being pulled out of the float because residents are aware of the poor condition of the decking and make sure that their boats are strongly tied down and protected with bumpers during storm conditions. Cleats pulling out of

the float can cause damage to vessels as they come into contact with the wooden decking. This damage induces additional expense on vessel owners as they must pay to fix the damage caused by the lost cleat, and they lose the time associated with repairing the damage.

D. Commercial Fishing

Information from the Commercial Fisheries Entry Commission (CFEC) shows that there were 23 commercial fishing vessels owned and operated by Seldovia residents in 2008 (the most recent year for which this vessel information is available). Both the mayor of Seldovia and the harbormaster reported that there were no Seldovia residents who moor their boats in other harbors, meaning that all of these commercial vessels are moored in Seldovia. Information provided by the Seldovia harbormaster in April 2010 shows that there are 15 commercial fishing vessels with moorage at the Seldovia Harbor.

According to the 2008 CFEC data, four of the 23 commercial vessels in Seldovia were listed as tender/packers in addition to commercial fishing activities. The most popular gear type of the Seldovia commercial fleet is longline, followed by pot gear, mechanical jig, and purse seine, and each vessel has an average of two gear types on board. Of the 23 vessels, 14 (or 61 percent) are registered to fish in a salmon net area. Table B-2 provides a summary of vessel characteristics of commercial fishing vessels owned by Seldovia residents in 2008.

Table B-2. Seldovia Commercial Vessel Characteristics

	Average	Number	Percent
Year Built	1980	23	100%
Age (in 2010)	30 yrs		
Number of Gear Types per Vessel	2	23	100%
Horsepower	318.1 hp	22	95.7%
Length	37.5 ft	23	100%
Length by Hull Type			
Aluminum	23.4 ft	8	34.8%
Fiberglass/Plastic	36.1 ft	11	47.8%
Iron/Steel/Alloy	79 ft	3	13.0%
Wood	41 ft	1	4.3%
Type of Activity			
Freezer/Canner		0	0.0%
Tender/Packer		4	17.4%
Commercial Fishing		23	100.0%
Gear(s) Intended to be Used			
Gill Net - Drift		5	21.7%
Gill Net - Set		3	13.0%
Longline		12	52.2%
Mechanical Jig		5	21.7%
Pot Gear		7	30.4%
Seine - Purse Seine		6	26.1%
Seine - Beach Seine		3	13.0%
Troll - Dinglebar		2	8.7%
Troll - Power		1	4.3%
Other Gear Types		1	4.3%

Source: State of Alaska, Commercial Fisheries Entry Commission, Vessel Characteristics & Statistics by Year, State, Alaskan Census Area, or Community, Seldovia, 2008.

According to the harbormaster, there are three to four commercial fishing vessels which utilize the harbor year-round. The Seldovia Harbor remains ice free in the winter: residents report that usually the water does not even get slushy. This makes the harbor more attractive for the commercial fishermen who target winter species. Vessels using the harbor in winter face limited crowded conditions as most recreational boaters store their boat in dry storage during the off-season.

There are currently no fish processing facilities in Seldovia: all local commercial fishermen must offload their fish elsewhere. The harbormaster reports that most Seldovia commercial fishermen travel to Homer to offload their catch. The trip to Homer takes 60 to 70 minutes by boat. The Seldovia City Manager has preliminary plans in place to turn a vacant piece of city property into a multi-use industrial facility including a fish processing plant (the plans for this development will be discussed in more detail in a later section). The expense of a 120 to 140 minute round trip to Homer could be eliminated several times each fishing season with processing facilities in Seldovia. This assumes that the fishing grounds are located in a region which is closer to Seldovia than to Homer, and that such a relationship exists that fishermen

from Homer can periodically deliver their catch to the Seldovia facility. If such a facility were built, there could be increased demand for transient harbor space for vessels stopping in Seldovia to deliver their catch. However, based on existing commercial vessel usage of the harbor, current demand is accommodated and expansion is not needed.

E. Recreational and Subsistence Boating

In the Seldovia Harbor, recreational boats make up about 84 percent of the fleet, based on harbormaster records. Slips containing recreational boats are generally not filled year-round as recreational boating is highly seasonal and most recreational boats are removed from the water during the winter. Recreational boats also make up a large portion of the transient fleet which utilizes Seldovia Harbor. The largest transient use during the summer occurs during the Fourth of July weekend, which is a popular weekend in Seldovia because of the local celebration and other tourist attractions. As many as 15 transient vessels use the Seldovia Harbor on that weekend, while normally during the summer there may only be a few transients in the harbor each week.

Also, many Seldovia residents qualify for subsistence harvesting which means that many recreational boats double as subsistence vessels. Vessels that are used to harvest subsistence resources are potentially more valuable than those that are used purely for recreational purposes. Subsistence resources are used as a food source and can be valued at the market value of the food they are replacing.

The City of Seldovia reports that there has been growth in the popularity of non-motorized recreational boating. This includes kayaks, canoes, rowboats, and small sailboats. According to the City Manager, Seldovia holds a non-motorized fishing tournament each year, which is gaining popularity. However, there is limited space in the harbor for these boats to maneuver and tie off.

Residents of Seldovia stated that part of the driving force behind the need for harbor expansion is recreational boating, including the growing popularity of non-motorized boating. The City Manager described a plan in which harbor expansion would include a new pier near the existing E float which would accommodate the tie off of small non-motorized vessels such as canoes and kayaks. However, the current design for harbor expansion includes moving both breakwaters out (west) and expanding the A, B, and C floats for vessel use, but does not include the creation of a kayak/canoe pier. Current motorized recreational vessel use in the Seldovia Harbor does not suggest an excess in the demand for harbor space which would necessitate harbor expansion. The community hopes to bolster their tourist and recreational boating industry in the future. If there was an increase in recreational boat traffic, additional harbor space could be needed.

F. Charter and Tour Boats

Recreational boating and tourism, including charter and tour boats, are important components of the Seldovia economy and represent major users of existing marine infrastructure. According to the harbormaster's records, there are five charter boats which moor in the Seldovia Harbor, about 4 percent of the fleet. Charters which begin in Seldovia are

potentially 60 to 70 minutes closer to fishing grounds than Homer. This is a benefit to both passengers on charter vessels and the vessel operators in terms of reduced travel time and associated operating costs.

Tour boats which regularly stop in Seldovia include the Discovery, operated by Alaska Coastal Marine, and the Rainbow Connection operated by Rainbow Tours. These tour boats are based out of Homer and offer day cruises with sightseeing stops in Seldovia. When the tour boats dock in Seldovia, they usually park along the main run close to the walkway ramp. However, occasional low water levels prevent the boats from pulling all the way up the main run and passengers must offload at the end of the float, near the harbor entrance. Figure B-8 shows the Rainbow Tours boat parked along the main run.

Figure B-8. The Rainbow Tours boat "Rainbow Connection" drops off a group of passengers in Seldovia. The vessel is parked along the end of the main run, near the harbor entrance.

Charter and tour boats are important to Seldovia because they bring visitors and revenue to the community through use of other services such as restaurants, gift shops, and lodging. Also, when a tour boat lands in Seldovia, the boat is charged a $13.20 per day tour boat landing fee as well as a $1 per passenger disembarkation fee.

If the harbor expansion alternative described in the design appendix was pursued, current charter and tour boats could benefit from additional moorage available along the main run. Similarly, harbor improvements would improve conditions for tour boats with improved conditions for tying off along the main float. However, current operations of charter and tour

boats in the Seldovia Harbor do not suggest that additional space is needed to accommodate existing charter operations.

G. Float Planes

There is a sea plane float and tie off located at the end of the E float (Figure B-9). According to the Seldovia harbormaster, there are about five float planes that frequent the dock. Residents report that during the summer, there is usually at least one plane tied off to the dock every day of the week. Planes are charged for every night that they are tied off to the dock. The fee is $20.90 per night including taxes, so the dock provides some revenue for the community.

Figure B-9. Float Plane Dock

The float plane dock is in poor condition with rotting decking and slippery deck surface. Also, planes in the harbor create a safety concern as it is difficult to accommodate both planes and boats within a relatively small harbor basin. Boat and plane traffic do not have enough maneuvering room when both are in the harbor. The location of the plane dock is near where the harbor is shallower and shoaling is a problem. This means that, based on depth, there is limited maneuvering room for vessels at this location. Float planes tied off to the dock further restrict the area that vessels have to travel within the harbor. However, the harbor basin is the only place where a float plane dock could be located. Locations outside of the breakwater do not offer the wave protection necessary to keep the planes safe while they are tied off.

It is unknown at this time if there will be an increase in float plane traffic or demand for additional tie off space in the harbor. Additional space in the harbor could be used to adequately accommodate sea plane traffic and reduce the potential safety risk created as a result of mixing plane and boat traffic. If additional boats started using the harbor, the safety

and maneuverability issues already present in the harbor between planes and boats would be compounded. However, current harbor use and configuration suggests that additional space to accommodate plane traffic is not essential at this time.

H. Boat Haul-Out Ramps

There is a concrete boat launch ramp located at the north end of the harbor, shown in Figure B-10. The boat launch is available for regular trailered boat launching and recovery. This ramp appears to be in satisfactory condition. The major use for this boat ramp is to launch and retrieve smaller vessels whose owners have trailers available for this purpose. The city charges $5.50 per ramp use with prior notice to the city, $27.50 for a season pass (May through September or October through April), or $10.00 per ramp use without prior notification to the city or harbormaster. A boater with annual moorage in Seldovia receives two free ramp uses per year.

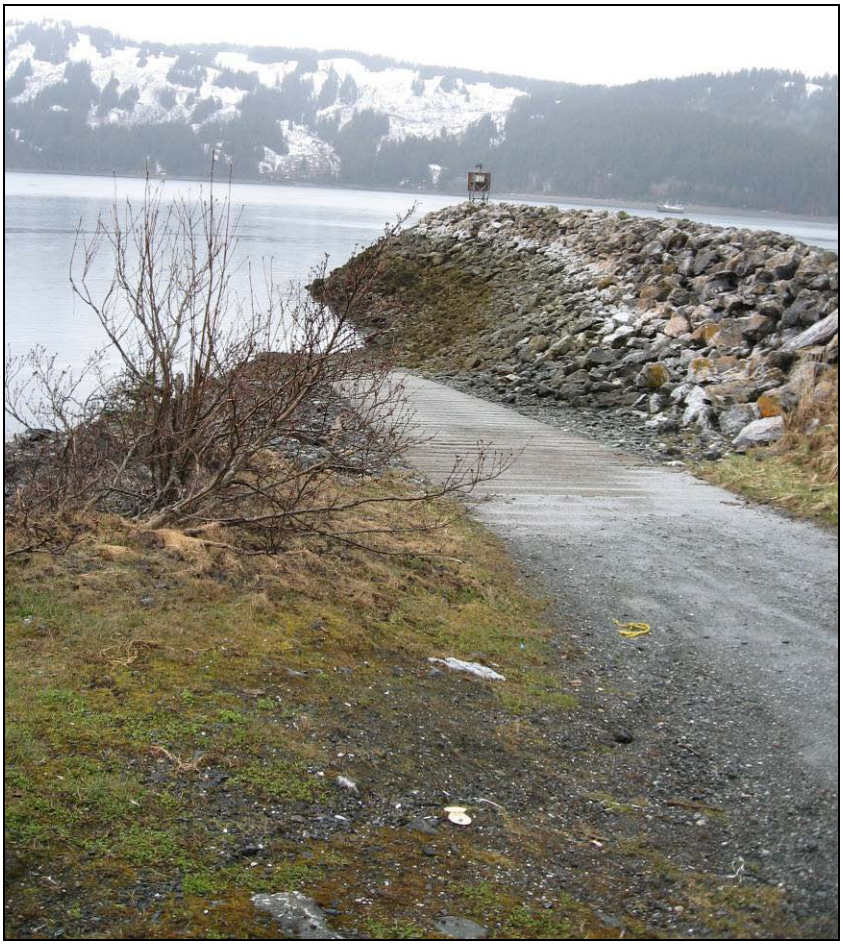

Figure B-10. Harbor Boat Launch Ramp

There is another boat launch in Seldovia used for larger vessels. This ramp is located north of the harbor and City Dock. The larger boat ramp is shown in Figure B-11 and the relative location of both ramps is shown in Figure B-4. For this larger ramp, the city operates a tractor

and trailer to haul the vessels out of the water. The ramp is located near the local boat storage yard. This location is beneficial for local boaters as many remove their vessels from the water during the off-season and store their boats in the storage yard. The City of Seldovia charges $150 for each haul out or launch. The city also charges $0.70 per month, per foot of vessel length for dry storage for a vessel with a paid annual moorage agreement. For a vessel without an annual moorage agreement, this rate is $1.40 per month, per foot of vessel length. There are other fees imposed by the city for use of the ramp and boat storage yard. However, the fees associated with boat storage and the larger haul out/launch go into a separate Boat Haul-Out Fund, which is separate from the Small Boat Harbor Fund and the General Fund and is not associated with the harbor.

Both of these vessel launch ramps are important to marine traffic in Seldovia as many boaters remove their boats from the water during the off-season. The Seldovia mayor and harbormaster both reported that there are only a few vessel owners who store their vessels outside of Seldovia. This means that the majority of vessel owners utilize one of the community's launch ramps at least twice during the year to launch their boat at the beginning of the season, retrieve it at the end of the season, and then store their vessel in the boat storage yard or other location in the community during the off-season.

Figure B-11. Large Vessel Haul-Out Ramp Located North of City Dock.

I. Tourism

Tourism has become an increasingly important industry in Seldovia. In the past the community relied upon its marine resources to take advantage of fishing and fish processing. While commercial fishing is still an important resource for Seldovia, the focus of marine use has shifted more to recreational boating and tourism.

There are many businesses and attractions in place in Seldovia to cater to the visitor industry. The businesses include lodges, hotels, bed and breakfasts, charter fishing outfits, gift shops, art galleries, markets, a visitor center and museum, bicycle and 4-wheeler rentals, kayak rentals, and restaurants and cafes. Seldovia also has beaches, campsites, parks, hiking trails, and local fishing and hunting opportunities. In addition, the community hosts events such as a summer chainsaw carving contest and Fourth of July parade and festival which are popular visitor attractions.

Tourism in Seldovia is heavily dependent on the season, with most tourism occurring during the summer. Some restaurants, shops, and tourist-related businesses are closed or reduce their hours of operation during the winter months. The Seldovia Fourth of July celebration is the most popular event of the summer and usually draws 300 to 400 people for the weekend including 15 transient vessels. Other visitors travel to Seldovia aboard the Alaska Marine Highway System (AMHS) ferry, the Seldovia Bay Ferry, and local water taxi service from Homer.

The AMHS ferries are important to residents and visitors in Seldovia. Hunting and fishing are popular activities. Many visitors will drive their RVs or four-wheelers onto the ferry in Homer and drive them off in Seldovia to take advantage of the recreational opportunities. These ferries are important to residents as well as it is the most convenient way to transport a vehicle to Seldovia and represents the only vehicular connection to the state highway system in Homer. Connection to Homer allows relatively easy access for tourist traffic and residents in order to stock up on supplies necessary for business and home.

Local residents recognize that a strong tourist industry is important to the growth and sustainability of the community. The Seldovia City Manager stated that there are currently enough tourist facilities to accommodate the current level of tourist visitation. But if there was an increase in visitors to the community, existing facilities, including stores, restaurants, and lodging, would be inadequate. Similarly, if there was a large increase in tourist activity, the current harbor configuration may be inadequate. Tourists travel to Seldovia in private vessels, water taxis, the private ferry, tour boats, or the state AMHS ferry. All of these transportation methods except the AMHS ferries utilize the Seldovia Harbor for docking or moorage. If there was an increase in tourist traffic, the vessels that utilize the harbor could benefit from harbor improvements or expansion to reduce navigation hazards, increase safety and maneuverability, and increase docking space along the main run. However, the necessity of harbor expansion is based upon an increase in tourist traffic in the future.

J. Harbor Finances

A key component in determining the practicality of harbor expansion is an examination of harbor finances to illustrate the community's responsibility and ability as harbor owners to financially sustain harbor improvements. That is, does the existing harbor management structure and fee schedule indicate that future improvements could be accommodated under existing operations with increased fees? In the Seldovia city budget, each marine entity (harbor, boat haul out and storage, and City Dock) has its own fund. This means that harbor revenues are kept in a fund separate from the general fund (or haul out and storage fund, or City Dock fund) and used only for harbor expenditures. The City of Seldovia also receives

funds from the State of Alaska for harbor operations including Raw Fish Tax revenue and other state tax revenues. These state tax revenues combined with harbor fee collection make up the harbor's operating revenues. Fees collected at the harbor which contribute to the harbor's revenue stream include stall rental/moorage fees, electrical fees, harbor boat ramp use, and miscellaneous rental fees including use of the fish cleaning table and water pumping and shoveling. The harbormaster stated that fees for trash disposal and fresh water are built into moorage rates and not charged separately. Other fees which make up harbor revenues include $13.20 per day tour boat landing fee, and a $1 per person passenger disembarkation fee charged for all persons ages 12 and over arriving aboard a tour boat.

According to city records, in fiscal year 2009 (FY '09), state tax revenue comprised about five percent of total harbor revenues. The other 95 percent of total harbor income was generated locally. The Seldovia City Manager reports that he has been putting away money from all of the city's funds into a "rainy day" fund. As of April 2010, he reported that he had about $33,000 saved. In the event of severe harbor budget shortfall, this additional emergency funding is available. Use of that fund for the harbor would assume that there is no other more pressing need for the money, as it was taken from all city funds, it would be available for any city expenditure and not limited to harbor operations. Table B-3 shows a summary of the Seldovia Harbor fund revenues and expenses from FY 06 through FY 09. In the past four fiscal years, the harbor fund has ranged from a $24,000 deficit to a $19,000 budget surplus. In that time, the amount spent on harbor repairs and maintenance has remained relatively constant, with only one instance of a major repair in FY 07. Harbor repairs and maintenance are a small portion of total harbor expenses.

Table B-3. City of Seldovia Harbor Fund Revenues and Expenses, 2005-2009

	Jul '05-Jun '06	Jul '06-Jun'07	Jul '07-Jun '08	Jul '08-Jun '09
Income				
Operating Transfer In	$ 4,000.00	$ -	$ -	$ -
State Revenue	-	11,300.00	-	8,578.97
Boat Harbor Revenue	114,228.20	134,136.32	149,864.70	148,064.63
Boat Ramp Fees	50.00	35.00	50.00	82.50
Local Revenue	8,198.41	1,100.00	600.00	15.00
Total Income	126,476.61	146,571.32	150,514.70	156,741.10
Expenses				
Repairs/Maintenance	2,179.71	1,259.99	2,186.93	1,302.80
Major Maintenance/Repairs	-	10,700.00	-	-
All Other Expenses	148,488.58	116,724.36	128,678.76	153,422.75
Total Expense	150,668.29	128,684.35	130,865.69	154,725.55
Net Income	**-$ 24,191.68**	**$ 17,886.97**	**$ 19,649.01**	**$ 2,015.55**

Source: City of Seldovia

Note: The expense category "All Other Expenses" includes Wages and Salaries, Social Security, Medicare, ESC, Worker's Compensation, Health Insurance, Pension Expense, Audit Fees, Contract Services/Leases, Dues and Reference Materials, Equipment Purchases, Vehicle Expense, Liability Insurance, Operating Supplies, Small Tools, Postage Expense, Misc. Expense, Office Supplies, Telephone/Fax, Union Negotiations, Utilities, Advertising, Outside Labor Services, Freight Expense, and Garbage Pick-Up.

The annual moorage fees at the Seldovia Harbor are significantly less than those charged at Homer, the next nearest harbor. As of January 2010, the Homer Small Boat Harbor charges an annual moorage fee of $34.19 per foot for overall length of vessel or length of stall assigned, whichever is greater, plus a $50 administrative fee per vessel.[9] The Seldovia Harbor charges $17.95 per foot of vessel or stall length (whichever is greater) for prepaid annual moorage, or $1.85 per foot for monthly installments, which equates to $22.20 per foot for the entire year.[10] This means that the Homer Harbor charges between $12 and $16 more per foot than the Seldovia Harbor (not taking into account the $50 administrative fee imposed in Homer). Transient moorage rates at the two harbors are more similar. Table B-4 provides a comparison of the moorage rates charged at the Seldovia and Homer Harbors.

Table B-4. Seldovia and Homer Harbor Fees

	Seldovia Harbor		Homer Harbor		
Annual Moorage					
Prepaid annually	$ 17.95		$ 34.19		Per Foot (a)
Paid in monthly installments	$ 22.20	(b)			Per Foot
Transient Moorage					
Daily	$ 0.94	(c)	$ 1.03	(d)	Per Foot
Monthly	$ 5.25	(e)	$ 5.81	(f)	Per Foot
Semi-Annually	$ 13.86		$ 22.91		Per Foot
Annually			$ 34.19		Per Foot
Administrative Fee			$ 50.00		Per Vessel (g)
Stall Wait List Fee	None	(h)	$ 30.00		Per Year, Per Listing

Source: City of Seldovia, Harbor Fee Schedule. City of Homer, 2010 Port/Harbor Fee Schedule
(a) All moorage rates are charged per foot of vessel length or per foot of assigned stall length, whichever is greater.
(b) If moorage paid is paid in monthly installments, it is understood by the boat owner that the term of the agreement is for 12 months, otherwise transient rates will apply.
(c) A discount of $0.22 per foot is given for moorage paid in advance on the daily rate.
(d) Vessels that properly register and pay all moorage fees in advance may deduct $5.00 per day from the daily rate.
(e) A discount of $0.88 per foot is given for moorage paid in advance on the monthly rate.
(f) Vessels that properly register and pay all moorage fees in advance may deduct $0.50 per foot per month.
(g) The $50 per vessel administrative fee is charged at the Homer Harbor for all vessels with reserved annual moorage and all vessels paying for annual transient moorage.
(h) The Seldovia Harbor does not maintain a stall waitlist.

The Seldovia and Homer Harbors are in close proximity to one another, yet charge noticeably different rates for moorage. As of July 2008, the wait list at the Homer Small Boat Harbor was 189 vessels.[11] This means that in the Kachemak Bay area, there exists demand for

[9] City of Homer, Port/Harbor. Port/Harbor Fees—Effective 1/1/10. http://www.ci.homer.ak.us/forms/Port_Forms/Fees2010.pdf

[10] City of Seldovia, Seldovia Harbor, Dock, and Boat Haul Out Facilities. Harbor Fee Schedule. http://www.cityofseldovia.com/files/Harbor%20Fees.pdf

[11] Homer Small Boat Harbor Navigation Improvements, Economics Appendix B. 24 December 2008.

moorage at the moorage rates charged in Homer. However, it cannot be assumed that the Seldovia and Homer Harbors are perfect substitutes and that all boaters in the region are just as likely to use Homer or Seldovia. The Homer Harbor offers 893 reserved stalls, 6,000 feet of transient mooring, a 5-lane boat launch ramp, two fuel floats, and a commercial fish dock.[12] These facilities are more expansive than those offered at the Seldovia Harbor and therefore likely require higher fees to maintain. Also, part of the appeal of the Homer Harbor to boaters is derived from its access to the state highway system. Since the Homer Harbor has a substantial waitlist and the Seldovia Harbor has slips available, it can be assumed that most boaters currently do not view Seldovia as an acceptable alternate moorage location.

However, raising moorage fees for additional funding to finance or support harbor improvements in Seldovia should be examined. Fees should not be increased to the rates charged by Homer Harbor for annual moorage as this might discourage existing users but there does seem to be a point above what Seldovia is currently charging and the rates charged at Homer that consumers would be willing to pay that would allow the harbor to conduct its own repairs and maintenance on a more regular basis.

K. Seldovia Bay Ferry

On May 26, 2010 the Seldovia Native Association and Seldovia Village Tribe began operating a private fast ferry, known as the Seldovia Bay Ferry. This ferry provides passenger and light freight service between Homer and Seldovia three times per day during the tourist season, from May 26 through September 7. The ferry vessel is the M/V Kachemak Voyager, a Teknicraft Catamaran built by All American Marine. The vessel is 83-feet long with a 29-foot beam, and 3-foot, 5-inch draft. The vessel can cruise at a maximum of 29 knots (fully loaded) and can hold 150 passengers and 4 crew members.[13] The original fast ferry proposal was for a car, passenger, and freight ferry to offer service to communities throughout Kachemak Bay including Halibut Cove, Jackolof Bay, Port Graham, and Nanwalek. However, a feasibility study in the early phases of the project revealed that this type of ferry was not financially viable and the project was changed to a passenger and freight ferry operating between Homer and Seldovia. Currently, the ferry is for passengers and their luggage only and limited freight service will begin after the dedicated docking facilities in both Homer and Seldovia are completed.[14] The trip between Homer and Seldovia is scheduled to take 45 minutes on the Kachemak Voyager. The ferry trip costs $35 one-way, and $59 round-trip for an adult passenger, with an additional $5 one-way for baggage.

The vessel is home-ported in Seldovia and spends the night in the community, and also has a docking location in Homer. In Seldovia, the vessel currently lands and unloads at the harbor. The Seldovia Village Tribe plans to build its own permanent dock between the City Dock and the harbor. The Seldovia Bay Ferry received permit approval in April to begin building the

[12] City of Homer, Port & Harbor Facilities. http://port.ci.homer.ak.us/map.htm

[13] All American Marine, Kachemak Voyager specifications. http://www.allamericanmarine.com/cats/P126_KachemakVoyager.html#

[14] Seldovia Bay Ferry website, FAQs. http://www.seldoviabayferry.com/FAQs.html

dock. The Seldovia City Manager reports that the Seldovia Bay Ferry will moor in the harbor until the dock is completed. Even then, the City Manager reports that wave conditions are too rough for the vessel to be at the dock during the night, so the vessel will likely continue to use harbor space for its overnight moorage.

The Seldovia Bay Ferry provides a reliable alternate means of transportation to air travel or the AMHS ferry. Local air service also provides transport between Homer and Seldovia several times per day at a rate of $48 one-way or $96 round-trip. This means that choosing the Seldovia Bay Ferry over air travel represents a savings of $37 per round-trip. However, flight service is available year-round, compared to the summer-only availability of the local ferry, and a flight takes about ten minutes compared to the 45-minute ferry trip. A trip from Homer to Seldovia aboard the AMHS ferry costs $33 one-way, or $66 round trip. These fares are similar to those charged aboard the Seldovia Bay Ferry, but AMHS ferry service is only available one to three times per week. The AMHS ferries which serve Seldovia are available almost year-round and have the capacity to carry cargo and vehicles, which is not available on the Seldovia Bay Ferry.

In an article in Homer News, Seldovia City Manager Tim Dillon reported that the Seldovia Bay Ferry was a boost for the local economy, as Seldovia benefits anytime additional visitors travel to the community. The Seldovia Bay Ferry provides a convenient means of transportation to Seldovia and serves as a link for tourist and resident traffic during the summer months. This link between Homer and Seldovia could encourage non-resident boaters to use the Seldovia Harbor. Since moorage is available in Seldovia, the additional transportation opportunity could entice boaters to use the harbor. However this effect would likely be minimal as this additional mode of transportation is only available during the summer and similar means of transportation to Seldovia already exist.

L. Seldovia City Dock

The Seldovia City Dock is located north of the harbor. The City Dock is used for AMHS ferry landing, loading, and off-loading, fuel barge landing and offloading, freight offloading, and boat fueling. The Seldovia City Dock with the AMHS ferry M/V Kennicott is shown in Figure B-12. The only marine fuel pump in the community is located at the City Dock, so all vessels must use this location to fuel. Currently there is not sufficient space in the harbor to accommodate a fuel facility.

Figure B-12. AMHS Ferry M/V Kennicott at the Seldovia City Dock

The AMHS ferry M/V Tustumena also serves Seldovia. The ferries are scheduled to stop in Seldovia one to three times per week, year-round, except for approximately one month in winter when the vessels are being overhauled. Residents of Seldovia reported that a ferry stopped in Seldovia only twice during February and March 2010 as a result of vessel overhaul. The ferry serves as means of cargo transportation for residents, and an important tourist link as tourists can drive their ATVs or other recreational vehicles onto the ferry to use in Seldovia.

Also located on the City Dock are two cranes for cargo offloading. These cranes can be used for a yearly fee of $100, or $10 per half hour on a single-use basis. There are no cranes in the harbor, so all freight offloading is done at the City Dock. There is no room to put a crane in the harbor. There are at least two barges owned by local residents that moor in the harbor but most offload freight at the City Dock. This represents an inconvenience and delay for vessels which moor in the harbor and offload freight, as the vessel must use the City Dock which could be occupied by the ferry or another vessel needing fuel, instead of offloading within the harbor. The expanded harbor layout presented in the design appendix (Appendix A) moves both breakwaters to the west to create a larger harbor basin which could accommodate up to 230 vessels. This expansion would include a new float located off the north main float and float extensions added to the A, B, and C floats. If the city chose to put a cargo crane and/or a fuel float in this new harbor layout for a cargo crane and/or a fuel float, harbor users would benefit in terms of increased efficiency and reduced congestion at the City Dock.

M. Expansion Potential

1. Multi-Use Industrial Facility

The City of Seldovia owns a 2.5 acre piece of property located directly adjacent (north) to the city offices near the City Dock. This property is shown in Figure B-13 and Figure B-14. The

community would like to turn this old cannery property into a multi-use industrial facility. The Seldovia City Manager reports that he is working with the Economic Development Center at the University of Alaska Anchorage (UAA), and with the Kenai Peninsula Economic Development District (KPEDD) to determine the feasibility of the facility and the best use of the land. The City Manager reports that for a multi-use industrial facility, the City of Seldovia would construct a building and private businesses would lease space inside. The community would like the facility to include fish processing and marine repair.

Figure B-13. Location of City Property for Future Multi-Use Industrial Facility

Figure B-14. City Property for Use as Future Industrial Facility

In terms of fish processing, the City Manager reports that he is interested in soliciting Indian Valley Meats for development of a value-added fish processing facility. A fish processing facility in Seldovia could benefit local boaters if they could offload their fish locally instead of traveling to Homer. Having a value-added processing plant would also provide new employment opportunities and allow local fishermen to capture larger portions of the profits from fish harvest. Depending on the location of the fishing grounds and the type of fish harvested, fishermen would save as much as two hours of travel time round trip to Homer. Similarly, a fish processing facility in Seldovia could attract other fishermen to the community who would normally deliver their catch to Homer. If such a processing facility was built, and if boaters chose and were able to offload at the facility, there could be additional demand for harbor space on a transient basis for these fishing vessels.

In a report for the Denali Commission on the nearby community of Port Graham, it was discovered that potential cannery operators were reluctant to begin operations due to lack of fishing resources in the area and the expense of operating a processing facility in a remote location. A cannery facility with equipment already exists in Port Graham. While Seldovia does have more consistent transportation than Port Graham, the community's remote location and the local salmon run may present the same difficulty in finding a company willing to operate a processing facility.

The other component of the industrial facility that the community could develop is a marine repair facility. Similar to the benefits derived from a fish processing facility, a marine repair facility would serve to supplement existing marine repair yards in Homer and could attract new boaters to Seldovia who were looking to reduce travel time to Homer for repairs during the fishing season. An additional benefit of a marine repair yard in Seldovia is the potential to avoid delay time spent waiting for repairs in Homer. Anecdotal evidence suggests that wait times can be lengthy in Homer with some vessels waiting 8 to 12 months. If the vessel damage necessitating repair was severe enough to prevent the vessel from operating, the boat

would miss an entire fishing season and the associated earnings. Or if a vessel can still be operated while waiting for repair, there is a chance that the damage could be made worse while operating in a damaged condition, thereby increasing the cost of the eventual repair work. In either scenario, fishermen face decreased earnings through lost time or increased repair costs. Residents report that in order to have a marine repair facility in Seldovia, a vessel lift would be needed for haul-out, servicing, and maintenance. At this point this project is in the early phases of determining the best use for the land and no marine repair or processing businesses have committed to operating in Seldovia.

2. Other

The community of Seldovia envisions additional ways in which improved harbor facilities will benefit the community. Seldovia has a strong historical tie to waterfront utilization and recognizes the importance of maintaining the harbor for community well-being. The harbor needs to be improved to meet the demands of boaters in the region. The harbor must accommodate recreational and tourist boats and commercial fishing vessels, all of which are important to the Seldovia economy. However, residents recognize that repairing the existing infrastructure takes priority over expansion.

Residents envision the community becoming a homeport for a Cook Inlet escort vessel or a National Oceanic and Atmospheric Administration (NOAA) research vessel. The community also suggests getting a sea tow so the community could retrieve broken down vessels from Kachemak Bay and bring them back to Seldovia for repair. This scenario would be more viable if a marine repair facility existed in the community.

Also, the community is taking steps to enroll in the National Marine Fisheries Service Community Quota Entity (CQE) program that allows communities to purchase Individual Fishing Quotas (IFQs) which are then leased to fishers from the community. The lease income goes back into the community to pay for program administration and IFQ purchases, and the fishing income (minus the lease portion) is retained by the fishers. The Seldovia City Manager estimates that this program should become available in Seldovia in 2011. Should this program be enacted, fishing participation and harvest for Seldovia residents is expected to increase.

III. SUMMARY

Current use of the Seldovia Harbor suggests that harbor expansion is not needed at this time. During the busy summer season, there are approximately 15 available slips and maximum transient traffic of 15 vessels. Seldovia does not maintain a waitlist or a record of transient vessel use. Some of these available slips lack an electrical connection and have poor decking conditions, suggesting that mechanical upgrades to the harbor are needed, but that adequate space exists to accommodate users. Similarly, some vessels face operational delays and the potential for vessel damage due to harbor and entrance channel depth issues and aging float infrastructure. These conditions further suggest that harbor infrastructure improvements are needed.

Recreational boats make up about 84 percent of the Seldovia fleet, with the rest of the fleet comprised of charter and commercial fishing vessels. Other harbor users include tour boats from Homer and the Seldovia Bay Ferry, which use space along the main run on a transient basis. Float planes tie off to a dock at the end of E float. This float is in poor condition and limits maneuverability in the harbor as shoaling occurs in that location and harbor depth is reduced. All of these harbor users could benefit from improved harbor infrastructure and increased depth in the harbor and entrance channel. However, current harbor space seems adequate to accommodate these users.

The community envisions many ways in which additional boaters will be attracted to Seldovia in the future. This includes using a piece of city property as a multi-use industrial facility to include fish-processing and marine repair. The community also hopes to use existing tourist attractions and facilities to attract more visitors and recreational boaters to the community.

The need for harbor expansion relies upon increased demand in the future. The current status of the harbor does not suggest that the demand for harbor space in Seldovia outweighs supply. The necessity of harbor expansion relies upon facility improvements, upgrades, and new facilities which will draw new boaters to the community in the future and not current overcrowding and demand for additional space.

Harbor Improvements
Cost Estimates Appendix C
Seldovia, Alaska

Prepared for:

Denali Commission

February 2011

Prepared by:

U.S. Army Corps of Engineers

Alaska District

Seldovia Harbor Improvements Feasibility Report

Title Page

This cost estimate is for the proposed harbor improvements for the Seldovia Harbor Improvement Project. The SOW is broken down into six (6) priorities.

This FSB CWE is available at: Y:\P\CW\W\Seldovia\Seldovia Harb Imp AKV292\1 Recon\0 Project

Estimated by	Christine Morgan
Designed by	Alaska District
Prepared by	Christine Morgan
Preparation Date	9/9/2010
Effective Date of Pricing	9/9/2010
Estimated Construction Time	180 Days

Date	Author	Note

10/13/2010 cam

Problem Description: The docks in the Seldovia boat harbor are almost fifty years old. The docks, originally constructed in 1962, are experiencing rot in pilings, decking, and the structural components. The water system, all but abandoned, has been temporarily replaced by a fire hose connected to several spigots. The electrical system has been partially upgraded but is not providing sufficient illumination and power for commercial users. The docks have been maintained and periodically modified and upgraded since their original installation, but complete replacement has not occurred in the almost fifty year life span. Seldovia continues to operate and maintain the harbor facility to the best of their ability through patches and quick fixes. There will be an increase in safety hazards as the deterioration continues.

Since harbor construction, residents have noted that depth is insufficient outside of the federal basin and in the entrance channel. Harbor shoaling continues to reduce harbor depth south of the C float. Insufficient harbor depth creates delays and hazardous conditions for users and reduces the functionality of the harbor. In the future, shoaling is expected to continue thereby reducing harbor depth and navigable space within the basin.

Proposed Solution: Recommend replacement of the dock facilities including electrical and plumbing upgrades. A phased approached is recommended to address the most worn areas first and then progress with replacement of all the docks as funding becomes available. Recent upgrades to the electrical system will allow for salvage and re-use of many electrical junction boxes and pedestals. In addition, several new steel pilings recently installed could also be incorporated into the replacement plans. Also recommended is dredging on the main fairways and the berthing area to the south of C Dock to, 12 feet mean lower low water (MLLW), the uniform depth of the existing harbor. A phased approach to dredging is also recommended.

The plan to replace the docks would be best accomplished through a phased approach. Replacement of individual sections of the harbor has been evaluated, and a detailed cost estimate was prepared for each. The replacement of each float system was given a priority ranking to address the worst sections of the float system. Improvements were ranked based on the condition of harbor infrastructure and preferential construction sequencing as determined by Corps engineers based on site visit data and previous reports. Replacement of each float section would also include replacement of the associated electrical and mechanical components.

DOCUMENTS: The documents used for this detailed cost estimate are the Harbor Improvements Evaluation, Seldovia, Alaska, Hydraulic Appendix (June 2010), the Electrical Scope of Work-Seldovia Harbor Improvement Project (July 12, 2010) and the survey drawing (May 17-20, 2006).

LIBRARIES USED: The MII English Cost Book 2008, Labor LabAK1: Davis Bacon South 63rd 06/18/2010, and the MII Equipment Region 9r 2010 have been used in this estimate. Fuel prices have been set to $3.65 for on-road diesel and $3.50 for marine fuel.

ASSUMPTIONS: Electrical - Based on the scope of work, use a two man electrical crew for the majority of the work. The only work assumed to be done by a subcontractor is a boat with a captain to be used as a work platform and/or a portable tool “van” and a boat crane (with a three man crew) for installation of the light poles on the floats. Quotes were obtained for the Marina Admiral SS Power Pedestals and the insulated ground wire. Labor to access the underside of the floats for demo/installation of the ground wire has not been included in this estimate as it is assumed that the work would be done concurrently with replacement of the existing docks.

Quantity take-offs were taken directly out of the Hydraulic Appendix and verified with the survey drawings dated May 17-26, 2006.

Floats - Costs for the floats were based upon bid received for a similar project in Cordova. Averages of the square footage were used for the main-walk and finger floats. Piles and sockets were based upon these same bids. All demolished material would be trucked to the Rocky Ridge Landfill for disposal. The landfill is approximately 2 ½ miles from town.

Dredging - Dredging is not included in this cost estimate. A seperate estimate was created to include all of the harbor that is not in the federally maintained basin.

Currency in US dollars

Date	Author	Note

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	MiscOwner	ProjectCost
Owner Cost Summary Report			**6,426,453**	**109,892**	**1,590,104**	**636,042**	**0**	**8,762,491**
			6,426,452.59					*8,762,490.58*
12 Harbor Improvements	**1.0**	**EA**	**6,426,453**	**109,892**	**1,590,104**	**636,042**	**0**	**8,762,491**
			1,630,080.35					*2,220,817.36*
1202 Harbor Float Improvements - Improvement 1	**1.0**	**EA**	**1,630,080**	**27,874**	**402,045**	**160,818**	**0**	**2,220,817**
			796,933.65					*1,088,597.48*
1202 Harbor Float Improvements - Improvement 2	**1.0**	**EA**	**796,934**	**13,628**	**198,597**	**79,439**	**0**	**1,088,597**
			1,015,574.46					*1,381,416.47*
1202 Harbor Float Improvements - Improvement 3	**1.0**	**EA**	**1,015,574**	**17,366**	**248,911**	**99,564**	**0**	**1,381,416**
			1,091,169.29					*1,486,262.19*
1202 Harbor Float Improvements - Improvement 4	**1.0**	**EA**	**1,091,169**	**18,659**	**268,881**	**107,553**	**0**	**1,486,262**
			751,818.94					*1,026,974.38*
1202 Harbor Float Improvements - Improvement 5	**1.0**	**EA**	**751,819**	**12,856**	**187,357**	**74,943**	**0**	**1,026,974**
			1,140,875.90					*1,558,422.71*
1202 Harbor Float Improvements - Improvement 6	**1.0**	**EA**	**1,140,876**	**19,509**	**284,313**	**113,725**	**0**	**1,558,423**

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Project Cost Summary Report			**6,426,453**	**109,892**	**1,590,104**	**636,042**	**8,762,491**
			6,426,452.59				*8,762,490.58*
12 Harbor Improvements	**1.0**	**EA**	**6,426,453**	**109,892**	**1,590,104**	**636,042**	**8,762,491**
			1,630,080.35				*2,220,817.36*
1202 Harbor Float Improvements - Improvement 1	**1.0**	**EA**	**1,630,080**	**27,874**	**402,045**	**160,818**	**2,220,817**
			211,162.40				*278,364.45*
120201 Mob/Demob & Bonds	**1.0**	**EA**	**211,162**	**3,611**	**45,422**	**18,169**	**278,364**
			211,162.40				*278,364.45*
12020101 Mob/Demob & Bonds	**1.0**	**EA**	**211,162**	**3,611**	**45,422**	**18,169**	**278,364**
USR Mob/Demob	1.0	LS	178,634	3,055	45,422	18,169	245,280
USR Bond	1.0	LS	32,528	556	0	0	33,084
			1,418,917.95				*1,942,452.91*
120299 Harbor Float Improvements - Improvement 1	**1.0**	**EA**	**1,418,918**	**24,263**	**356,622**	**142,649**	**1,942,453**
			1,418,917.95				*1,942,452.91*
12029900 North Main Float & Float Plane Dock-Improvement 1	**1.0**	**EA**	**1,418,918**	**24,263**	**356,622**	**142,649**	**1,942,453**
			240,597.78				*330,361.21*
12029900 North Main Float-Electrical-Improvement 1	**1.0**	**EA**	**240,598**	**4,114**	**61,178**	**24,471**	**330,361**
			23,780.94				*32,653.26*
1202990001 North Main Float - Demolition Work	**1.0**	**EA**	**23,781**	**407**	**6,047**	**2,419**	**32,653**
			727.35	*1.71%*	*25.43%*	*10.17%*	*998.71*
RSM 260505250490 Demo, remove 240 volt Power Pedestal containing GE kilowatt-hour meter, circuit braker & NEMA type IV power receptacle, metal frame	6.0	EA	4,364	75	1,110	444	5,992
			10.49	*1.71%*	*25.43%*	*10.17%*	*14.40*
RSM 260505204050 Demolish exisitng 4 Conductor Marine Power Cable	1,000.0	LF	10,489	179	2,667	1,067	14,402
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			62,861.06				*86,313.58*
1202990002 Power Pedestals and Cable	**1.0**	**EA**	**62,861**	**1,075**	**15,984**	**6,394**	**86,314**
			6,118.19	*1.71%*	*25.43%*	*10.17%*	*8,400.80*
RSM 262713102080 Power Pedestal, Marina Admiral SS Power Pedestal	6.0	EA	36,709	628	9,334	3,734	50,405
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	15.0	CLF	16,490	282	4,193	1,677	22,642
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	333.0	EA	734	13	187	75	1,008
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			153,955.78				*211,394.38*
1202990003 Circuit Breakers and Additional Branch Circuits w/Power Cable & Flood Lights	**1.0**	**EA**	**153,956**	**2,633**	**39,147**	**15,659**	**211,394**
			614.95	*1.71%*	*25.43%*	*10.17%*	*844.38*
RSM 262413400180 Circuit breakers, 3 pole, 240 V, 15 to 60 amp, FA frame, for feerder section	3.0	EA	1,845	32	469	188	2,533
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	35.0	CLF	38,477	658	9,784	3,913	52,832
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	1,000.0	EA	2,204	38	560	224	3,026
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	120.0	HR	8,247	141	2,097	839	11,324
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	120.0	HR	13,179	225	3,351	1,340	18,097
			823.59	*1.71%*	*25.43%*	*10.17%*	*1,130.86*
RSM 265636201950 Floodlights, exterior, metal halide, 175 Watt, incl ballast and lamp, excl pole	16.0	EA	13,177	225	3,351	1,340	18,094
			2,434.26	*1.71%*	*25.43%*	*10.17%*	*3,342.45*
RSM 265613103203 Light poles, anchor base, aluminum, 30' high, excl concrete bases	16.0	EA	38,948	666	9,904	3,961	53,479
			231.54	*1.71%*	*25.43%*	*10.17%*	*317.92*
USR ELEC2-cam Electrical Crew	75.0	HR	17,365	297	4,416	1,766	23,844
			273.50	*1.71%*	*25.43%*	*10.17%*	*375.53*
USR BOAT - cam Light Pole Crew - Crane	75.0	HR	20,512	351	5,216	2,086	28,165
			131,682.05				*180,810.64*
12029901 Float Plane Dock-Electrical Work	**1.0**	**EA**	**131,682**	**2,252**	**33,483**	**13,393**	**180,811**
			51,687.95				*70,971.94*
1202990102 Power Pedestals and Cable	**1.0**	**EA**	**51,688**	**884**	**13,143**	**5,257**	**70,972**
			3,568.36	*1.71%*	*25.43%*	*10.17%*	*4,899.66*
RSM 262713102080 Power Pedestal, Lighthouse	1.0	EA	3,568	61	907	363	4,900
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	14.0	CLF	15,391	263	3,913	1,565	21,133
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	180.0	HR	12,371	212	3,146	1,258	16,987
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	180.0	HR	19,769	338	5,027	2,011	27,145
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	267.0	EA	588	10	150	60	808
			79,994.10				*109,838.70*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
1202990103 Circuit Breakers and Additional Branch Circuits w/Power Cable & Flood Lights	**1.0**	**EA**	**79,994**	**1,368**	**20,341**	**8,136**	**109,839**
			614.95	*1.71%*	*25.43%*	*10.17%*	*844.38*
RSM 262413400180 Circuit breakers, 3 pole, 240 V, 15 to 60 amp, FA frame, for feerder section	2.0	EA	1,230	21	313	125	1,689
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	51.0	CLF	56,066	959	14,256	5,702	76,984
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	1,000.0	EA	2,204	38	560	224	3,026
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			823.59	*1.71%*	*25.43%*	*10.17%*	*1,130.86*
RSM 265636201950 Floodlights, exterior, metal halide, 175 Watt, incl ballast and lamp, excl pole	2.0	EA	1,647	28	419	168	2,262
			2,434.26	*1.71%*	*25.43%*	*10.17%*	*3,342.45*
RSM 265613103203 Light poles, anchor base, aluminum, 30' high, excl concrete bases	2.0	EA	4,869	83	1,238	495	6,685
			231.54	*1.71%*	*25.43%*	*10.17%*	*317.92*
USR ELEC2-cam Electrical Crew	10.0	HR	2,315	40	589	235	3,179
			273.50	*1.71%*	*25.43%*	*10.17%*	*375.53*
USR BOAT - cam Light Pole Crew - Crane	10.0	HR	2,735	47	695	278	3,755
			1,028,396.72				*1,406,234.07*
12029907 North Main Float - Improvement 1	**1.0**	**EA**	**1,028,397**	**17,586**	**257,323**	**102,929**	**1,406,234**
			1,028,396.72				*1,406,234.07*
1202990701 North Main Float & Float Plane Dock	**1.0**	**EA**	**1,028,397**	**17,586**	**257,323**	**102,929**	**1,406,234**
			33.77	*1.71%*	*25.43%*	*10.17%*	*46.37*
RSM 355113241740-cam Demolition Existing Wood Float	8,088.0	SF	273,121	4,670	69,448	27,779	375,019
			12.91	*1.71%*	*25.43%*	*10.17%*	*17.72*
RSM 024119180500 Selective demolition, disposal only, wood frame, includes loading and 5 mile RT haul to dump	675.0	CY	8,713	149	2,216	886	11,964
			88.16	*1.71%*	*25.43%*	*10.17%*	*121.05*
RSM 355113241740 Float, wooden, 10' wide	7,120.0	SF	627,717	10,734	159,613	63,845	861,909
			105.82	*1.71%*	*25.43%*	*10.17%*	*145.30*
RSM 355113230500 Docks, floating, Float Plane	968.0	SF	102,434	1,752	26,046	10,419	140,650
			3,988.05	*1.71%*	*0.00%*	*0.00%*	*4,056.24*
USR A01 Pile Sleeve	2.0	EA	7,976	136	0	0	8,112
			52.72	*1.71%*	*0.00%*	*0.00%*	*53.62*
RSM 316216130190 Sheet steel piles, round, 12" pile, 40' depth, excludes mobilization or demobilization	160.0	VLF	8,435	144	0	0	8,579
			18,241.40				*25,046.99*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
12029908 North Main Float-Fresh Water Supply	**1.0**	**EA**	**18,241**	**312**	**4,638**	**1,855**	**25,047**
			15.46				*21.23*
1202990801 Demo Existing Steel Pipe	**300.0**	**LF**	**4,638**	**79**	**1,179**	**472**	**6,369**
			37.36	*1.71%*	*25.43%*	*10.17%*	*51.30*
RSM 024113460900 Selective demolition, steel pipe, fittings, 3/4-4", excludes excavation	15.0	EA	560	10	143	57	770
			17.20	*1.71%*	*25.43%*	*10.17%*	*23.62*
RSM 220505101980 Pipe hanger / support, selective demolition	30.0	EA	516	9	131	52	709
			114.68	*1.71%*	*25.43%*	*10.17%*	*157.47*
RSM 220505101910 Pipe fittings with a single connection, 2" diameter, selective demolition	6.0	EA	688	12	175	70	945
			9.56	*1.71%*	*25.43%*	*10.17%*	*13.12*
RSM 220505102050 Pipe, metal pipe, 2" diam., selective demolition	300.0	LF	2,867	49	729	292	3,937
			6.88	*1.71%*	*25.43%*	*10.17%*	*9.45*
RSM 220505102162 Pipe, plastic, with fittings, 2" diameter, selective demolition	1.0	LF	7	0	2	1	9
			31.20				*42.83*
1202990802 New 2" HDPE Water Supply Pipe	**300.0**	**LF**	**9,359**	**160**	**2,380**	**952**	**12,850**
			229.06	*1.71%*	*25.43%*	*10.17%*	*314.52*
RSM 220523203480 Valves, bronze, gate, non-rising stem, threaded, class 150, 2"	1.0	EA	229	4	58	23	315
			135.54	*1.71%*	*25.43%*	*10.17%*	*186.10*
RSM 221119141340 Flexible metal hose, bronze braided, carbon steel ends, threaded, 2" diameter x 36"	1.0	EA	136	2	34	14	186
			88.48	*1.71%*	*25.43%*	*10.17%*	*121.49*
RSM 221113766070 Coupling, plastic, CPVC, threaded, 2", schedule 80	2.0	EA	177	3	45	18	243
			8.72	*1.71%*	*25.43%*	*10.17%*	*11.98*
RSM 221113780312 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	1.0	EA	9	0	2	1	12
			10.94	*1.71%*	*25.43%*	*10.17%*	*15.03*
RSM 221113780712 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	1.0	EA	11	0	3	1	15
			164.82	*1.71%*	*25.43%*	*10.17%*	*226.31*
RSM 220523201500 Valves, bronze, ball, threaded, 150 lb., 2"	2.0	EA	330	6	84	34	453
			158.54	*1.71%*	*25.43%*	*10.17%*	*217.68*
RSM 221119140220 Flexible metal hose, bronze braided, bronze ends, threaded, 2" diameter x 18"	2.0	EA	317	5	81	32	435
			88.48	*1.71%*	*25.43%*	*10.17%*	*121.49*
RSM 221113766070 Coupling, plastic, CPVC, threaded, 2", schedule 80	4.0	EA	354	6	90	36	486
			1.90	*1.71%*	*25.43%*	*10.17%*	*2.61*
RSM 221113780066 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	500.0	LF	952	16	242	97	1,307
			393.36	*1.71%*	*25.43%*	*10.17%*	*540.12*
RSM 221113785366 Coupling, plastic, high density polyethylene (HDPE), force transfer, welded, 2"	12.0	EA	4,720	81	1,200	480	6,481

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.							
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	15.0	EA	380	6	97	39	521
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	30.0	EA	444	8	113	45	609
			11.67	*1.71%*	*25.43%*	*10.17%*	*16.02*
RSM 220529104480 Pipe hanger / support, U-bolt, standard, 2" pipe size, type number 42 per MSS-SP58, includes nuts	2.0	EA	23	0	6	2	32
			10.94	*1.71%*	*25.43%*	*10.17%*	*15.03*
RSM 221113780712 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	2.0	EA	22	0	6	2	30
			272.92	*1.71%*	*25.43%*	*10.17%*	*374.74*
RSM 221119540900 Water hammer arrester/shock absorber, copper, for 114 to 154 fixtures, 2" male I.P.S.	2.0	EA	546	9	139	56	749
			355.29	*1.71%*	*25.43%*	*10.17%*	*487.85*
RSM 221113786216 End termination, plastic, high density polyethylene (HDPE), welded, 2" DR 11, add 1 weld per joint, includes vent plug, excludes hangers, trenching, backfill, hoisting or digging equipment.	2.0	EA	711	12	181	72	976
			1,061.02				*1,456.87*
1202990803 New 2" HDPE Pipe Risers/Hose Bibbs Docks	**4.0**	**EA**	**4,244**	**73**	**1,079**	**432**	**5,827**
			10.94	*1.71%*	*25.43%*	*10.17%*	*15.03*
RSM 221113780712 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	4.0	EA	44	1	11	4	60
			1.90	*1.71%*	*25.43%*	*10.17%*	*2.61*
RSM 221113780066 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	40.0	LF	76	1	19	8	105
			8.72	*1.71%*	*25.43%*	*10.17%*	*11.98*
RSM 221113780312 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	4.0	EA	35	1	9	4	48
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	4.0	EA	59	1	15	6	81
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	20.0	EA	506	9	129	51	695
			55.66	*1.71%*	*25.43%*	*10.17%*	*76.43*
RSM 260529204100 Channels, steel, 3" x 1-1/2"	16.0	LF	891	15	226	91	1,223
			11.67	*1.71%*	*25.43%*	*10.17%*	*16.02*
RSM 220529104480 Pipe hanger / support, U-bolt, standard, 2" pipe size, type number 42 per MSS-SP58, includes nuts	16.0	EA	187	3	47	19	256

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			88.48	*1.71%*	*25.43%*	*10.17%*	*121.49*
RSM 221113766070 Coupling, plastic, CPVC, threaded, 2", schedule 80	4.0	EA	354	6	90	36	486
			208.42	*1.71%*	*25.43%*	*10.17%*	*286.17*
HNC 221113455644 Tee, steel, malleable iron, galvanized, reducing on the outlet, threaded, 150 lb., 2"	4.0	EA	834	14	212	85	1,145
			214.27	*1.71%*	*25.43%*	*10.17%*	*294.21*
RSM 221113162120 Tee, brass, rough bronze, threaded, standard weight, 1"	4.0	EA	857	15	218	87	1,177
			50.24	*1.71%*	*25.43%*	*10.17%*	*68.98*
RSM 224139105000 Faucets/fittings, sillcock, compact brass, I.P.S. or solder to hose	8.0	EA	402	7	102	41	552
			796,933.65				*1,088,597.48*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
1202 Harbor Float Improvements - Improvement 2	**1.0**	**EA**	**796,934**	**13,628**	**198,597**	**79,439**	**1,088,597**
			103,177.43				*136,011.22*
120201 Mob/Demob & Bonds	**1.0**	**EA**	**103,177**	**1,764**	**22,192**	**8,877**	**136,011**
			103,177.43				*136,011.22*
12020101 Mob/Demob & Bonds	**1.0**	**EA**	**103,177**	**1,764**	**22,192**	**8,877**	**136,011**
USR Mob/Demob	1.0	LS	87,277	1,492	22,192	8,877	119,839
USR Bond	1.0	LS	15,900	272	0	0	16,172
			693,756.22				*952,586.25*
120299 Harbor Float Improvements - Improvement 2	**1.0**	**EA**	**693,756**	**11,863**	**176,405**	**70,562**	**952,586**
			144,806.80				*198,832.04*
12029902 A Float - Electrical Work	**1.0**	**EA**	**144,807**	**2,476**	**36,821**	**14,728**	**198,832**
			23,780.94				*32,653.26*
1202990201 A Float - Demolition Work	**1.0**	**EA**	**23,781**	**407**	**6,047**	**2,419**	**32,653**
			727.35	*1.71%*	*25.43%*	*10.17%*	*998.71*
RSM 260505250490 Demo, remove 240 volt Power Pedestal containing GE kilowatt-hour meter, circuit braker & NEMA type IV power receptacle, metal frame	6.0	EA	4,364	75	1,110	444	5,992
			10.49	*1.71%*	*25.43%*	*10.17%*	*14.40*
RSM 260505204050 Demolish exisitng 4 Conductor Marine Power Cable	1,000.0	LF	10,489	179	2,667	1,067	14,402
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			62,861.06				*86,313.58*
1202990202 Power Pedestals and Cable	**1.0**	**EA**	**62,861**	**1,075**	**15,984**	**6,394**	**86,314**
			6,118.19	*1.71%*	*25.43%*	*10.17%*	*8,400.80*
RSM 262713102080 Power Pedestal, Marina Admiral SS Power Pedestal	6.0	EA	36,709	628	9,334	3,734	50,405
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	15.0	CLF	16,490	282	4,193	1,677	22,642
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	333.0	EA	734	13	187	75	1,008
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			58,164.80				*79,865.21*
1202990203 Circuit Breakers and Additional Branch Circuits w/Power Cable & Flood	**1.0**	**EA**	**58,165**	**995**	**14,790**	**5,916**	**79,865**

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Lights							
			614.95	*1.71%*	*25.43%*	*10.17%*	*844.38*
RSM 262413400180 Circuit breakers, 3 pole, 240 V, 15 to 60 amp, FA frame, for feerder section	1.0	EA	615	11	156	63	844
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	12.0	CLF	13,192	226	3,354	1,342	18,114
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	1,000.0	EA	2,204	38	560	224	3,026
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	60.0	HR	4,124	71	1,049	419	5,662
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	60.0	HR	6,590	113	1,676	670	9,048
			823.59	*1.71%*	*25.43%*	*10.17%*	*1,130.86*
RSM 265636201950 Floodlights, exterior, metal halide, 175 Watt, incl ballast and lamp, excl pole	5.0	EA	4,118	70	1,047	419	5,654
			2,434.26	*1.71%*	*25.43%*	*10.17%*	*3,342.45*
RSM 265613103203 Light poles, anchor base, aluminum, 30' high, excl concrete bases	5.0	EA	12,171	208	3,095	1,238	16,712
			231.54	*1.71%*	*25.43%*	*10.17%*	*317.92*
USR ELEC2-cam Electrical Crew	30.0	HR	6,946	119	1,766	706	9,538
			273.50	*1.71%*	*25.43%*	*10.17%*	*375.53*
USR BOAT - cam Light Pole Crew - Crane	30.0	HR	8,205	140	2,086	835	11,266
			543,958.49				*746,901.25*
12029907 A Float - Floating Dock Replacement	**1.0**	**EA**	**543,958**	**9,302**	**138,315**	**55,326**	**746,901**
			543,958.49				*746,901.25*
1202990204 A Float Improvements	**1.0**	**EA**	**543,958**	**9,302**	**138,315**	**55,326**	**746,901**
			33.77	*1.71%*	*25.43%*	*10.17%*	*46.37*
RSM 355113241740-cam Demolition Existing Wood Float	4,140.0	SF	139,802	2,391	35,548	14,219	191,961
			12.91	*1.71%*	*25.43%*	*10.17%*	*17.72*
RSM 024119180500 Selective demolition, disposal only, wood frame, includes loading and 5 mile RT haul to dump	230.0	CY	2,969	51	755	302	4,077
			88.16	*1.71%*	*25.43%*	*10.17%*	*121.05*
RSM 355113241740 Float, wooden, 10' wide	2,250.0	SF	198,366	3,392	50,439	20,176	272,373
			107.31	*1.71%*	*25.43%*	*10.17%*	*147.35*
RSM 355113241740 Float, wooden, fingers, 5' wide	1,890.0	SF	202,821	3,468	51,572	20,629	278,491
			4,990.92				*6,852.96*
12029908 A Float - Fresh Water Supply Upgrade	**1.0**	**EA**	**4,991**	**85**	**1,269**	**508**	**6,853**
			23.77				*32.63*
1202990802 New 1" HDPE Water Supply Pipe/Hose Bibbs	**210.0**	**LF**	**4,991**	**85**	**1,269**	**508**	**6,853**
			469.49	*1.71%*	*25.43%*	*10.17%*	*644.65*
RSM 221113786616 Tee, plastic, high density polyethylene (HDPE), welded, 2" x 1" , add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	5.0	EA	2,347	40	597	239	3,223

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	2.0	EA	51	1	13	5	70
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	2.0	EA	30	1	8	3	41
			82.23	*1.71%*	*25.43%*	*10.17%*	*112.91*
RSM 220523201470 Valves, bronze, ball, threaded, 150 lb., 1"	1.0	EA	82	1	21	8	113
			86.90	*1.71%*	*25.43%*	*10.17%*	*119.32*
RSM 221119140180 Flexible metal hose, bronze braided, bronze ends, threaded, 1" diameter x 18"	1.0	EA	87	1	22	9	119
			68.28	*1.71%*	*25.43%*	*10.17%*	*93.75*
RSM 221113766040 Coupling, plastic, threaded, 1", schedule 80	2.0	EA	137	2	35	14	188
			13.54	*1.71%*	*25.43%*	*10.17%*	*18.60*
RSM 220529104310 Pipe hanger / support, strap, 1" pipe size, type number 26 per MSS-SP58	3.0	EA	41	1	10	4	56
			0.76	*1.71%*	*25.43%*	*10.17%*	*1.05*
RSM 221113780054 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	210.0	LF	160	3	41	16	220
			9.12	*1.71%*	*25.43%*	*10.17%*	*12.52*
RSM 221113780704 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	5.0	EA	46	1	12	5	63
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	24.0	EA	285	5	72	29	391
			14.27	*1.71%*	*25.43%*	*10.17%*	*19.60*
RSM 220529108020 Pipe hanger / support, pipe clamp, plastic, 1" CTS	42.0	EA	599	10	152	61	823
			1.00	*1.71%*	*25.43%*	*10.17%*	*1.37*
RSM 221113748160 Pipe, plastic, polyethylene, flexible, 200 psi, 1" diameter, SDR 9, excludes couplings and hangers	30.0	LF	30	1	8	3	41
			6.98	*1.71%*	*25.43%*	*10.17%*	*9.58*
RSM 221113780304 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	5.0	EA	35	1	9	4	48
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	22.0	EA	261	4	66	27	359
			8.56	*1.71%*	*25.43%*	*10.17%*	*11.76*
RSM 220529100630 Pipe hanger / support, one hole clamp, 1" pipe size, for vertical mounting	4.0	EA	34	1	9	3	47
			176.96	*1.71%*	*25.43%*	*10.17%*	*242.98*
RSM 221119540600 Water hammer arrester/shock absorber, copper, for 12 to 32 fixtures, 1" male I.P.S.	4.0	EA	708	12	180	72	972
			7.38	*1.71%*	*25.43%*	*10.17%*	*10.13*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
RSM 220529104450 Pipe hanger / support, U-bolt, standard, 1" pipe size, type number 42 per MSS-SP58, includes nuts	8.0	EA	59	1	15	6	81
			1,015,574.46				*1,381,416.47*
1202 Harbor Float Improvements - Improvement 3	**1.0**	**EA**	**1,015,574**	**17,366**	**248,911**	**99,564**	**1,381,416**
			131,518.18				*173,374.10*
120201 Mob/Demob & Bonds	**1.0**	**EA**	**131,518**	**2,249**	**28,291**	**11,316**	**173,374**
			131,518.18				*173,374.10*
12020101 Mob/Demob & Bonds	**1.0**	**EA**	**131,518**	**2,249**	**28,291**	**11,316**	**173,374**
USR Mob/Demob	1.0	LS	111,260	1,903	28,291	11,316	152,770
USR Bond	1.0	LS	20,258	346	0	0	20,604
			884,056.27				*1,208,042.37*
120299 Harbor Float Improvements - Improvement 3	**1.0**	**EA**	**884,056**	**15,117**	**220,621**	**88,248**	**1,208,042**
			144,806.80				*198,832.04*
12029903 B Float-Electrical Work	**1.0**	**EA**	**144,807**	**2,476**	**36,821**	**14,728**	**198,832**
			23,780.94				*32,653.26*
1202990301 B Float - Demolition Work	**1.0**	**EA**	**23,781**	**407**	**6,047**	**2,419**	**32,653**
			727.35	*1.71%*	*25.43%*	*10.17%*	*998.71*
RSM 260505250490 Demo, remove 240 volt Power Pedestal containing GE kilowatt-hour meter, circuit braker & NEMA type IV power receptacle, metal frame	6.0	EA	4,364	75	1,110	444	5,992
			10.49	*1.71%*	*25.43%*	*10.17%*	*14.40*
RSM 260505204050 Demolish exisitng 4 Conductor Marine Power Cable	1,000.0	LF	10,489	179	2,667	1,067	14,402
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			62,861.06				*86,313.58*
1202990302 Power Pedestals and Cable	**1.0**	**EA**	**62,861**	**1,075**	**15,984**	**6,394**	**86,314**
			6,118.19	*1.71%*	*25.43%*	*10.17%*	*8,400.80*
RSM 262713102080 Power Pedestal, Marina Admiral SS Power Pedestal	6.0	EA	36,709	628	9,334	3,734	50,405
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	15.0	CLF	16,490	282	4,193	1,677	22,642
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	333.0	EA	734	13	187	75	1,008
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			58,164.80				*79,865.21*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
1202990303 Circuit Breakers and Additional Branch Circuits w/Power Cable & Flood Lights	**1.0**	**EA**	**58,165**	**995**	**14,790**	**5,916**	**79,865**
			614.95	*1.71%*	*25.43%*	*10.17%*	*844.38*
RSM 262413400180 Circuit breakers, 3 pole, 240 V, 15 to 60 amp, FA frame, for feerder section	1.0	EA	615	11	156	63	844
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	12.0	CLF	13,192	226	3,354	1,342	18,114
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	1,000.0	EA	2,204	38	560	224	3,026
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	60.0	HR	4,124	71	1,049	419	5,662
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	60.0	HR	6,590	113	1,676	670	9,048
			823.59	*1.71%*	*25.43%*	*10.17%*	*1,130.86*
RSM 265636201950 Floodlights, exterior, metal halide, 175 Watt, incl ballast and lamp, excl pole	5.0	EA	4,118	70	1,047	419	5,654
			2,434.26	*1.71%*	*25.43%*	*10.17%*	*3,342.45*
RSM 265613103203 Light poles, anchor base, aluminum, 30' high, excl concrete bases	5.0	EA	12,171	208	3,095	1,238	16,712
			273.50	*1.71%*	*25.43%*	*10.17%*	*375.53*
USR BOAT - cam Light Pole Crew - Crane	30.0	HR	8,205	140	2,086	835	11,266
			231.54	*1.71%*	*25.43%*	*10.17%*	*317.92*
USR ELEC2-cam Electrical Crew	30.0	HR	6,946	119	1,766	706	9,538
			5,240.08				*7,195.07*
12029908 B Float - Fresh Water Supply Upgrade	**1.0**	**EA**	**5,240**	**90**	**1,332**	**533**	**7,195**
			19.41				*26.65*
1202990802 New 1" HDPE Water Supply Pipe/Hose Bibbs	**270.0**	**LF**	**5,240**	**90**	**1,332**	**533**	**7,195**
			469.49	*1.71%*	*25.43%*	*10.17%*	*644.65*
RSM 221113786616 Tee, plastic, high density polyethylene (HDPE), welded, 2" x 1" , add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	5.0	EA	2,347	40	597	239	3,223
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	2.0	EA	51	1	13	5	70
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	2.0	EA	30	1	8	3	41
			82.23	*1.71%*	*25.43%*	*10.17%*	*112.91*
RSM 220523201470 Valves, bronze, ball, threaded, 150 lb., 1"	1.0	EA	82	1	21	8	113
			86.90	*1.71%*	*25.43%*	*10.17%*	*119.32*
RSM 221119140180 Flexible metal hose, bronze braided, bronze ends, threaded, 1" diameter x 18"	1.0	EA	87	1	22	9	119
			68.28	*1.71%*	*25.43%*	*10.17%*	*93.75*
RSM 221113766040 Coupling, plastic, threaded, 1", schedule 80	2.0	EA	137	2	35	14	188
			13.54	*1.71%*	*25.43%*	*10.17%*	*18.60*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
RSM 220529104310 Pipe hanger / support, strap, 1" pipe size, type number 26 per MSS-SP58	3.0	EA	41	1	10	4	56
			0.76	*1.71%*	*25.43%*	*10.17%*	*1.05*
RSM 221113780054 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	270.0	LF	206	4	52	21	282
			9.12	*1.71%*	*25.43%*	*10.17%*	*12.52*
RSM 221113780704 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	7.0	EA	64	1	16	6	88
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	24.0	EA	285	5	72	29	391
			14.27	*1.71%*	*25.43%*	*10.17%*	*19.60*
RSM 220529108020 Pipe hanger / support, pipe clamp, plastic, 1" CTS	54.0	EA	771	13	196	78	1,058
			1.00	*1.71%*	*25.43%*	*10.17%*	*1.37*
RSM 221113748160 Pipe, plastic, polyethylene, flexible, 200 psi, 1" diameter, SDR 9, excludes couplings and hangers	30.0	LF	30	1	8	3	41
			6.98	*1.71%*	*25.43%*	*10.17%*	*9.58*
RSM 221113780304 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	7.0	EA	49	1	12	5	67
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	22.0	EA	261	4	66	27	359
			8.56	*1.71%*	*25.43%*	*10.17%*	*11.76*
RSM 220529100630 Pipe hanger / support, one hole clamp, 1" pipe size, for vertical mounting	4.0	EA	34	1	9	3	47
			176.96	*1.71%*	*25.43%*	*10.17%*	*242.98*
RSM 221119540600 Water hammer arrester/shock absorber, copper, for 12 to 32 fixtures, 1" male I.P.S.	4.0	EA	708	12	180	72	972
			7.38	*1.71%*	*25.43%*	*10.17%*	*10.13*
RSM 220529104450 Pipe hanger / support, U-bolt, standard, 1" pipe size, type number 42 per MSS-SP58, includes nuts	8.0	EA	59	1	15	6	81
			734,009.40				*1,002,015.25*
12029909 Harbor Float Improvements - Floating Dock Work Improvement 3	**1.0**	**EA**	**734,009**	**12,552**	**182,467**	**72,987**	**1,002,015**
			734,009.40				*1,002,015.25*
1202990901 B Float Improvements	**1.0**	**EA**	**734,009**	**12,552**	**182,467**	**72,987**	**1,002,015**
			33.77	*1.71%*	*25.43%*	*10.17%*	*46.37*
RSM 355113241740-cam Demolition Existing Wood Float	5,380.0	SF	181,676	3,107	46,196	18,478	249,456
			12.91	*1.71%*	*25.43%*	*10.17%*	*17.72*
RSM 024119180500 Selective demolition, disposal only, wood frame, includes loading and 5 mile RT haul to dump	305.0	CY	3,937	67	1,001	400	5,406
			17.99	*1.71%*	*25.43%*	*10.17%*	*24.70*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
RSM 316219101500 Demolition, Existing Wooden Piles	140.0	VLF	2,518	43	640	256	3,458
			88.16	*1.71%*	*25.43%*	*10.17%*	*121.05*
RSM 355113241740 Float, wooden, 10' wide	2,500.0	SF	220,406	3,769	56,044	22,418	302,637
			107.31	*1.71%*	*25.43%*	*10.17%*	*147.35*
RSM 355113241740 Float, wooden, fingers, 5' wide	2,880.0	SF	309,061	5,285	78,586	31,435	424,367
			3,988.05	*1.71%*	*0.00%*	*0.00%*	*4,056.24*
USR A01 Pile Sleeve	2.0	EA	7,976	136	0	0	8,112
			52.72	*1.71%*	*0.00%*	*0.00%*	*53.62*
RSM 316216130190 Sheet steel piles, round, 12" pile, 40' depth, excludes mobilization or demobilization	160.0	VLF	8,435	144	0	0	8,579
			1,091,169.29				*1,486,262.19*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
1202 Harbor Float Improvements - Improvement 4	**1.0**	**EA**	**1,091,169**	**18,659**	**268,881**	**107,553**	**1,486,262**
			141,304.88				*186,276.67*
120201 Mob/Demob & Bonds	**1.0**	**EA**	**141,305**	**2,416**	**30,397**	**12,159**	**186,277**
			141,304.88				*186,276.67*
12020101 Mob/Demob & Bonds	**1.0**	**EA**	**141,305**	**2,416**	**30,397**	**12,159**	**186,277**
USR Mob/Demob	1.0	LS	119,543	2,044	30,397	12,159	164,143
USR Bond	1.0	LS	21,762	372	0	0	22,134
			949,864.41				*1,299,985.51*
120299 Harbor Float Improvements - Improvement 4	**1.0**	**EA**	**949,864**	**16,243**	**238,485**	**95,394**	**1,299,986**
			104,278.37				*143,183.07*
12029904 C Float-Electrical Work	**1.0**	**EA**	**104,278**	**1,783**	**26,515**	**10,606**	**143,183**
			35,090.27				*48,181.93*
1202990402 Power Pedestals and Cable	**1.0**	**EA**	**35,090**	**600**	**8,923**	**3,569**	**48,182**
			6,118.19	*1.71%*	*25.43%*	*10.17%*	*8,400.80*
RSM 262713102080 Power Pedestal, Marina Admiral SS Power Pedestal	2.0	EA	12,236	209	3,111	1,245	16,802
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	12.0	CLF	13,192	226	3,354	1,342	18,114
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	333.0	EA	734	13	187	75	1,008
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			69,188.10				*95,001.14*
1202990403 Circuit Breakers and Additional Branch Circuits w/Power Cable & Flood Lights	**1.0**	**EA**	**69,188**	**1,183**	**17,593**	**7,037**	**95,001**
			614.95	*1.71%*	*25.43%*	*10.17%*	*844.38*
RSM 262413400180 Circuit breakers, 3 pole, 240 V, 15 to 60 amp, FA frame, for feerder section	2.0	EA	1,230	21	313	125	1,689
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	12.0	CLF	13,192	226	3,354	1,342	18,114
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	333.0	EA	734	13	187	75	1,008
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	120.0	HR	8,247	141	2,097	839	11,324
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	120.0	HR	13,179	225	3,351	1,340	18,097

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			823.59	*1.71%*	*25.43%*	*10.17%*	*1,130.86*
RSM 265636201950 Floodlights, exterior, metal halide, 175 Watt, incl ballast and lamp, excl pole	5.0	EA	4,118	70	1,047	419	5,654
			2,434.26	*1.71%*	*25.43%*	*10.17%*	*3,342.45*
RSM 265613103203 Light poles, anchor base, aluminum, 30' high, excl concrete bases	5.0	EA	12,171	208	3,095	1,238	16,712
			1,165.01	*1.71%*	*25.43%*	*10.17%*	*1,599.65*
HNC 262413400412 Circuit breaker, 2 pole, 240 V, 100 amp to 225 amp, FA frame, for feerder section	1.0	EA	1,165	20	296	118	1,600
			273.50	*1.71%*	*25.43%*	*10.17%*	*375.53*
USR BOAT - cam Light Pole Crew - Crane	30.0	HR	8,205	140	2,086	835	11,266
			231.54	*1.71%*	*25.43%*	*10.17%*	*317.92*
USR ELEC2-cam Electrical Crew	30.0	HR	6,946	119	1,766	706	9,538
			5,348.56				*7,344.02*
12029908 C Float - Fresh Water Supply Upgrade	**1.0**	**EA**	**5,349**	**91**	**1,360**	**544**	**7,344**
			17.83				*24.48*
1202990802 New 1" HDPE Water Supply Pipe/Hose Bibbs	**300.0**	**LF**	**5,349**	**91**	**1,360**	**544**	**7,344**
			469.49	*1.71%*	*25.43%*	*10.17%*	*644.65*
RSM 221113786616 Tee, plastic, high density polyethylene (HDPE), welded, 2" x 1" , add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	5.0	EA	2,347	40	597	239	3,223
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	2.0	EA	51	1	13	5	70
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	2.0	EA	30	1	8	3	41
			82.23	*1.71%*	*25.43%*	*10.17%*	*112.91*
RSM 220523201470 Valves, bronze, ball, threaded, 150 lb., 1"	1.0	EA	82	1	21	8	113
			86.90	*1.71%*	*25.43%*	*10.17%*	*119.32*
RSM 221119140180 Flexible metal hose, bronze braided, bronze ends, threaded, 1" diameter x 18"	1.0	EA	87	1	22	9	119
			68.28	*1.71%*	*25.43%*	*10.17%*	*93.75*
RSM 221113766040 Coupling, plastic, threaded, 1", schedule 80	2.0	EA	137	2	35	14	188
			13.54	*1.71%*	*25.43%*	*10.17%*	*18.60*
RSM 220529104310 Pipe hanger / support, strap, 1" pipe size, type number 26 per MSS-SP58	3.0	EA	41	1	10	4	56
			0.76	*1.71%*	*25.43%*	*10.17%*	*1.05*
RSM 221113780054 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	300.0	LF	228	4	58	23	314
			9.12	*1.71%*	*25.43%*	*10.17%*	*12.52*
RSM 221113780704 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	7.0	EA	64	1	16	6	88
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	24.0	EA	285	5	72	29	391

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			14.27	*1.71%*	*25.43%*	*10.17%*	*19.60*
RSM 220529108020 Pipe hanger / support, pipe clamp, plastic, 1" CTS	60.0	EA	856	15	218	87	1,176
			1.00	*1.71%*	*25.43%*	*10.17%*	*1.37*
RSM 221113748160 Pipe, plastic, polyethylene, flexible, 200 psi, 1" diameter, SDR 9, excludes couplings and hangers	30.0	LF	30	1	8	3	41
			6.98	*1.71%*	*25.43%*	*10.17%*	*9.58*
RSM 221113780304 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	7.0	EA	49	1	12	5	67
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	22.0	EA	261	4	66	27	359
			8.56	*1.71%*	*25.43%*	*10.17%*	*11.76*
RSM 220529100630 Pipe hanger / support, one hole clamp, 1" pipe size, for vertical mounting	4.0	EA	34	1	9	3	47
			176.96	*1.71%*	*25.43%*	*10.17%*	*242.98*
RSM 221119540600 Water hammer arrester/shock absorber, copper, for 12 to 32 fixtures, 1" male I.P.S.	4.0	EA	708	12	180	72	972
			7.38	*1.71%*	*25.43%*	*10.17%*	*10.13*
RSM 220529104450 Pipe hanger / support, U-bolt, standard, 1" pipe size, type number 42 per MSS-SP58, includes nuts	8.0	EA	59	1	15	6	81
			840,237.48				*1,149,458.42*
12029910 Harbor Float Improvements - Floating Dock Work Improvement 4	**1.0**	**EA**	**840,237**	**14,368**	**210,609**	**84,244**	**1,149,458**
			840,237.48				*1,149,458.42*
1202991001 C Float Improvements	**1.0**	**EA**	**840,237**	**14,368**	**210,609**	**84,244**	**1,149,458**
			33.77	*1.71%*	*25.43%*	*10.17%*	*46.37*
RSM 355113241740-cam Demolition Existing Wood Float	6,070.0	SF	204,976	3,505	52,120	20,848	281,449
			12.91	*1.71%*	*25.43%*	*10.17%*	*17.72*
RSM 024119180500 Selective demolition, disposal only, wood frame, includes loading and 5 mile RT haul to dump	515.0	CY	6,648	114	1,690	676	9,128
			17.99	*1.71%*	*25.43%*	*10.17%*	*24.70*
RSM 316219101500 Demolition, Existing Wooden Piles	210.0	VLF	3,777	65	961	384	5,187
			88.16	*1.71%*	*25.43%*	*10.17%*	*121.05*
RSM 355113241740 Float, wooden, 10' wide	2,870.0	SF	253,027	4,327	64,338	25,735	347,427
			107.31	*1.71%*	*25.43%*	*10.17%*	*147.35*
RSM 355113241740 Float, wooden, fingers, 5' wide	3,200.0	SF	343,401	5,872	87,318	34,927	471,519
			3,988.05	*1.71%*	*0.00%*	*0.00%*	*4,056.24*
USR A01 Pile Sleeve	3.0	EA	11,964	205	0	0	12,169
			68.52	*1.71%*	*25.43%*	*10.17%*	*94.08*
RSM 316216130190 Sheet steel piles, round, 12" pile, 40' depth, excludes mobilization or demobilization	240.0	VLF	16,444	281	4,181	1,673	22,579
			751,818.94				*1,026,974.38*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
1202 Harbor Float Improvements - Improvement 5	**1.0**	**EA**	**751,819**	**12,856**	**187,357**	**74,943**	**1,026,974**
			97,324.53				*128,297.93*
120201 Mob/Demob & Bonds	**1.0**	**EA**	**97,325**	**1,664**	**20,935**	**8,374**	**128,298**
			97,324.53				*128,297.93*
12 02 01 01 Mob/Demob & Bonds	**1.0**	**EA**	**97,325**	**1,664**	**20,935**	**8,374**	**128,298**
USR Mob/Demob	1.0	LS	82,333	1,408	20,935	8,374	113,050
USR Bond	1.0	LS	14,992	256	0	0	15,248
			654,494.40				*898,676.45*
120299 Harbor Float Improvements - Improvement 5	**1.0**	**EA**	**654,494**	**11,192**	**166,422**	**66,569**	**898,676**
			55,524.06				*76,239.25*
12029905 D Float - Electrical Work	**1.0**	**EA**	**55,524**	**949**	**14,118**	**5,647**	**76,239**
			55,524.06				*76,239.25*
1202990503 Circuit Breakers and Additional Branch Circuits w/Power Cable & Flood Lights	**1.0**	**EA**	**55,524**	**949**	**14,118**	**5,647**	**76,239**
			614.95	*1.71%*	*25.43%*	*10.17%*	*844.38*
RSM 262413400180 Circuit breakers, 3 pole, 240 V, 15 to 60 amp, FA frame, for feerder section	2.0	EA	1,230	21	313	125	1,689
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	12.0	CLF	13,192	226	3,354	1,342	18,114
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	333.0	EA	734	13	187	75	1,008
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			823.59	*1.71%*	*25.43%*	*10.17%*	*1,130.86*
RSM 265636201950 Floodlights, exterior, metal halide, 175 Watt, incl ballast and lamp, excl pole	5.0	EA	4,118	70	1,047	419	5,654
			2,434.26	*1.71%*	*25.43%*	*10.17%*	*3,342.45*
RSM 265613103203 Light poles, anchor base, aluminum, 30' high, excl concrete bases	5.0	EA	12,171	208	3,095	1,238	16,712
			273.50	*1.71%*	*25.43%*	*10.17%*	*375.53*
USR BOAT - cam Light Pole Crew - Crane	30.0	HR	8,205	140	2,086	835	11,266
			231.54	*1.71%*	*25.43%*	*10.17%*	*317.92*
USR ELEC2-cam Electrical Crew	30.0	HR	6,946	119	1,766	706	9,538
			5,348.56				*7,344.02*
12029908 D Float - Fresh Water Supply Upgrade	**1.0**	**EA**	**5,349**	**91**	**1,360**	**544**	**7,344**
			17.83				*24.48*
1202990802 New 1" HDPE Water Supply Pipe/Hose Bibbs	**300.0**	**LF**	**5,349**	**91**	**1,360**	**544**	**7,344**
			469.49	*1.71%*	*25.43%*	*10.17%*	*644.65*
RSM 221113786616 Tee, plastic, high density polyethylene (HDPE), welded, 2" x 1" , add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	5.0	EA	2,347	40	597	239	3,223

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	2.0	EA	51	1	13	5	70
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	2.0	EA	30	1	8	3	41
			82.23	*1.71%*	*25.43%*	*10.17%*	*112.91*
RSM 220523201470 Valves, bronze, ball, threaded, 150 lb., 1"	1.0	EA	82	1	21	8	113
			86.90	*1.71%*	*25.43%*	*10.17%*	*119.32*
RSM 221119140180 Flexible metal hose, bronze braided, bronze ends, threaded, 1" diameter x 18"	1.0	EA	87	1	22	9	119
			68.28	*1.71%*	*25.43%*	*10.17%*	*93.75*
RSM 221113766040 Coupling, plastic, threaded, 1", schedule 80	2.0	EA	137	2	35	14	188
			13.54	*1.71%*	*25.43%*	*10.17%*	*18.60*
RSM 220529104310 Pipe hanger / support, strap, 1" pipe size, type number 26 per MSS-SP58	3.0	EA	41	1	10	4	56
			0.76	*1.71%*	*25.43%*	*10.17%*	*1.05*
RSM 221113780054 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	300.0	LF	228	4	58	23	314
			9.12	*1.71%*	*25.43%*	*10.17%*	*12.52*
RSM 221113780704 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	7.0	EA	64	1	16	6	88
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	24.0	EA	285	5	72	29	391
			14.27	*1.71%*	*25.43%*	*10.17%*	*19.60*
RSM 220529108020 Pipe hanger / support, pipe clamp, plastic, 1" CTS	60.0	EA	856	15	218	87	1,176
			1.00	*1.71%*	*25.43%*	*10.17%*	*1.37*
RSM 221113748160 Pipe, plastic, polyethylene, flexible, 200 psi, 1" diameter, SDR 9, excludes couplings and hangers	30.0	LF	30	1	8	3	41
			6.98	*1.71%*	*25.43%*	*10.17%*	*9.58*
RSM 221113780304 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	7.0	EA	49	1	12	5	67
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	22.0	EA	261	4	66	27	359
			8.56	*1.71%*	*25.43%*	*10.17%*	*11.76*
RSM 220529100630 Pipe hanger / support, one hole clamp, 1" pipe size, for vertical mounting	4.0	EA	34	1	9	3	47
			176.96	*1.71%*	*25.43%*	*10.17%*	*242.98*
RSM 221119540600 Water hammer arrester/shock absorber, copper, for 12 to 32 fixtures, 1" male I.P.S.	4.0	EA	708	12	180	72	972
			7.38	*1.71%*	*25.43%*	*10.17%*	*10.13*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
RSM 220529104450 Pipe hanger / support, U-bolt, standard, 1" pipe size, type number 42 per MSS-SP58, includes nuts	8.0	EA	59	1	15	6	81
			593,621.79				*815,093.18*
12029911 Harbor Float Improvements - Floating Dock Work Improvement 5	**1.0**	**EA**	**593,622**	**10,151**	**150,943**	**60,377**	**815,093**
			593,621.79				*815,093.18*
1202991101 D Float Improvements	**1.0**	**EA**	**593,622**	**10,151**	**150,943**	**60,377**	**815,093**
			33.77	*1.71%*	*25.43%*	*10.17%*	*46.37*
RSM 355113241740-cam Demolition Existing Wood Float	4,470.0	SF	150,946	2,581	38,382	15,353	207,262
			12.91	*1.71%*	*25.43%*	*10.17%*	*17.72*
RSM 024119180500 Selective demolition, disposal only, wood frame, includes loading and 5 mile RT haul to dump	415.0	CY	5,357	92	1,362	545	7,356
			17.99	*1.71%*	*25.43%*	*10.17%*	*24.70*
RSM 316219101500 Demolition, Existing Wooden Piles	700.0	VLF	12,591	215	3,202	1,281	17,289
			88.16	*1.71%*	*25.43%*	*10.17%*	*121.05*
RSM 355113241740 Float, wooden, 10' wide	2,870.0	SF	253,027	4,327	64,338	25,735	347,427
			107.31	*1.71%*	*25.43%*	*10.17%*	*147.35*
RSM 355113241740 Float, wooden, fingers, 5' wide	1,600.0	SF	171,701	2,936	43,659	17,464	235,759
			1,140,875.90				*1,558,422.71*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
1202 Harbor Float Improvements - Improvement 6	**1.0**	**EA**	**1,140,876**	**19,509**	**284,313**	**113,725**	**1,558,423**
			147,665.46				*194,660.35*
120201 Mob/Demob & Bonds	**1.0**	**EA**	**147,665**	**2,525**	**31,764**	**12,706**	**194,660**
			147,665.46				*194,660.35*
12020101 Mob/Demob & Bonds	**1.0**	**EA**	**147,665**	**2,525**	**31,764**	**12,706**	**194,660**
USR Mob/Demob	1.0	LS	124,920	2,136	31,764	12,706	171,526
USR Bond	1.0	LS	22,745	389	0	0	23,134
			993,210.44				*1,363,762.36*
120299 Harbor Float Improvements - Improvement 6	**1.0**	**EA**	**993,210**	**16,984**	**252,549**	**101,019**	**1,363,762**
			111,048.11				*152,478.50*
12029906 Harbor Float Improvements - Electrical Work Improvement 6	**1.0**	**EA**	**111,048**	**1,899**	**28,237**	**11,295**	**152,478**
			55,524.06				*76,239.25*
1202990603 South Main Float-Circuit Breakers and Additional Branch Circuits w/Power Cable & Flood Lights	**1.0**	**EA**	**55,524**	**949**	**14,118**	**5,647**	**76,239**
			614.95	*1.71%*	*25.43%*	*10.17%*	*844.38*
RSM 262413400180 Circuit breakers, 3 pole, 240 V, 15 to 60 amp, FA frame, for feerder section	2.0	EA	1,230	21	313	125	1,689
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	12.0	CLF	13,192	226	3,354	1,342	18,114
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	333.0	EA	734	13	187	75	1,008
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			823.59	*1.71%*	*25.43%*	*10.17%*	*1,130.86*
RSM 265636201950 Floodlights, exterior, metal halide, 175 Watt, incl ballast and lamp, excl pole	5.0	EA	4,118	70	1,047	419	5,654
			2,434.26	*1.71%*	*25.43%*	*10.17%*	*3,342.45*
RSM 265613103203 Light poles, anchor base, aluminum, 30' high, excl concrete bases	5.0	EA	12,171	208	3,095	1,238	16,712
			273.50	*1.71%*	*25.43%*	*10.17%*	*375.53*
USR BOAT - cam Light Pole Crew - Crane	30.0	HR	8,205	140	2,086	835	11,266
			231.54	*1.71%*	*25.43%*	*10.17%*	*317.92*
USR ELEC2-cam Electrical Crew	30.0	HR	6,946	119	1,766	706	9,538
			55,524.06				*76,239.25*
1202990603 E Float-Circuit Breakers and Additional Branch Circuits w/Power Cable & Flood Lights	**1.0**	**EA**	**55,524**	**949**	**14,118**	**5,647**	**76,239**
			614.95	*1.71%*	*25.43%*	*10.17%*	*844.38*
RSM 262413400180 Circuit breakers, 3 pole, 240 V, 15 to 60 amp, FA frame, for feerder section	2.0	EA	1,230	21	313	125	1,689

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			1,099.34	*1.71%*	*25.43%*	*10.17%*	*1,509.48*
RSM 260526803810 Insulated ground wire, copper, stranded, 3/0	12.0	CLF	13,192	226	3,354	1,342	18,114
			2.20	*1.71%*	*25.43%*	*10.17%*	*3.03*
RSM 260529200700 Strap, steel, 2 holes, EMT, 1/2" diameter	333.0	EA	734	13	187	75	1,008
			68.73	*1.71%*	*25.43%*	*10.17%*	*94.37*
EP M10SM001 MARINE EQUIPMENT, BOATS & LAUNCHES, 17' LITTLE GIANT, W/CABIN TRI-HULL, CAP 2,000 LBS, OUTBOARD, 17.5' X 7.25' X 0.7'	50.0	HR	3,436	59	874	350	4,719
			109.83	*1.71%*	*25.43%*	*10.17%*	*150.80*
MIL X-EQOPRMED-cam Outside Equip. Operators, Boat Captain	50.0	HR	5,491	94	1,396	559	7,540
			823.59	*1.71%*	*25.43%*	*10.17%*	*1,130.86*
RSM 265636201950 Floodlights, exterior, metal halide, 175 Watt, incl ballast and lamp, excl pole	5.0	EA	4,118	70	1,047	419	5,654
			2,434.26	*1.71%*	*25.43%*	*10.17%*	*3,342.45*
RSM 265613103203 Light poles, anchor base, aluminum, 30' high, excl concrete bases	5.0	EA	12,171	208	3,095	1,238	16,712
			273.50	*1.71%*	*25.43%*	*10.17%*	*375.53*
USR BOAT - cam Light Pole Crew - Crane	30.0	HR	8,205	140	2,086	835	11,266
			231.54	*1.71%*	*25.43%*	*10.17%*	*317.92*
USR ELEC2-cam Electrical Crew	30.0	HR	6,946	119	1,766	706	9,538
			22,477.69				*30,863.78*
12029908 Harbor Float Improvements - Fresh Water Supply	**1.0**	**EA**	**22,478**	**384**	**5,716**	**2,286**	**30,864**
			14.88				*20.43*
1202990801 Demo Existing Steel Pipe - South Main Float & E float	**400.0**	**LF**	**5,953**	**102**	**1,514**	**605**	**8,174**
			37.36	*1.71%*	*25.43%*	*10.17%*	*51.30*
RSM 024113460900 Selective demolition, steel pipe, fittings, 3/4-4", excludes excavation	20.0	EA	747	13	190	76	1,026
			17.20	*1.71%*	*25.43%*	*10.17%*	*23.62*
RSM 220505101980 Pipe hanger / support, selective demolition	40.0	EA	688	12	175	70	945
			114.68	*1.71%*	*25.43%*	*10.17%*	*157.47*
RSM 220505101910 Pipe fittings with a single connection, 2" diameter, selective demolition	6.0	EA	688	12	175	70	945
			9.56	*1.71%*	*25.43%*	*10.17%*	*13.12*
RSM 220505102050 Pipe, metal pipe, 2" diam., selective demolition	400.0	LF	3,823	65	972	389	5,249
			6.88	*1.71%*	*25.43%*	*10.17%*	*9.45*
RSM 220505102162 Pipe, plastic, with fittings, 2" diameter, selective demolition	1.0	LF	7	0	2	1	9
			88.10				*120.97*
1202990802 New 2" HDPE Water Supply Pipe - South Main Float	**100.0**	**LF**	**8,810**	**151**	**2,240**	**896**	**12,097**
			229.06	*1.71%*	*25.43%*	*10.17%*	*314.52*
RSM 220523203480 Valves, bronze, gate, non-rising stem, threaded, class 150, 2"	1.0	EA	229	4	58	23	315
			135.54	*1.71%*	*25.43%*	*10.17%*	*186.10*
RSM 221119141340 Flexible metal hose, bronze braided, carbon steel ends, threaded, 2" diameter x 36"	1.0	EA	136	2	34	14	186
			88.48	*1.71%*	*25.43%*	*10.17%*	*121.49*
RSM 221113766070 Coupling, plastic, CPVC, threaded, 2", schedule 80	2.0	EA	177	3	45	18	243

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			8.72	*1.71%*	*25.43%*	*10.17%*	*11.98*
RSM 221113780312 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	1.0	EA	9	0	2	1	12
			10.94	*1.71%*	*25.43%*	*10.17%*	*15.03*
RSM 221113780712 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	1.0	EA	11	0	3	1	15
			164.82	*1.71%*	*25.43%*	*10.17%*	*226.31*
RSM 220523201500 Valves, bronze, ball, threaded, 150 lb., 2"	2.0	EA	330	6	84	34	453
			158.54	*1.71%*	*25.43%*	*10.17%*	*217.68*
RSM 221119140220 Flexible metal hose, bronze braided, bronze ends, threaded, 2" diameter x 18"	2.0	EA	317	5	81	32	435
			88.48	*1.71%*	*25.43%*	*10.17%*	*121.49*
RSM 221113766070 Coupling, plastic, CPVC, threaded, 2", schedule 80	4.0	EA	354	6	90	36	486
			1.90	*1.71%*	*25.43%*	*10.17%*	*2.61*
RSM 221113780066 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	500.0	LF	952	16	242	97	1,307
			393.36	*1.71%*	*25.43%*	*10.17%*	*540.12*
RSM 221113785366 Coupling, plastic, high density polyethylene (HDPE), force transfer, welded, 2" DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	12.0	EA	4,720	81	1,200	480	6,481
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	5.0	EA	127	2	32	13	174
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	10.0	EA	148	3	38	15	203
			11.67	*1.71%*	*25.43%*	*10.17%*	*16.02*
RSM 220529104480 Pipe hanger / support, U-bolt, standard, 2" pipe size, type number 42 per MSS-SP58, includes nuts	2.0	EA	23	0	6	2	32
			10.94	*1.71%*	*25.43%*	*10.17%*	*15.03*
RSM 221113780712 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 2" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	2.0	EA	22	0	6	2	30
			272.92	*1.71%*	*25.43%*	*10.17%*	*374.74*
RSM 221119540900 Water hammer arrester/shock absorber, copper, for 114 to 154 fixtures, 2" male I.P.S.	2.0	EA	546	9	139	56	749
			355.29	*1.71%*	*25.43%*	*10.17%*	*487.85*
RSM 221113786216 End termination, plastic, high density polyethylene (HDPE), welded, 2" DR 11, add 1 weld per joint, includes vent plug, excludes hangers, trenching, backfill, hoisting or digging equipment.	2.0	EA	711	12	181	72	976
			17.83				*24.48*
1202990803 New 1" HDPE Water Supply Pipe/Hose Bibbs	**300.0**	**LF**	**5,349**	**91**	**1,360**	**544**	**7,344**
			469.49	*1.71%*	*25.43%*	*10.17%*	*644.65*
RSM 221113786616 Tee, plastic, high density polyethylene (HDPE), welded, 2" x 1" , add 1 weld per	5.0	EA	2,347	40	597	239	3,223

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
joint, excludes hangers, trenching, backfill, hoisting or digging equipment.							
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	2.0	EA	51	1	13	5	70
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	2.0	EA	30	1	8	3	41
			82.23	*1.71%*	*25.43%*	*10.17%*	*112.91*
RSM 220523201470 Valves, bronze, ball, threaded, 150 lb., 1"	1.0	EA	82	1	21	8	113
			86.90	*1.71%*	*25.43%*	*10.17%*	*119.32*
RSM 221119140180 Flexible metal hose, bronze braided, bronze ends, threaded, 1" diameter x 18"	1.0	EA	87	1	22	9	119
			68.28	*1.71%*	*25.43%*	*10.17%*	*93.75*
RSM 221113766040 Coupling, plastic, threaded, 1", schedule 80	2.0	EA	137	2	35	14	188
			13.54	*1.71%*	*25.43%*	*10.17%*	*18.60*
RSM 220529104310 Pipe hanger / support, strap, 1" pipe size, type number 26 per MSS-SP58	3.0	EA	41	1	10	4	56
			0.76	*1.71%*	*25.43%*	*10.17%*	*1.05*
RSM 221113780054 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	300.0	LF	228	4	58	23	314
			9.12	*1.71%*	*25.43%*	*10.17%*	*12.52*
RSM 221113780704 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	7.0	EA	64	1	16	6	88
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	24.0	EA	285	5	72	29	391
			14.27	*1.71%*	*25.43%*	*10.17%*	*19.60*
RSM 220529108020 Pipe hanger / support, pipe clamp, plastic, 1" CTS	60.0	EA	856	15	218	87	1,176
			1.00	*1.71%*	*25.43%*	*10.17%*	*1.37*
RSM 221113748160 Pipe, plastic, polyethylene, flexible, 200 psi, 1" diameter, SDR 9, excludes couplings and hangers	30.0	LF	30	1	8	3	41
			6.98	*1.71%*	*25.43%*	*10.17%*	*9.58*
RSM 221113780304 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	7.0	EA	49	1	12	5	67
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	22.0	EA	261	4	66	27	359
			8.56	*1.71%*	*25.43%*	*10.17%*	*11.76*
RSM 220529100630 Pipe hanger / support, one hole clamp, 1" pipe size, for vertical mounting	4.0	EA	34	1	9	3	47
			176.96	*1.71%*	*25.43%*	*10.17%*	*242.98*
RSM 221119540600 Water hammer arrester/shock absorber, copper, for 12 to 32 fixtures, 1" male I.P.S.	4.0	EA	708	12	180	72	972

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			7.38	*1.71%*	*25.43%*	*10.17%*	*10.13*
RSM 220529104450 Pipe hanger / support, U-bolt, standard, 1" pipe size, type number 42 per MSS-SP58, includes nuts	8.0	EA	59	1	15	6	81
			591.55				*812.25*
1202990804 New 1" HDPE Pipe Risers/Hose Bibbs Fish Wash	**4.0**	**EA**	**2,366**	**40**	**602**	**241**	**3,249**
			469.49	*1.71%*	*25.43%*	*10.17%*	*644.65*
RSM 221113786616 Tee, plastic, high density polyethylene (HDPE), welded, 2" x 1" , add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	1.0	EA	469	8	119	48	645
			25.31	*1.71%*	*25.43%*	*10.17%*	*34.76*
RSM 221113784050 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 2" pipe size, weld, excludes welding machine	2.0	EA	51	1	13	5	70
			14.79	*1.71%*	*25.43%*	*10.17%*	*20.30*
RSM 220529104340 Pipe hanger / support, strap, 2" pipe size, type number 26 per MSS-SP58	2.0	EA	30	1	8	3	41
			82.23	*1.71%*	*25.43%*	*10.17%*	*112.91*
RSM 220523201470 Valves, bronze, ball, threaded, 150 lb., 1"	1.0	EA	82	1	21	8	113
			86.90	*1.71%*	*25.43%*	*10.17%*	*119.32*
RSM 221119140180 Flexible metal hose, bronze braided, bronze ends, threaded, 1" diameter x 18"	1.0	EA	87	1	22	9	119
			68.28	*1.71%*	*25.43%*	*10.17%*	*93.75*
RSM 221113766040 Coupling, plastic, threaded, 1", schedule 80	2.0	EA	137	2	35	14	188
			13.54	*1.71%*	*25.43%*	*10.17%*	*18.60*
RSM 220529104310 Pipe hanger / support, strap, 1" pipe size, type number 26 per MSS-SP58	3.0	EA	41	1	10	4	56
			0.76	*1.71%*	*25.43%*	*10.17%*	*1.05*
RSM 221113780054 Pipe, plastic, high density polyethylene (HDPE), single wall, straight, welded, based on 40' length, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	40.0	LF	30	1	8	3	42
			9.12	*1.71%*	*25.43%*	*10.17%*	*12.52*
RSM 221113780704 Tee, plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	5.0	EA	46	1	12	5	63
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	24.0	EA	285	5	72	29	391
			14.27	*1.71%*	*25.43%*	*10.17%*	*19.60*
RSM 220529108020 Pipe hanger / support, pipe clamp, plastic, 1" CTS	8.0	EA	114	2	29	12	157
			1.00	*1.71%*	*25.43%*	*10.17%*	*1.37*
RSM 221113748160 Pipe, plastic, polyethylene, flexible, 200 psi, 1" diameter, SDR 9, excludes couplings and hangers	30.0	LF	30	1	8	3	41
			6.98	*1.71%*	*25.43%*	*10.17%*	*9.58*
RSM 221113780304 Elbow, 90 Deg., plastic, high density polyethylene (HDPE), single wall, welded, 1" diam., DR 11, add 1 weld per joint, excludes hangers, trenching, backfill, hoisting or digging equipment.	8.0	EA	56	1	14	6	77
			11.87	*1.71%*	*25.43%*	*10.17%*	*16.30*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
RSM 221113784030 Welding, plastic, high density polyethylene (HDPE), single wall, labor per joint, cost based on the thickest wall for each diameter, 1" pipe size, weld, excludes welding machine	22.0	EA	261	4	66	27	359
			8.56	*1.71%*	*25.43%*	*10.17%*	*11.76*
RSM 220529100630 Pipe hanger / support, one hole clamp, 1" pipe size, for vertical mounting	4.0	EA	34	1	9	3	47
			176.96	*1.71%*	*25.43%*	*10.17%*	*242.98*
RSM 221119540600 Water hammer arrester/shock absorber, copper, for 12 to 32 fixtures, 1" male I.P.S.	2.0	EA	354	6	90	36	486
			7.38	*1.71%*	*25.43%*	*10.17%*	*10.13*
RSM 220529104450 Pipe hanger / support, U-bolt, standard, 1" pipe size, type number 42 per MSS-SP58, includes nuts	8.0	EA	59	1	15	6	81
			50.24	*1.71%*	*25.43%*	*10.17%*	*68.98*
RSM 224139105000 Faucets/fittings, sillcock, compact brass, I.P.S. or solder to hose	4.0	EA	201	3	51	20	276
			859,684.64				*1,180,420.08*
12029912 Harbor Float Improvements - Floating Dock Work Improvement 6	**1.0**	**EA**	**859,685**	**14,701**	**218,596**	**87,439**	**1,180,420**
			859,684.64				*1,180,420.08*
1202991201 South Main & E Float Improvements	**1.0**	**EA**	**859,685**	**14,701**	**218,596**	**87,439**	**1,180,420**
			33.77	*1.71%*	*25.43%*	*10.17%*	*46.37*
RSM 355113241740-cam Demolition Existing Wood Float	6,640.0	SF	224,224	3,834	57,015	22,806	307,879
			12.91	*1.71%*	*25.43%*	*10.17%*	*17.72*
RSM 024119180500 Selective demolition, disposal only, wood frame, includes loading and 5 mile RT haul to dump	555.0	CY	7,164	123	1,822	729	9,837
			88.16	*1.71%*	*25.43%*	*10.17%*	*121.05*
RSM 355113241740 Float, wooden, 10' wide	4,400.0	SF	387,915	6,633	98,637	39,455	532,641
			107.31	*1.71%*	*25.43%*	*10.17%*	*147.35*
RSM 355113241740 Float, wooden, fingers, 5' wide	2,240.0	SF	240,381	4,111	61,123	24,449	330,063

Currency in US dollars

Seldovia Harbor Improvements Feasibility Report

Title Page

This cost estimate is for the dredging scope of work only for the Seldovia Harbor Improvement Project.

This detailed feasability cost estimate is available at: Y:\P\CW\W\Seldovia\Seldovia Harb Imp AKV292\1 Recon\4 Dredging Improvements\MII

Estimated by	Christine Morgan
Designed by	Alaska District
Prepared by	Christine Morgan
Preparation Date	9/9/2010
Effective Date of Pricing	9/9/2010
Estimated Construction Time	180 Days

Date	Author	Note
10/18/2010	cam	The Seldovia Harbor is comprised of a 3.85 acre federally maintained basin to -12 feet MLLW and a 2.67 acre basin that was dredged to approximately -12 feet MLLW in 1983. The proposed dredging improvements in this section address improvements to areas outside of the federally maintained basin. This estimate assumes no difficult dredging (i.e. no rock needing blasting), dredging with a 3 CY clamshell and up land disposal. If rock is encountered than the dredging would cease in that area. Material is assumed to be mud/silt. All material dredged is assumed to be non-contaminated. If contaminated material is encountered than additional costs would be incurred. Upland disposal includes loaders and an excavator offloading from the scow onto a conveyor to the bank/parking lot that is directly across from the South Main Float to allow for de-watering. Once the material has drained then front end loaders will load the material onto dump trucks to be hauled within 2 miles for dumping. A dozer would spread the material once the dredged material is in place.

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	MiscOwner	ProjectCost
Owner Cost Summary Report			**2,179,441**	**37,268**	**543,129**	**217,252**	**0**	**2,977,091**
			2,179,441.31					*2,977,090.63*
12 Harbor Improvements - Dredging	**1.0**	**EA**	**2,179,441**	**37,268**	**543,129**	**217,252**	**0**	**2,977,091**
			2,179,441.31					*2,977,090.63*
1202 Harbor Improvements - Dredging	**1.0**	**EA**	**2,179,441**	**37,268**	**543,129**	**217,252**	**0**	**2,977,091**
(Note: From CEDEP With a 3CY clamshell bucket crane on a barge, estimate 85CY/Hr as the dredging rate. This includes $5,000 per month for water testing and $500 permitting fees. Dumping of dredged material is dewatered within 300 feet of dredge site using a conveyer with an excavator & dozer.)								
			447,568.00					*599,081.36*
120201 Mob/Demob & Bonds	**1.0**	**EA**	**447,568**	**7,653**	**102,757**	**41,103**	**0**	**599,081**
			170.93					*234.70*
120215 Clamshell Dredging and onshore Disposal, Complete	**10,132.0**	**CY**	**1,731,873**	**29,615**	**440,372**	**176,149**	**0**	**2,378,009**

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Project Cost Summary Report			**2,179,441**	**37,268**	**543,129**	**217,252**	**2,977,091**
			2,179,441.31				*2,977,090.63*
12 Harbor Improvements - Dredging	**1.0**	**EA**	**2,179,441**	**37,268**	**543,129**	**217,252**	**2,977,091**
			2,179,441.31				*2,977,090.63*
1202 Harbor Improvements - Dredging	**1.0**	**EA**	**2,179,441**	**37,268**	**543,129**	**217,252**	**2,977,091**
			447,568.00				*599,081.36*
120201 Mob/Demob & Bonds	**1.0**	**EA**	**447,568**	**7,653**	**102,757**	**41,103**	**599,081**
			447,568.00				*599,081.36*
12020101 Mob/Demob & Bonds	**1.0**	**EA**	**447,568**	**7,653**	**102,757**	**41,103**	**599,081**
			170.93				*234.70*
120215 Clamshell Dredging and onshore Disposal, Complete	**10,132.0**	**CY**	**1,731,873**	**29,615**	**440,372**	**176,149**	**2,378,009**
			140.69				*193.18*
12021501 Clamshell Dredging and onshore Disposal, Complete - Improvement 1	**2,620.0**	**CY**	**368,607**	**6,303**	**93,727**	**37,491**	**506,128**
			56.08				*77.00*
Dredge	**2,620.0**	**CY**	**146,929**	**2,512**	**37,360**	**14,944**	**201,745**
			84.61				*116.18*
Remove Dredge Material	**2,620.0**	**CY**	**221,678**	**3,791**	**56,367**	**22,547**	**304,383**
			149.66				*205.49*
12021502 Clamshell Dredging and onshore Disposal, Complete - Improvement 2	**3,030.0**	**CY**	**453,466**	**7,754**	**115,305**	**46,122**	**622,648**
			72.88				*100.07*
Dredge	**3,030.0**	**CY**	**220,823**	**3,776**	**56,150**	**22,460**	**303,209**
			76.78				*105.43*
Remove Dredge Material	**3,030.0**	**CY**	**232,643**	**3,978**	**59,155**	**23,662**	**319,439**
			304.02				*417.44*
12021503 Clamshell Dredging and onshore Disposal, Complete - Improvement 3	**825.0**	**CY**	**250,814**	**4,289**	**63,776**	**25,510**	**344,389**
			93.50				*128.39*
Dredge	**825.0**	**CY**	**77,141**	**1,319**	**19,615**	**7,846**	**105,921**
			210.51				*289.05*
Remove Dredge Material	**825.0**	**CY**	**173,673**	**2,970**	**44,161**	**17,664**	**238,467**
			148.38				*203.74*
12021504 Clamshell Dredging and onshore Disposal, Complete - Improvement 4	**2,230.0**	**CY**	**330,886**	**5,658**	**84,136**	**33,654**	**454,334**
			53.65				*73.66*
Dredge	**2,230.0**	**CY**	**119,638**	**2,046**	**30,421**	**12,168**	**164,273**
			94.73				*130.07*
Remove Dredge Material	**2,230.0**	**CY**	**211,248**	**3,612**	**53,715**	**21,486**	**290,062**
			1,612.51				*2,214.11*
12021505 Clamshell Dredging and onshore Disposal, Complete - Improvement 5	**100.0**	**CY**	**161,251**	**2,757**	**41,002**	**16,401**	**221,411**
			69.68				*95.67*

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Dredge	**100.0**	**CY**	**6,968**	**119**	**1,772**	**709**	**9,567**
			1,542.83				*2,118.44*
Remove Dredge Material	**100.0**	**CY**	**154,283**	**2,638**	**39,230**	**15,692**	**211,844**
			641.73				*881.15*
12021506 Clamshell Dredging and onshore Disposal, Complete - Improvement 6	**260.0**	**CY**	**166,850**	**2,853**	**42,426**	**16,970**	**229,099**
			31.87				*43.77*
Dredge	**260.0**	**CY**	**8,287**	**142**	**2,107**	**843**	**11,379**
			609.86				*837.38*
Remove Dredge Material	**260.0**	**CY**	**158,562**	**2,711**	**40,318**	**16,127**	**217,720**

Currency in US dollars

SELDOVIA HARBOR EXPANSION

ITEM	QUANTITY	UNIT	UNIT PRICE ($)	TOTAL ($)	ESCALATED UNIT PRICE ($)	ESCALATED TOTAL COST ($)	UPDATED UNIT PRICE ($)	UPDATED TOTAL COST ($)	NOTES
Mobilization/Demobilization	1	LS	75,000	75,000	124,500	124,500	**1,556,513**	**1,556,513**	
Breakwaters									
- Extend North Breakwater									
-- Armor Rock	11,400	CY	50	570,000	83	946,200	83	946,200	
-- Filter Rock	5,100	CY	45	229,500	75	380,970	75	380,970	
-- Dredged Rock	7,200	CY	8	57,600	13	95,616	13	95,616	
-- Quarry Run	20,000	CY	35	700,000	58	1,162,000	58	1,162,000	
- Move South Breakwater									
-- Armor Rock	10,200	CY	25	255,000	42	423,300	42	423,300	
-- Filter Rock	12,400	CY	24	297,600	40	494,016	40	494,016	
-- Core	36,000	CY	21	756,000	35	1,254,960	35	1,254,960	
Dredging									
- Rock	7,200	CY	27	194,400	45	322,704	**70**	**504,000**	*All dredging updated with CEDEP program.*
- Other Dredgings (including disposal)	23,000	CY	14	322,000	23	534,520	**154**	**3,542,000**	*Includes upland removal of dredged material.*
Float System									
- Floats	11,900	SF	25	297,500	42	493,850	**75**	**892,500**	*Updated with historical data for harbor improvements.*
- Piles	74	EA	2,100	155,400	3,486	257,964	**6,000**	**444,000**	" "
- Electrical Upgrades	0	LS	0	0	0	0	**2,247,024**	**2,247,024**	*Not included in previous estimates.*
- Mechanical Upgrades	0	LS	0	0	0	0	**98,709**	**98,709**	" "
- Existing Harbor Upgrades	0	LS	0	0	0	0	**4,678,567**	**4,678,567**	" "
- Existing Eectrical Upgrades	0	LS	0	0	0	0	**948,695**	**948,695**	" "
- Existing Mechanical Upgrades	0	LS	0	0	0	0	**62,701**	**62,701**	" "
SUBTOTAL				3,910,000		6,490,600		18,175,258	
Contingency (25%)				977,500		1,622,650		4,543,815	
CONSTRUCTION CONTRACT				4,887,500		8,113,250		22,719,073	
Engineering & Design (E&D 7%)				342,125		567,928		1,590,335	
Supervision & Admin (S&A 6.5%)				317,688		527,361		1,476,740	
Lighted Navigation Aids									
(Coast Guard)	1	LS	4,000	4	6,640	7	6,640	7	
TOTAL PROJECT COST				5,547,313		9,208,539		25,786,147	

Escalation Rate		
FY98	457.55	
FY12	757.54	1.66

Harbor Improvements
Trip Reports Appendix D
Seldovia, Alaska

Prepared for:

Denali Commission

February 2011

Prepared by:

U.S. Army Corps of Engineers

Alaska District

HARBOR IMPROVEMENTS
TRIP REPORTS APPENDIX
SELDOVIA, ALASKA

CONTENTS

I. TRIP REPORT – SEPTEMBER 10, 2009

A. Participants

Bruce Sexauer – EN-CW-PF

Chris Floyd - EN-CW-ER

Crane Johnson – EN-CW-HH

B. Summary

This trip report documents the site visit to Seldovia, Alaska to investigate harbor improvements as part of the AKV292 (326049) Seldovia Harbor Improvements Denali Commission project.

Photos taken during the site visit are located at O:_Projects by Location\Seldovia\AKV292 (326049) Seldovia Harbor Improvements Denali Commission\06 Photos-Maps-Drawings

C. Background

Seldovia Harbor is a Federal project with two pertinent authorizations

(1) Rivers and Harbors Act, 2 March 1945 (House Doc. 702, 76th Congress, 1st Session) as adopted, provides for removal of obstructions in the entrance channel near Watch Point to a depth of 24 feet below MLLW.

(2) Rivers and Harbors Act, 3 July 1958 (House Doc. 34, 85th Congress, 1st Session) as adopted, provides for a small boat basin 300 feet long by 700 feet wide to a depth of 12 feet below MLLW protected by two rock breakwaters 400 and 600 feet long.

The small boat basin provides protected moorage for 140 fishing vessels. Improvement of the outer channel eliminates delays due to tides, permits use of larger vessels, facilitates deep-draft cargo operations at the port, and assures greater safety for vessels calling at Seldovia. Project depth is effectively available throughout the deep draft channel, June 2003. The vast majority of the Federal basin also meets or exceeds project depth, but the float configuration is such that for vessels transiting the local basin, -9.5 feet MLLW controls. The following figures are available in Alaska District Project Maps and Index Sheets, Revised to 30 September 2007.

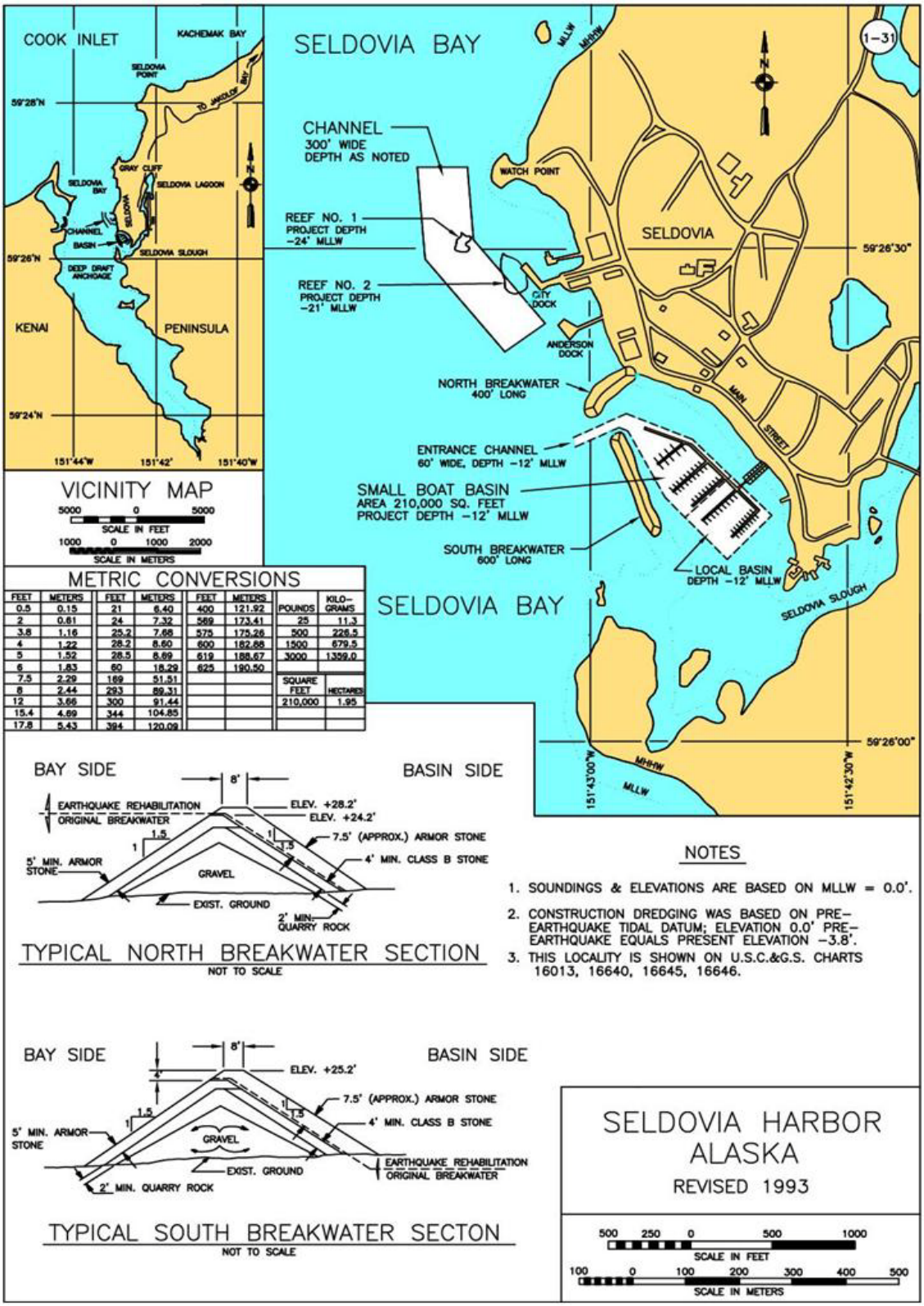

Figure D-1. Project Index Drawing from the 2007 Project Index Book

Seldovia Harbor

View taking in the main city dock and the small boat harbor, 2000.

The small boat harbor and downtown Seldovia, 2000.

Figure D-2. Photos from the 2007 Project Index Book

The following documents the various Federal activities listed in the Alaska District Project Maps and Index Sheets, Revised to 30 September 2007

1960 - Hydrographic surveys and predesign investigations are carried out.

1961 - The project is modified during the design stage as follows: Reef No. 2 is to be removed completely to the -21 foot depth (instead of partial removal to -24 feet), minor relocation of the basin and breakwaters, and modification of the basin's shape. Basin dredging begins in October with suitable material utilized as breakwater core.

1962 - Drilling and blasting operations begin in the outer channel in February and are completed in April; final dredging in the basin is finished in April as well. Work on the breakwaters continues until completion in December.

1964 - The earthquake of 27 March 1964 damages the breakwaters and inner harbor facilities; a subsidence of 3.8 feet is reported. Rehabilitation of the Federal project by increasing the elevation of the breakwaters by 4 feet is initiated in June and completed in October.

2000 - A condition survey is conducted in May of both the harbor and the deep draft channel.

2002 - Vertical aerial photography is taken in June.

2003 - A condition survey of both the harbor and the deep draft channel is conducted in June.

2006 - The latest condition surveys of both the channel and harbor are completed in May.

D. Trip Report

The Corps team travelled to Seldovia, Alaska on September 10, 2009 to investigate harbor improvements as part of the AKV292 (326049) Seldovia Harbor Improvements Denali Commission projects.

Travel was via Pen Air to Homer, then Homer Air to Seldovia. Note that one must take a taxi from the main Homer air terminal to the other side of the airport where the Homer Air facilities are located.

The team arrived in Seldovia at about 8:15 AM and was greeted by Tim Dillon, Seldovia City Manager. After a brief tour of Seldovia proper, the team gathered at the Seldovia Harbor offices to discuss the project with Mr. Dillon and the harbormaster Susan Carlough. The discussion centered on the various needs for harbor improvement. The remainder of this document will detail the concerns of the city, information gathered, and requests for information left with the city.

E. City Concerns and Ideas

The City of Seldovia has several concerns with the existing condition of the harbor facilities. These include docks, power and water systems, seaplane facilities, lack of kayak/rowboat/non powered boat facilities, old pilings, and shallow depths available in significant portions of the harbor. The city’s specific concerns are as follows.

Harbor Depth – From C Dock southward, the harbor is shallower than the Federal harbor depth of 12 feet. For reasons unknown to the city, this portion was never dredged. Several boats are limited in their ability to maneuver at low tides and many groundings have been reported. When boats are moored at the ends of the docks nearest the breakwater, deeper draft vessels cannot navigate around them because the channel is too shallow away from the docks. Moorage of vessels at the D and E docks are limited to either shallow draft vessels or to the few spots where deeper water exists. The harbormaster reports that many vessels use the channel to the south of the main breakwater for entrance and egress even though this channel goes dry during negative tides.

Floats – The harbormaster repeatedly described the floats as being old, suffering from rot, and in need of significant upgrade, overhaul, and/or replacement. She has particular concerns with the bull rails which are showing signs of rot. She reports several incidences of cleats pulling out and boats breaking loose because of a lack of mooring points and cleats. Work had been done by a previous contractor but was not completed for a variety of reasons. This worked upgraded much of the B dock decking, but most of the bull rails, and some of the decking still needs replacement.

Pilings – As previously mentioned, the harbor had some upgrades already completed. Many of the harbor's wood piling have been replaced with modern aluminum pile. However, as the city reports, several of the new piling were not able to be placed. Resident Jim Hopkins worked on the project to replace the piling and reported that several of the locations for new piling were located on material that was far too rocky to achieve an adequate pile depth. In a few instances, there was no penetration at all. He said the pile driving record was on file with the city. Mr. Hopkins also stated that in order to drive the remainder of the pilings, a drill rig would likely be needed.

Power – As part of the previously attempted upgrades, significant portions of the electrical system has been upgraded, though there are multiple features that are still needed. The city specifically mentioned light standards are needed on A dock, along with new 30 Amp service.

Water – The city manager said water has been a maintenance nightmare. Early in his tenure, he found that he had to send his crews to the harbor almost daily to perform repairs to the water system. After conversations with other harbormasters, he discovered Homer utilizes a system of fire hoses that are laid out every year, then drained and stored every winter. Seldovia has put this system into practice and has found this approach may very well meet their needs. The city manager and harbormaster both commented that work was needed to make this system safe and effective for the long run, but would be very willing to use this as their long term water system.

Seaplane – The city reports the seaplane facility located at the end B dock is in poor condition. In addition, they find the seaplanes tend to cause navigation hazards as they enter in through the main harbor entrance. Though the opening to the south of the main breakwater is not considered a navigable channel, seaplanes do tend to utilize this access point as well at higher tides when the shoal is covered. The city has expressed some interest in dredging a channel in this opening.

Kayak/rowboat/non powered boat facilities – The city has noticed a substantial increase in the number of non powered vessels (kayaks, rowboats, small sail boats) utilizing the city docks. There is very limited room for this type of use so the city did express interest in developing an additional pier for this purpose.

Fast Ferry – The proposed Seldovia ferry may also need to be incorporated into the improvements. The Alaska Native Village of Seldovia has expressed interest in constructing a wharf outside the harbor, though once the derelict vessel (the Husky II) has been scrapped, there will be ample space for moorage of the ferry in the harbor. The city would like this item examined.

Harbor Expansion – Though the existing harbor is operating without a substantial waiting list, there is desire by some in the community to explore harbor expansion. Seldovia Harbor has been utilized by the commercial fishing fleet as a harbor of refuge for shelter during storms or as a port for making repairs without going further to the harbor at Homer. In addition, the city is considering development of a value added fish processing facility. Harbor expansion could help support these activities.

F. Corps Inspection

The following are the observations of the Corps staff from inspection of the Seldovia harbor facilities. The investigations were mostly visual, with some impromptu tests of wood integrity using a screw driver to jab at wood to find rotted sections.

1. Main Run

The main run of the dock system has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. In some areas, the bull rail has vegetation growing out of cracks. Towards the north end, the main run appears warped as if the floatation is unevenly distributed. In the same northern area, the dock appears to be significantly undersized for the type of vessels that are moored to it. The main run needs 6, 3-phase meters replaced. The water system being used is a series of fire hoses with connections to previously installed water spigots. The city reports they are using this system now because the older system was breaking daily and had become a maintenance burden. The city reports that if the fire hose system were adjusted for easy installation and safe placement, they would be very satisfied. To the south along the main run the decking and bull rail show similar signs of wear as the north end. There is also warping of the main run dock showing an uneven distribution of floatation.

Figure D-3. Main Run Show Decking Wear and Hose Watering System

Figure D-4. Main Run Warping

2. A Dock

A Dock has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. In some areas, the bull rail has vegetation growing out of cracks.

The finger piers are fastened using a pin system leaving the fingers to not be stable. The slippery nature of the decking in combination with the finger pier instability provides for a potential safety hazard. The float is in need of 3 light standards and 3 30 Amp service pillars. There are 2 groups of piling (three piling each) that are not utilized and can be removed.

Figure D-5. A Dock Showing Decking and Bull Rail Condition

Figure D-6. A Dock Typical Finger Pier

Figure D-7. Typical Finger Pier Pin Connection

3. B Dock

B Dock has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. Some sections of B Dock have been replaced. The finger piers have a solid connection that is integrated into the main run of B Dock. This provides a stable finger pier. The city commented the fillet that is integrated into the finger pier connection does not allow vessels to back into their slips. Two piles that were to be installed are missing. Two wooden piles need to be removed. The electrical system on B Dock is satisfactory.

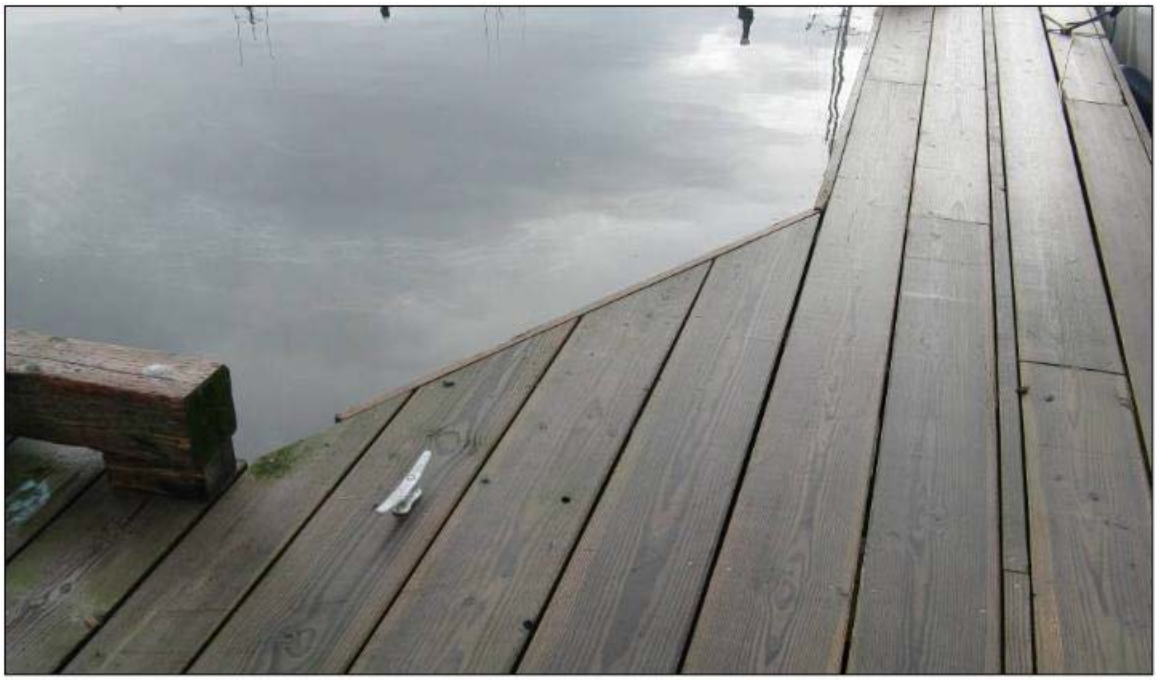

Figure D-8. B Dock Finger Pier

Figure D-9. B Dock Bull Rail Rot

4. C Dock

C Dock has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. In some areas, the bull rail has vegetation growing out of cracks. The finger piers are fastened using a pin system leaving the fingers to not be stable. The

slippery nature of the decking in combination with the finger pier instability provides for a potential safety hazard. 3 of the new metal piles are missing. 21 wood piles need to be removed. The city reports that vessels cannot pass the end of C Dock at low tide when a boat is moored at the end because the water is too shallow.

Figure D-10. C Dock Typical Deck and Bull Rail

5. D Dock

D Dock has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. In some areas, the bull rail has vegetation growing out of cracks. The finger piers are fastened using a pin system leaving the fingers to not be stable. The slippery nature of the decking in combination with the finger pier instability provides for a potential safety hazard. About 3 to 5 of the new metal piles are missing. 10 wood piles need to be removed. D dock has no finger piers to the north. If installed, these finger piers could provide more moorage.

Figure D-11. D Dock - Decking Damage

6. E Dock

E Dock has worn decking and bull rails. Both appear solid, but do have a fair amount of moss, wear marks, and cracking. The finger piers are fastened using a pin system leaving the fingers to not be stable. The slippery nature of the decking in combination with the finger pier instability provides for a potential safety hazard. Some of the new metal piles are missing. 14 wood piles need to be removed. E dock needs lighting. The floatplane dock attached to the outside end of E dock is very worn and needs replacing.

Figure D-12. Float Plane Dock

7. Boat Launches

The community boat launch facilities appear to be in satisfactory condition with the city reporting no issues. There are two launches. The large vessel launch is to the north of the harbor and the City dock. The city operates a tractor and trailer to haul larger vessels out of the water. The inner harbor boat launch is at the northern end of the boat harbor. This launch is available for regular trailered boat launching and recovery. Neither launch facility has a dock.

Figure D-13. Large Vessel Launch

Figure D-14. Inner Harbor Boat Launch

8. City Dock

The city has their main dock located to the north of the boat harbor. Recent upgrades have improved the dock electrical system and have rehabilitated and/or wrapped several piling to extend their structural life span. The gangway utilized by the Alaska Marine Highway

System (AMHS) is in poor condition, as well as the safety net that stretches out below the gangway. The city stated they are working with the AMHS and others on a plan to replace/fix these two issues.

Figure D-15. City Dock

G. Environmental Observations

Water quality within the harbor basin appeared to be good, based on visual observations.

Turbidity appeared to be low, and the large numbers of invertebrates (e.g., *Meretridium* anemones, barnacles, mussels, etc.) seen growing on substrates such as ship hulls and piers suggested a reasonably high dissolved oxygen content. Several fuel sheens were seen floating on the water around the float system.

We arrived at Seldovia during an ebb tide, and were able to see water flowing at a high rate out of Seldovia Slough. The water flowing out of the slough was very clear, suggesting that the slough is not a significant source of sediment for the harbor basin.

At low tide, the reef that extends south from the end of the main breakwater was clearly visible.

Large blades of kelp-like brown algae were growing from the bottoms of the float systems. A large clump of uprooted bull kelp (probably *Nereocystis* sp.) was floating in the harbor basin east of the float system. The harbormaster stated the kelp did not grow in the harbor but washed in from Seldovia Bay. Clumps of eel grass (*Zostera* sp.) were seen in the water and on piers around D float and further south. The eel grass did not appear to have come from the harbor basin; the harbormaster said the eel grass grew in the Seldovia Slough estuary.

Bird life around the harbor consisted mostly of glaucous wing gulls and northwestern crows, with smaller numbers of bald eagles, fox sparrows, and kingfishers. One northern sea otter was seen resting a few dozen feet south of E float. The remains of a recently-killed northwestern crow were found on A float. The harbormaster believed that a mink had most likely killed the crow, based on the state of the carcass; she stated that she had previously seen mink hunting on the harbor floats.

The harbormaster and city manager stated that few people fished within the harbor basin, although the nearby slough was a popular fishing area, especially for king and silver salmon. Some king salmon are caught off the north end of the harbor breakwater, and off the city dock outside the harbor basin.

[The ADFG fish distribution database lists chum, coho, and pink salmon as spawning in Seldovia Slough; the king salmon are stocked in Seldovia Bay as part of an ADFG program.]

Dungeness crab used to be caught in Seldovia Bay, but have not been actively fished in many years.

H. Initial Assessment of Proposed Project

1. Dredging

After reviewing the 2006 project condition survey and discussions with the harbormaster and harbor users there exists a need to dredge the 'locally' maintained portion of the harbor. An initial quantity estimate for the amount of material to be dredged in the locally maintained area around floats D and E to a depth of -12 MLLW is 5,500 cubic yards. Several items of work quickly come to mind to reach this goal:

- Establish the limits and depth of dredging for this project through consultation with the city and an analysis of harbor usage to determine a recommended depth for the locally maintained area. This analysis could also include looking at the federal area and determining if -12 MLLW is the appropriate depth for the entrance channel and the large boat berthing areas. Original harbor planning documents indicate the project depth was initially -14 MLLW and then reduced to -12 MLLW. Most of the federal area is several feet deeper than the required -12 federal depth due to subsidence in the 1964 Earthquake. The local basin area ranges from -10 to -13 MLLW with the extreme southern corner around the airplane float much shallower (~ -5 MLLW).

- Characterize material proposed to be dredged. This would include all of the required sediment sampling to determine if the material is contaminated and scope the work for dredging (hard till, loose sediment, rock etc.). This should not be completed until we are fairly confident in both the location and depth of required dredging. A brief review of the original harbor documents indicates the local basin area is likely silty, gravelly sand. Geotech will need to review the historical reports and determine if additional geotech investigations are necessary. Additional information, if required, could be gathered at the same time as samples are collected for chemical analysis.

- One thing discussed in previous reports that might address some of the groundings brought up by the harbormaster would be including channel navigation markers for the entrance channel. The channel extends for some distance beyond the breakwaters and some historical groundings occurred not because of inadequate water depth but due to drifting of boats outside of the channel. Installation of channel navigation markers have been recommended in the past and could eliminate some groundings that are due to traveling outside of the entrance channel.

2. Pilings

The remaining wooden creosote pilings should be removed and replaced as originally designed during the recent harbor upgrades. The number required and the scope of work to install these will require input from geotech. This would include driving piles in the areas that already have hoops installed and removing and replacing the wooden piles that are still in place. The driving logs from the 2005 harbor improvements would be valuable for defining this future work.

3. Water and Power

The scope of work for the electrical and water systems is straightforward and would require a site visit and detailed condition survey by the respective disciplines prior to developing designs/alternatives

4. Docks

With regards to the wood decking and bull rails a brief inspection of the harbor facilities shows that some of the bull rails show signs of rotting and a smaller percentage of the decking is showing signs of rotting. A rough estimated 20-30% of the bull rails and decking could use replacement including the airplane float that is weathered and in need of replacement. The under structure appeared to be in fair condition with no areas of rot noted in this brief site visit. We might consider developing a few options to deal with the decking and bull rails. Areas of flotation under the floats had been recently repaired; one obvious area along the main run may require additional replacement/repair of the existing flotation system.

- Targeting repairs for unacceptable areas would extend the life of the float system with the city then preparing to replace the float system in 10-15 years. We would need to do a detailed assessment and redline areas to be repaired/replaced.

- A complete re-decking of the float system with replacement floats installed in say 20-30 years.

- Consider complete replacement of the float system. The system is nearing 50 years old and past the expected life of most systems.

II. TRIP REPORT – APRIL 28-29, 2010

A. Participants

Dee Ginter – EN-CW-HH

Bruce Sexauer – EN-CW-PF

Emily Toenes – EN-CW-EC

Alex Dalsfoist – EN-TE-ME

Jose Oquendo – EN-TE-ME

B. Summary

This trip report documents the site visit to Seldovia, Alaska on April 28-29, 2010 to investigate harbor improvements as part of the AKV292 (326049) Seldovia Harbor Improvements Denali Commission project.

The purpose of this visit was to collect detailed information on the existing electrical and water systems, perform a detailed inventory of work required for the docks themselves, meet with the Seldovia City Council, and hold a public meeting to receive input regarding the proposed study.

Photos taken during the site visit are located at O:_Projects by Location\Seldovia\AKV292 (326049) Seldovia Harbor Improvements Denali Commission\06 Photos-Maps-Drawings

C. Background

A previous site visit was performed by the Corps in September 2009 as a preliminary investigation for the study. The trip report for that visit contains additional background information. The following diagrams show general information regarding the project area.

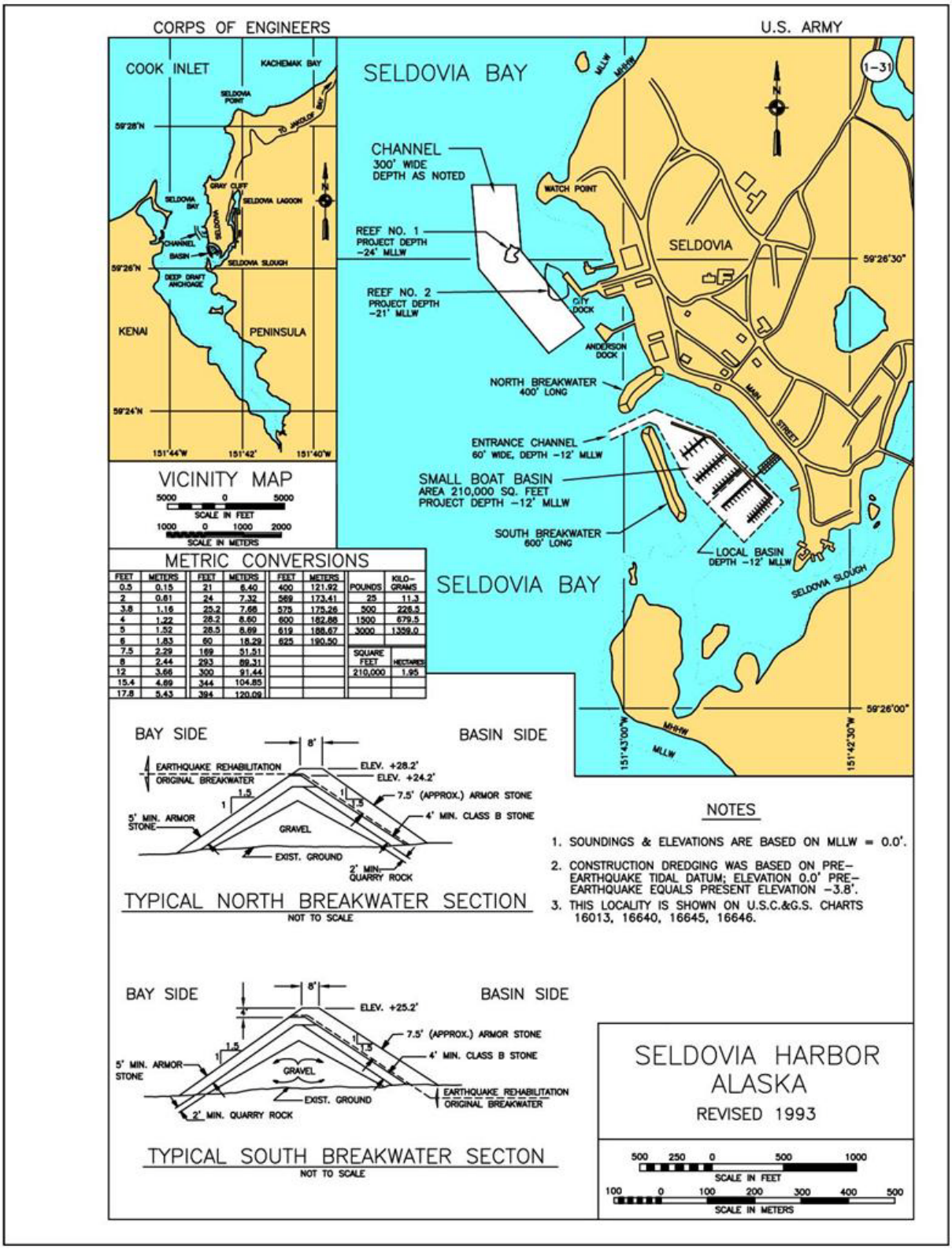

Figure D-16. Project Index Drawing from the 2007 Project Index Book

Figure D-17. Aerial view of Seldovia Harbor – April 29, 2010

D. Trip Report

The Corps team travelled to Seldovia, Alaska on April 28, 2009 via Pen Air to Homer, then Homer Air to Seldovia. The team arrived in Seldovia at about 4:30 PM and was greeted by Tim Dillon, Seldovia City Manager. The team checked into the Bay View Suites then prepared for the evening meeting with the City Council.

E. City Council and Public Meetings

The team met with the Seldovia City Council and provided a summary of the scope for the harbor improvements project. The City Council indicated that they would provide comments at the public meeting rather than the council meeting so that the public could be fully informed

The Public Meeting held the afternoon of April 29th was attended by about 30 people including a variety of harbor users, city officials, and other interested parties. Everyone present was in favor of repairs to the float system, dredging for better access, and improvements to the water and power systems. The general consensus was that a complete replacement would be needed rather than piecemeal repairs.

The remainder of the conversation focused upon the desire to expand the harbor facilities by moving the breakwater out further into the bay and extend the dredging limits of the project. The discussion focused upon the potential for future value added fish processing, development of a commercial fishing repair facility, and increased tourism possibilities. The discussion included how Corps projects are justified versus how a Denali Commission project is justified and explored different ways to provide funding for such a project.

Problems at the main City Dock and boat launches were also discussed specifically with how the fuel dock is connected to the City Dock. The pilings at the point of connection are protected by rubber sheathing which is ripped and/or missing in several places. If not repaired, the pilings will be subject to wear at a quicker rate than desired.

The desire to upgrade the large boat launch to handle larger vessels was mentioned. A stronger ramp and a larger lift would be required.

A detailed list of the meeting notes will be included in the project report.

F. Project Investigations

The following information was gathered by the study team during the site visit. This information will form the basis for the Corps analysis, alternative and cost development. This information will be refined and melded together with the previous trip report and included in the project report.

1. Dredging and Dock Investigations

Harbor Depth – From C Float southward, the harbor is shallower than the Federal harbor depth of 12 feet. Several boats are limited in their ability to maneuver at low tides and many groundings have been reported. When boats are moored at the ends of the docks nearest the breakwater, deeper draft vessels cannot navigate around them because the channel is too shallow away from the docks. Moorage of vessels at the D and E float are limited to either shallow draft vessels or to the few spots where deeper water exists.

Figure D-18. The south end of the harbor at D and E docks are too shallow to navigate or moor at the lowest tides

Docks – The docks are old and the wood structure is in a much deteriorated condition, and in need of significant upgrade, overhaul, and/or replacement. The bull rails are showing signs of deterioration and significant wear. Work had been done to replace deck planks as needed on the docks, but no work has been done to repair or replace the float substructure. Reports from locals who worked on the deck plank replacement indicate that the float substructure is rotting and in need of replacement.

Pilings – The wooden piles in the harbor are being replaced by steel piles. At several of the locations the piles were located on material that was too rocky to achieve design depth so they

were driven until refusal. At several other locations there was no penetration at all, and the piles were not placed.

Main Float - The main run of the float system has a section perpendicular to the gangway and an angled section. Both sections have worn decking and bull rails. In some areas, the bull rail has vegetation growing out of cracks. The north angled section is warped and the floatation is unevenly distributed. To the south along the main run the decking and bull rail show similar signs of wear as the north end. There is also warping of the main run dock showing an uneven distribution of floatation.

Figure D-19. Warping of the main float is very evident near the north end

Figure D-20. Bull rails along the main dock are exhibiting significant wear in many places

A Dock - A Dock has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. In some areas, the bull rail has vegetation growing out of cracks. The finger piers are fastened using a pin system. The slippery nature of the decking in combination with the finger pier instability provides for a potential safety hazard.

Figure D-21. This is an example of the pin connection for many of the older finger piers

B Float – B Float has worn decking and bull rails. Some sections of B Float deck planking have been replaced, but there was no work performed on the substructure. The finger piers have a solid connection that is integrated into the main run of B Dock. This provides a uniform B Float structure with no separate finger float connection. This configuration eliminates the need for a pile at the end of the finger float, which can reduce costs, but the finger can be subject to excess strain and wear if the float is subject to wave action. The harbormaster noted that this configuration does not allow vessels to back into their slips. Two piles that were to be installed during pile replacement are missing. Until the final pile upgrades are made the two original wooden piles remain in place.

Figure D-22. B Dock Finger float with gusset. Boat owners do not like the design because they can only moor bow in

Figure D-23. The empty pile collar shows where a steel pile could not be driven because of rock

Figure D-24. A typical example of a deteriorating bull rail on B dock

C Dock - C Dock has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. In some areas, the bull rail has vegetation growing out of cracks. The finger piers are fastened using a pin system. The pin system has loosened due to normal wear which has made the finger piers to be less stable to walk on. 3 of the new metal piles are missing. The remaining wood piles need to be removed. The city reports that vessels cannot pass the end of C Dock at low tide when a boat is moored at the end because the water is too shallow.

Figure D-25. A typical example of decking and rotting bull rail on C dock

D Dock - D Dock has worn decking and bull rails. Both appear solid, but have a fair amount of moss, wear marks, and cracking. In some areas, the bull rail has vegetation growing out of cracks. The finger piers are fastened using a pin system that is worn and loose. Two piles are missing at the base of the gangway that leads to D Float. Wood piles need to be removed and replaced with new steel piling.

Figure D-26. An empty pile collar at the base of the gangway

Figure D-27. Decking damage along E Dock

E Dock - E Dock has worn decking and bull rails and a fair amount of moss, wear marks, and cracking. The finger piers are fastened using a pin system that is now loose and worn. Wood piles need to be removed. E dock needs lighting. The floatplane dock attached to the outside end of E dock is very worn and needs replacing. The launch ramp on the sides of the float plane dock is rotting and the deck surface is worn and very slippery.

Figure D-28. Grass and moss growing on D dock

Figure D-29. Transition from E dock to the float plane dock

Boat Launches - The community boat launch facilities appear to be in satisfactory condition with the city reporting no issues. There are two launches. The large vessel launch is to the north of the harbor and the City dock. The city operates a tractor and trailer to haul larger vessels out of the water. The inner harbor boat launch is at the northern end of the boat harbor. This launch is available for regular trailered boat launching and recovery. Neither launch facility has a dock.

Figure D-30. Large vessel launch

Figure D-31. Inner harbor boat launch

City Dock - The main dock located to the north of the boat harbor. The gangway utilized by the Alaska Marine Highway System (AMHS) is in poor condition, as well as the safety net

that stretches out below the gangway. The city stated they are working with the AMHS and others on a plan to replace/fix these two issues.

Figure D-32. City Dock

2. Electrical Investigations

Power distribution system on Floats A, B, C, D and E consist of 208/120 VAC, 3 phase, and 240/480 VAC, 3 phase distributed from panel boards located at various locations on the floats. Lighting system consist of pole mounted area lighting and lighting pedestals. Power distribution is via flexible cables from the panels to the loads. See Figure D-33 through Figure D-36.

Figure D-33. An electrical panel near the gangway

Figure D-34. Examples of wiring conduit

Figure D-35. Examples of overhead lighting and electric pedestals

Figure D-36. Other electrical pedestals and panels

Part of the float power system was upgraded in June 2007. Upgrades included new shore power and lighting pedestals on Floats B, C, D, and E, new pole mounted lighting and light pedestals on the floats, 3 new power panels, and new circuits breakers for existing panel TF.

Power pedestals located at beginning of Float A, all pedestals on Float A, and a walkway extending from Float A into the entrance are old, and have not been replaced. These power pedestals, meters, circuit breakers, and power receptacles are decayed, corroded and unreliable for safe use. See Figure D-37 through Figure D-40.

Figure D-37. An older panel along the main dock

Figure D-38. An older pedestal along the main dock

Figure D-39. Older pedestals along the A dock

Figure D-40. Manufacturer plate on an older circuit breaker

3. Water Supply Investigations

The existing harbor consist of the approach structure including the ramp, main float, floats A, B, C, D and E off the main float, and the fingers off floats A to E. Plumbing features consist of new 2" pipe and valve train off a recently installed 6" water main serving the new fire hydrant, one hose station at the end of the ramp, five hose stations at the junction of the main float and floats A, B, C, D and E and a fish wash area near float D.

The valve train consists of a 2" meter, check valve, backflow preventer, a valved hose connection and a shut-off valve. The hose stations consist of a 2" vertical pipe with two hose connections.

The water meter is located under the harbor approach and is not readily accessible. Reading the water meter is challenging.

Hose stations are located at each float junctions. A total of five hose stations were counted. Floats A, B, and C are referred to as north floats while Floats D and E are south floats.

Main water source comes from an existing 500,000 gallon tank and chlorination facility located about 300 feet elevation in a nearby hill outside the city near the airport. Water quality is generally good with only infrequent minor incidents according to Jordan Cameron of the Seldovia Public Works Department. At the harbor, the pressure is at 80 psi at the nearest hydrant which was installed only a year ago. A 2" Plexco Bluestripe Polyethylene pipe branch from the 6" to that hydrant is the pipe used to supply water to the harbor. The 2" pipe is capped awaiting final connections to the hose station.

Currently the hose stations on the south floats are served by an under the boardwalk 2" galvanized pipe with a 2" branch to the hose stations and a 1" branch to the fish washing area. Hose stations on the north floats are serve by various size flexible hoses with wye connections. Similar 2" galvanized pipe that used to serve the hose station exist in the north float but is not in use.

Water is classified non-potable at the harbor. The classification serves as a practical way to dismantle and reconnect the water supply to the harbor without the seasonal and labor intensive mandatory cleaning, flushing and testing water quality.

Figure D-41. The recently installed fire hydrant where the new 2" Polyethylene pipe branched off to serve the harbor water requirements.

Figure D-42. The valve train consists of a 2" meter (inside right enclosure), check valve, backflow preventer (inside left enclosure), hose connection and a shut off valve.

Access to the water meter requires stepping off the stairs to the sloped rocky area. Water meter gauge can only be read on this side of the meter.

Figure D-43. The 2” polypropylene pipe with a tee connection and capped ends awaiting final connections to the hose station.

Figure D-44. Existing 2” pipe main serving the south float.

Figure D-45. Fish washing area on the south float near float D junction.

Figure D-46. 1” pipe branch off 2” main under boardwalk grate serving the fish wash area.

Figure D-47. Hose stations on the south floats are served by the existing under the boardwalk 2" galvanized pipe with a 2" branch to the hose stations. A 1" valved flexible pipe branch extends the hose to floats D and E fingers.

Figure D-48. Existing 2" hose station north of the ramp. The hose station 2" flexible hose connection serving north floats A, B and C hose stations. The 2" pipe under the boardwalk main is abandoned in place.

Figure D-49. Main float and Floats A, B and C hose stations flexible main water supply.

Figure D-50. Typical north float hose station served by the flexible hose with the original vertical hose station abandoned in place.

4. Economic Investigations

Economic personnel accompanied the engineering team on the site visit to Seldovia for the purpose of gathering information on harbor use. Information was gathered through conversations with the Seldovia City Manager, Harbormaster, Mayor, City Council, and residents at a public meeting held during our visit.

Seldovia is a small community comprised of 160 to 180 year-round residents. Seldovia is made up of many seasonal residents, and the summer population is estimated to be 250 to 300 people, according to the Seldovia city manager, Tim Dillon. The community has some tourist attractions in place, including a summer festival over the July Fourth weekend. During the summer's busiest weekend (July Fourth), the community attracts as many as 300 to 400 visitors.

Tim Dillon is working with the Center for Economic Development and the Kenai Peninsula Economic Development District to use 2 ½ acres of city-owned land as a multi-use industrial facility. This land is located near the city dock and city office, and is shown in Figure D-51. For this facility, the city would construct the building and lease the inside to businesses for their use. The city hopes to turn the facility into a value-added fish-processing plant and a marine repair facility. Tim Dillon reported that he had already received support from Greg Drum of Indian Valley Meats for the value-added fish plant.

Community interest is strong for a marine repair facility. Residents reported that Seldovia could easily serve as an alternative to Homer for marine repairs. Several residents reported that wait times for vessel repair were as long as 8 months to 1 year in Homer. Residents stated that a marine lift would be necessary for the marine repair facility. A lift cannot be put in at the Seldovia Harbor due to size restrictions, and would likely be located in the vicinity of the city dock and existing commercial haul out: both of which are closer to the future plant property than the harbor.

According to many in the community, this new industrial facility would likely increase the demand for moorage in Seldovia. Additional boats would likely seek moorage, at least on a transient basis, if they were waiting for marine repairs or offloading fish. There are several local commercial fishermen in Seldovia, all of whom currently deliver their catch to Homer. Residents reported that a processing facility in Seldovia may also encourage additional local boaters to engage in fishing activities.

Another feature in the boat harbor is a float plane dock and tie off. This dock is located at the end of the E float. The harbormaster, Susan Carlough, stated that 4 to 5 float planes use the dock on a regular basis. The planes are charged a tie off fee for every night that they use the dock. The mayor, Keith Gain, said that float planes in the harbor pose a safety hazard as it is difficult for both planes and boats to maneuver in the same harbor. Also, the planes could reduce the already limited maneuvering room near the E float where shoaling is occurring. Keith Gain stated that there is not another suitable location for a float plane dock because no other area of the town's water front would offer the needed protection behind the breakwater.

The harbormaster reports that there are 8 to 12 boats that use the harbor which are commercial fishers. There are an additional 5 to 10 boats in the harbor that operate as charters. Two boats which use the main float are barges owned by a resident. There are a few skiffs that use the harbor that are setnetters. The harbormaster said that there are between 12 and 15 unrented slips in the harbor, and that no waitlist is kept for harbor usage. The rest of the approximately 160 slips are occupied by recreational boaters. Most residents in Seldovia qualify for subsistence permits, so these recreational boats often double as subsistence vessels. Transient vessels which use the harbor include 4 to 5 drifters from Cook Inlet during the summer and as many as 15 recreational boats during busy summer weekends such as July Fourth.

The harbormaster reported that many harbor users only moor seasonally in the harbor and store their boats in dry storage during the winter. There is a boat storage yard near the commercial boat haul out ramp located near the public dock. The commercial boat haul out ramp is shown in Figure D-52 and the local boat storage yard is shown in Figure D-53. A few Seldovia residents store their boats in yards in Homer for the off-season. The harbormaster knew of no local residents that used any other harbors. The harbormaster reported that typical winter fill for the Seldovia harbor was what was present in the harbor on the day of our visit. A rough count of harbor usage on that day showed the harbor to be about 25 percent full.

Tim Dillon said that there was a growing demand for non-motorized boat traffic and moorage in Seldovia. The city holds a non-motorized fishing tournament every summer and many canoes and kayaks have no place to park in the current harbor configuration. Tim Dillon believed that the need for harbor expansion is strongly driven by recreational boaters, including many non-motorized boats.

There are also a few tourist boats that dock periodically in the harbor. The Rainbow Tours boat from Homer, the Discovery, and Seldovia Fast Ferry currently dock along the main run in the harbor to drop off and pick up passengers. The Rainbow Tours boat is shown in Figure D-54.

The Seldovia City Manager reports that some people prefer to fish or take fishing charters from Seldovia rather than Homer because Seldovia is 60 to 70 minutes closer to fishing grounds than Homer. Black bear hunting is a popular activity on Seldovia, and hunters are able to drive their RVs or ATVs off the state Alaska Marine Highway System (AMHS) ferry (which lands at the public dock) to use them for hunting trips in Seldovia. The AMHS ferry M/V Kennicott at the Seldovia public dock is shown in Figure D-55.

Harbor revenues are from fees collected. Fees include moorage fees, water, and electric. These harbor fees are put into a specific harbor fund, which is then used to fund maintenance. A specific fee schedule is available on the Seldovia City website. Fees which are collected for boat haul out and city dock usage are put into separate funds and are not used to fund harbor repairs. Other harbor revenue is from a $1 per person disembarkation fee for tourist boats, and taxes from boat ticket sales purchased in Seldovia.

The Husky II is a large derelict vessel which is currently parked along the main run of the harbor, shown in Figure D-56. The City Manager has a plan in place to have the vessel

removed on May 13-17, 2010. Some residents were concerned that the Husky II was a safety hazard in the harbor. Tim Dillon reports that he has already made a deal with the Seldovia Village Tribe to allow them to use that space to moor their new fast ferry. The Tribe recently received permits to construct a dock for their ferry, but Tim Dillon stated that the vessel cannot be stored at that dock overnight and will need to seek refuge in the harbor.

During the public meeting on April 29, 2010, several residents voiced their opinion that the harbor and waterfront serve as major assets for Seldovia and were crucial for the future sustainability of the community. Many felt that expansion of the harbor was necessary to encourage growth and make the harbor more attractive for users. Expansion of the harbor was also viewed as important when considering the future industrial plant. However, most residents agreed that improvements to existing harbor infrastructure were necessary before expansion could be considered.

Residents also expressed concern over Seldovia being a "hot" harbor, with a lot of electrolysis in the water. Vessel owners were concerned about having to replace the sacrificial zinc plates on their boats much more frequently than would be required in other harbors. Residents were unsure of the source of the electrolysis, and wondered if it was stronger in certain areas of the harbor.

Residents were also concerned about the harbor depth and need for dredging. Shoaling occurs off the end of the E float which affects harbor maneuverability for both the D and E floats. Residents reported having to pull a boat off of the shoals about two times each summer. Residents were concerned that the depth maintained in the federal dredging of the harbor would not allow large enough vessels into the harbor. Concern was also voiced regarding the depth at the harbor mouth. Residents reported that at a strong minus tide, larger vessels, such as commercial fishing boats or a salmon tender, cannot enter the harbor and must wait for the tide to come back in. Residents reported that this has always been a problem in the harbor and that most boaters just work around the issue, so it does not usually create lengthy operational delays.

Figure D-51. Approximately 2 ½ acres of land adjacent to City offices and public dock is the proposed site for a future multi-use industrial facility.

Figure D-52. Commercial boat haul out ramp located adjacent to Seldovia public dock.

Figure D-53. Seldovia boat storage yard, located across the street from the commercial boat haul out and the public dock.

Figure D-54. The Rainbow Tours boat "Rainbow Connection" from Homer drops off school children on a field trip, April 29, 2010.

Figure D-55. AMHS Ferry M/V Kennicott at the Seldovia City Dock

Figure D-56. The Husky II is a large derelict vessel moored along the main float

III. OTHER SELDOVIA OBSERVATIONS FROM APRIL 2010 SITE VISIT

A. Other Water-Related Points of Interest:

- The main water source for the City of Seldovia and the harbor consist of a 500,000 gallon tank and a chlorination facility. After a short visit, it was noted that the water storage tank gauge is not accurate, the gauge should be calibrated to show actual water level.

- The pipes in the chlorination facility are showing extensive corrosion. Proper ventilation and pipe coating should be provided.

- The new flow control valve that fills the tank and controls the chlorination is highly customized for the function it serves. A flow diagram of the control valve should be documented with set points on the various pilot valves so that adjustments can be made with a good knowledge where the original settings are.

B. Fire Protection Related Points of Interest:

- The harbor is protected with fire extinguisher stations having two fire extinguishers each located at Main float junctions at Float A, B, C, D, and E. A quick look revealed that some fire extinguishers did not have the inspection cards attached. A current inspection of all fire extinguishers is recommended for safety.

- It was also observed that the longest floats are Floats C and D which are about 300 feet each. With the fire extinguishers at the junction, the farthest finger is about 300 feet which seems too distant. It is recommended that the floats be provided with fire extinguishers station at least within 100 feet to the farthest finger.

C. General Points of Interest

- The urinal in the men's restroom behind the Harbormaster's office needs to be replaced and properly anchored to the wall. The men's and women's restroom need new exhaust fans to properly ventilate the rooms.

- The fuel source of the Harbormaster building is located just north of the facility. It is about a 250 gallon tank that used to be buried and is showing signs of corrosion. The tank sits on a makeshift crib about 2 feet from the drop to the harbor. It is recommended to replace the tank with a new tank and new tank coating to inhibit corrosion from the marine environment. It is also recommended that the tank be placed on a non combustible crib and located at least ten feet away from the building and ten feet away from the drop to the harbor.

- Elsewhere in the area, the fuel tanks are located too close to the facility it serves. Some fuel lines were made out of combustible materials which present added hazard in a fire event.