SHALLOW DRAFT NAVIGATION AND SEDIMENT MANAGEMENT PLAN

for the Middle Peninsula Chesapeake Bay Public Access Authority

EXECUTIVE SUMMARY

Federal funding has historically been provided in the Army Corps of Engineers' budget for shallow draft low use navigation projects. However, current budget metrics are not providing sufficient funding at levels to sustain maintenance dredging of the 17 Federal navigation channels located in the Middle Peninsula. The Middle Peninsula Chesapeake Bay Public Access Authority (MPCBPAA) recognizes that the Federal budget constraints are likely to continue into the future, but the Federal navigation channels still need to be maintenance dredged and will require continued maintenance dredging into the future.

The purpose of this report is to provide the MPCBPAA with a probable average annual cost for maintaining all the Federal navigation channels within the geographic boundaries of the Authority assuming other mechanisms would provide funding streams for the work in the future. Average annual costs for maintaining a beneficial use shoreline placement program to supplement the dredging program are also provided.

But there are some events that could cause the average annual costs to vary (up or down) over time. For instance, competitiveness within the dredging industry could cause variation in bid prices or physical variations at the projects could cause a more or less frequent dredging cycle. For this reason, the report brackets the most probable average annual cost with high and low bounds for the average annual cost. This allows the user to perform his or her own prioritization and risk analyses.

Considering these variations, the most probable average annual cost for maintaining (dredging) a shallow draft navigation program on the Middle Peninsula is approximately $1,630,000 per year. The cost for dredging could range from $550,000 per year to $4,917,000 per year. In addition, approximately $111,000 per year would most probably be required in order to use available suitable material in a beneficial manner for placement along nearby shorelines. The cost for beneficial placement could range from $24,000 per year to $247,000 per year.

Considering the expense of managing such a dredging program the report, discusses several potential funding mechanisms. The pros and cons of each funding mechanism are provided.

Further, there are some projects that the users of this report may want to consider for future dredging that are not currently included in the inventory of Federal navigation projects. Such projects will more than likely require more development as channel designs and placement alternatives may not be already available. The report includes a section that outlines the steps for decision makers to consider when evaluating the components of potential new navigation channels.

Costs provided in this plan are based on December 2010 prices levels and discount rates used for comparisons of alternatives range from 2.5 percent to 6.0 percent.

Regional Shallow-Draft Navigation and Sediment Management Plan
For the Middle Peninsula of Virginia

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BACKGROUND

In recognition of the needs of shallow draft navigation users and for the protection of tidal shorelines combined with the scarce resources available to accomplish these important projects, the following plan has been developed to assist public policy decision makers by defining the existing conditions, describing the problems, needs, and opportunities, and presenting potential solution sets. For example, the 17 shallow draft navigation channels in the study area are used by a wide range of beneficiaries to include recreational boaters, commercial interests (grain products, forestry products, fishing products, and boat building) as well as a Coast Guard base. The latest reported annual figures (2008) indicate that 682,000 tons of commercial commodities were transported via these navigation channels. It should be noted that the commercial tonnage is not fully reported by users; nevertheless, there is a significant amount of commercial usage. In addition, over 48 miles of shoreline are evaluated in the plan as having potential shoreline (protection) needs. Information in the plan is based on December 2010 price and development levels and discount rates ranging from 2.5 percent to 6 percent.

EXISTING CONDITIONS

The Middle Peninsula Chesapeake Bay Public Access Authority (MPCBPAA) identified seventeen navigation projects (reference the navigation project location map, included) and seventeen shorelines (reference the shoreline study location map, included) for evaluation. An evaluation of existing conditions for Shallow Draft Navigation projects and selected shorelines on the Middle Peninsula is included as part of this Section 22 effort. A Section 22 of the Water Resources Development Act of 1974 granted the Corps general authority to cooperate with states to provide several services, on a cost-shared basis, including technical assistance to support preparation of comprehensive water resource plans.

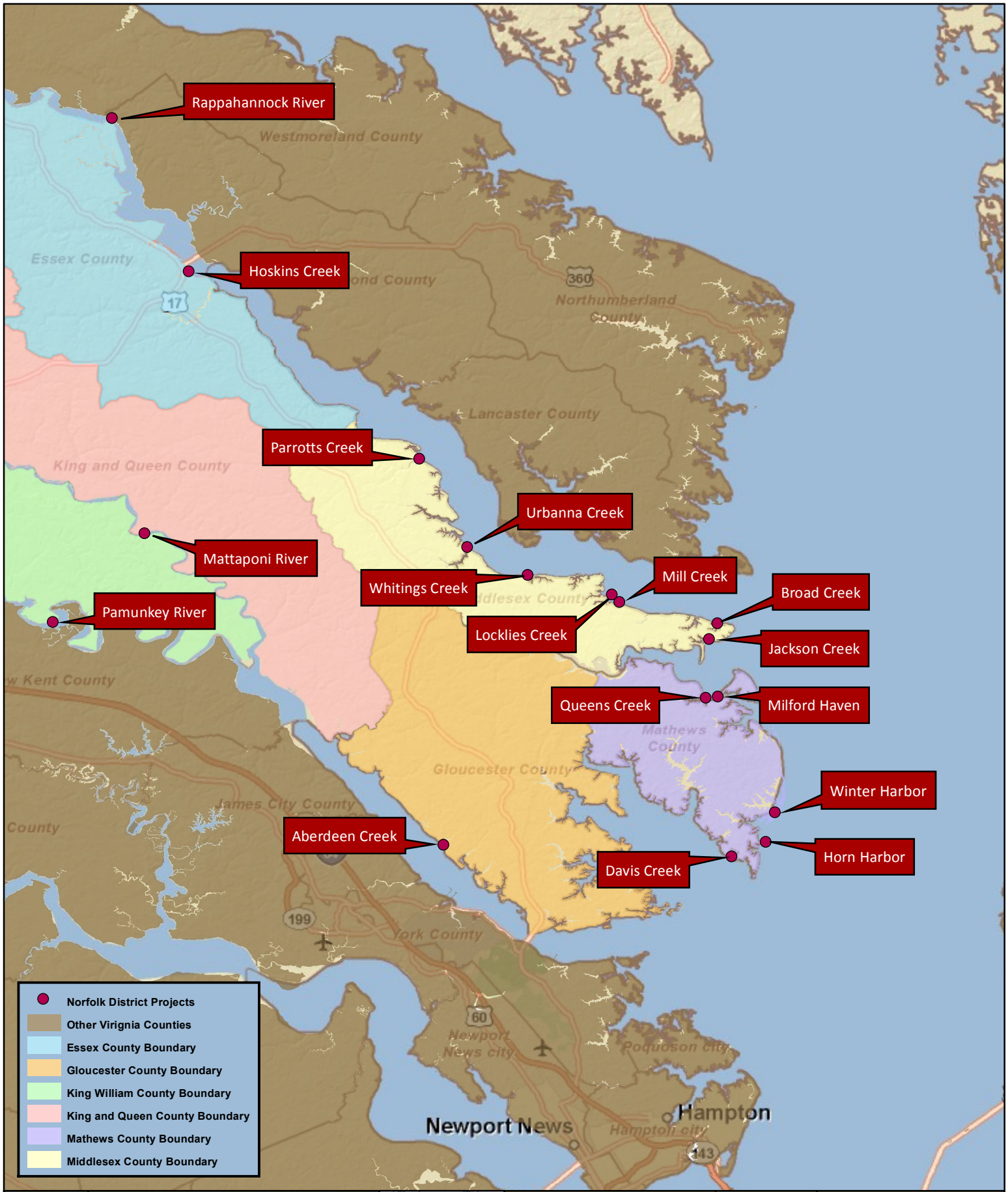
Shallow Draft Navigation

The navigation channels identified for this study effort are all designated as Federal Navigation Channels. No local government, community, or private maintained channels were identified by the local sponsor to be included into this study effort. Appendix A is a spreadsheet that contains consolidated summary of data for each of the Federal Navigation Channels in the MPCBPPA. The first column in the spreadsheet indicates the Federal channel name and the county that serves or would serve as the project's local sponsor is indicated in the next column. The remaining columns are intended to concisely display selected physical, financial, and usage characteristics of the projects.

Physical Characteristics

Below is additional information that explains the Navigation project column headings for physical characteristics included in Appendix A:

Project Status: Once initial construction is completed and a project is catalogued in the Federal inventory of navigation channels, Federal projects enter the maintenance phase. With time conditions can change at a project. For examples the usage of a channel can change depending upon economic conditions. Also, the local sponsor support of a channel and the environmental conditions of the area around the Federal channel can change. With these changes the maintenance status of project can also change. To reflect these changes, an individual Federal channel's designation can change from actively maintained to not maintained, or vice versa. When a project is designated as actively maintained this is an indication that many conditions are met: there is adequate use of the project, the local sponsor has satisfied all items of local cooperation, adequate long term placement site capacity exists, environmental permits are available, and the project can be dredged if funds are appropriated. When a project is designated as not maintained, one or more of the prerequisite conditions are missing.



US Army Corps of Engineers
Norfolk District

Middle Peninsula

Shallow Draft
Navigation Projects

Middle Peninsula Chesapeake Bay Public Access Authority

0 2.5 5 10 Miles

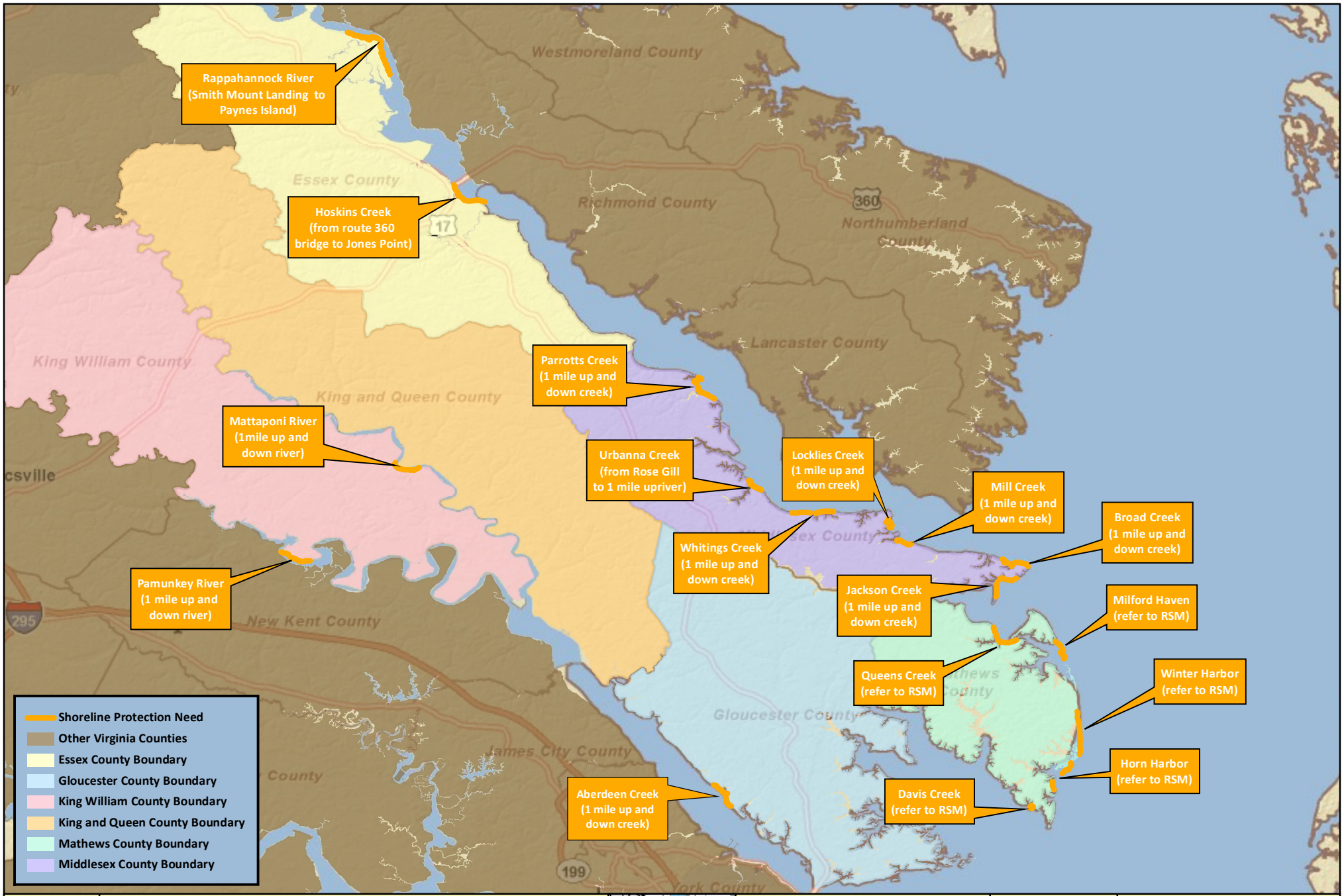
N

Projection:
Virginia State Plane
South Zone - NAD 83
U.S. Survey Feet

ESRI Street Map World 2D

Prepared by: Katlyn P. Battista
Geospatial Services Section

Map File: mpcbpaa_shallow_draft_navigation.mxd
Map Date: 27 April 2011



US Army Corps of Engineers
Norfolk District

Middle Peninsula

Shoreline Protection Needs

Potential Beneficial Use Sites

0 2.5 5 10 Miles

N

Projection:
Virginia State Plane
South Zone - NAD 83
U.S. Survey Feet

VGIN_2007_South

Prepared by: Katlyn P. Battista
Geospatial Services Section

Map File: mpcbpaa_shoreline_protection_needs.mxd
Map Date: 27 April 2011

Feature: Refers to the General Navigation Features that are components of Federal Navigation projects. Examples of General Navigation Features that could be included in a project's authorization include: channels, turning basins, harbors of refuge, barge fleeting areas, jetties, and access channels.

Authorized Length: General Navigation Feature authorizations frequently include a limitation on the length of the feature that can be constructed and maintained. This limitation is called the authorized length and this length cannot be exceeded.

Authorized Width: Similar to authorized width, General Navigation Feature authorizations generally include a limitation on the width of the feature that can be constructed and maintained. This limitation is called authorized width and is generally not exceeded. Increasing the width of dredging is a complicated issue requiring much coordination with policy reviewers and environmental agencies.

Authorized Depth: A General Navigation Features always include a limitation on the depth of the feature that can be constructed and maintained.

Maintained Length: The length of the channel maintained on a project. This is the length of the channel that the Corps District considers when preparing maintenance contracts. Normally the maintained length is equal to the authorized length, but is sometimes less. In cases where the authorization does not include a length limitation, the maintained length generally becomes the distance between the authorized depth contour outside of the mouth of the creek to the authorized depth contour inside the creek. In some cases, the upstream dredging distance is limited to the project's public access facility.

Maintained Width: The width of the channel maintained on a project. This is the width of the channel that the Corps District considers when preparing maintenance contracts. Normally the maintained width is equal to the authorized width, but sometimes varies due to a number of considerations. These variances usually require approval by higher authority than the local Corps District office.

Maintained Depth: This is the depth of the channel that the Corps District provides when dredging a channel. The Corps considers using traffic needs, dredging industry capabilities, fiscal policies and directives, etc., when determining the maintained depth to specify in maintenance dredging contracts. Often the maintained depth is equal to the authorized depth, but on rare occasion may be a different depth after various factors are considered. Such factors considered could include the user traffic needs, dredging contract allowable over depth, excess dredging depth, advanced maintenance, surrounding infrastructure, permitted depth, etc. Changing the designated maintained depth is a complicated issue that must be well coordinated between the Corps District, local sponsor, environmental agencies, and higher Corps authority.

Financial Characteristics

The data cells in the Financial Characteristics of Appendix A were important inputs into the economic analysis supporting the findings in this report. Each of the data cells have great impact to the overall cost forecast for dredging in the MPCBPAA area. Given this consideration, sensitivity analyses were performed in order to bracket the range of costs. The final analysis reflects the sensitivity analysis by showing a low cost estimate for average annual costs, a high estimate for average annual costs, and also a most probable average annual cost. Below are descriptions of the data contained in the following financial characteristics data columns:

Date of Last Maintenance: In the data provided in this report, the date of last maintenance is the year in which the physical completion of the last dredging contract occurred. This date was determined by

reviewing a number of historical references. Examples of these references include Norfolk District after dredging reports, Corps of Engineers Annual Reports, and Corps District survey mapping records.

Total Cost of Maintenance: This is the cumulative amount of money spent on the individual projects over the life of the project. In this report, most cases the total cost of maintenance was determined by researching the Corps of Engineers annual report up to Federal fiscal year 2009, the latest report available at the time of research.

Estimated Dredging Cycle: This is the median number of years that pass between dredging cycles on a Federal navigation channel. This is the assumed period Federal navigation projects that are either very old or have been dredged very frequently have well established records for determining how regularly the channel must be dredged to provide maintained depth. For this report, the estimated dredging cycle is a theoretical period used in the economic analysis to determine average annual cost. The theoretical estimated dredging cycle is not the same as actual dredging cycle. Actual dredging cycle can vary significantly from the estimated dredging cycle. Actual dredging cycle is determined by a number of factors: shoaling depth and patterns, extreme weather events, appropriation cycles, project-specific funding allocations, environmental time of year restrictions, availability of permits and placement sites, local sponsor support, changing usage of the channel, contractor availability, etc.

Dredged Material Placement Site Available: For the purposes of this report, this data cell simply indicates yes or no. If yes, a placement site is available for the project. The site has long-term access agreements provided by the local sponsor, permits for use of the site as a dredged material placement site are available, but the site may or may not be in a state of physical preparation for receipt of material. If a site is not available, then the data cell indicates a no response. In the case of a no response, significant preparatory work would be required for the project to be dredged and there is no certainty that the project could ever be dredged until a dredged material placement site becomes available.

Worth note in the financial characteristics is the importance of mobilization and demobilization costs. Mobilization and demobilization (Mob/Demob) is a line item cost in a dredging contract. Much of this line item's cost is the cost for bringing a dredge to the dredging site from its last location. Mob/demob also includes very important work such as project setup prior to dredging and cleanup of the dredging area and placement site once dredging is complete.

The reason mob/demob is important for the MPCBPAA is because of the nature of the projects in the local geographic area, specifically each of the projects classification as shallow draft, low use. On such projects mob/demob can be a significant percentage of the cost on an individual contract because of the relatively low cubic yardages typically dredged. In these low yardage cases, mob/demob cost is difficult to accurately estimate and forecast. Historical bid results show that mob/demob can be most of the cost for a dredging project with low cubic yardage. When two projects share mob/demob costs, it can reduce mob/demob costs on an individual project basis. This uncertainty is absorbed in the sensitivity analysis because of the 50-year time period of analysis. The MPCBPAA needs to be aware that the uncertainty involved in mob/demob can result in periodic actual costs exceeding the leveled out costs of this analysis.

Consider an example of Dredging Project A being dredged as a standalone project with an assumed mob/demob bid of $200,000. Then consider nearby Dredging Project B that coincidentally requires dredging and can be dredged in sequence after Dredging Project A (this assumes neither project has an environmental time of year restriction for dredging). Assume in this case that Dredging Project B will require an additional mob/demob cost of $100,000. In this case the total mob/demob for both projects becomes $300,000. If the project customers agree to split the mob and demob equally then the costs would be distributed as $150,000 on Dredging Project A and $150,000 on Dredging Project B. This

enables the first project to save $50,000 on mob/demob cost. The first project benefits from the combined procurement.

But, did Dredging Project B benefit? While it may not always benefit, the historical records reveal that it probably will benefit if the two projects truly are compatible (in this example compatible means having same dredging plant requirements, same placement methods, same types of physical characteristics, same pumping distances, etc). For example, when Dredging Project B is issued as a standalone contract for bidding, there is no guarantee that the nearest dredge is the one that is interested in Dredging Project B. That dredge may have a commitment in another location. In this case Dredging Project B may receive bids from another company using another dredge. Assume the mob/demob bid for Dredging Project B's separate solicitation is $300,000. In this case, Dredging Project B would have saved $150,000 if it had been included in the procurement package with Dredging Project A.

With respect to project costs, the local sponsors should be aware of cost sharing requirements. As events evolve during project development, various policies requirements can activate depending upon the circumstances of individual projects. Items of local cooperation can be expensive items that the local sponsor may have to bear. Depending upon how a local sponsor and the Corps of Engineers develop a project, specific requirements for real estate acquisition, relocations, cost-sharing could be activated. The local sponsor could be solely responsible for items such as these, not the Federal government. In the backup analysis and results included in this report, cost sharing and local cooperation costs are not indicated.

Usage Characteristics

Average Number of Commodities: This data cell is derived from the Waterborne Commerce Statistics data that users report to the Corps of Engineer's Navigation Data Center. Note that for Middle Peninsula projects the commerce and vessel trip data is often underreported by the project users, with the possible exception of the Rappahannock and Pamunkey Rivers. However, underreporting is typical for most shallow draft low use Federal navigation projects.

Principle Commodities: This data cell also includes data derived from the Waterborne Commerce Statistics data that users report. In this particular data cell, however, some project data has been added when the Corps District staff is aware of other known commerce or activities on the creek that may have Federal interest.

Latest Annual Tonnage: This data cell is derived from the Waterborne Commerce Statistics data that users report to the Corps of Engineer's Navigation Data Center. Again, for most shallow draft low use Federal navigation projects the tonnage data is often underreported by the project users.

Recreation: when recreational boating usage is known to exist on a project, that usage is indicated in this data cell.

Federal Authorizations and Policies

The Corps of Engineers received authorization to construct and maintain each Federal navigation project by either the River and Harbor Act of the Congress or by obtaining approvals through the Continuing Authorities Program delegated to the Chief of Engineers by Congress. In all cases, specific project authorizations exist for each Federal navigation project included in this report. A summary of select data from the authorizing documents is included as Appendix B.

In addition to the authorizing documents, Engineering, Economic, and Environmental policies govern every Federal navigation project. Some examples of these polices include beneficial uses of dredged material guidance, dredged material management plans policies, budget guidance circulars, design and cost estimating guidance, planning and policy guidance, real estate regulations, quality review standards guidance, etc. Before a project is dredged, compliance review and policy coordination must occur at many levels prior to issuing and completing a maintenance dredging contract. Specific conditions that arise on any given project can be unique and activate a number of additional compliance requirements.

The impacts of legislative action, either Federal or state, on Federal navigation channels cannot be overstated. Legislative actions and agency implementation of the legislative actions can significantly impact a navigation or shoreline project's costs, implementation methodologies, design requirements, etc.

Shoreline Protection

Seventeen shorelines were identified by the MPCBPAA for inclusion in this report. The MPCBPPA intent of the shoreline designations is to highlight areas that the local sponsor identified for consideration as beneficial use placement sites for nearby Federal channels. Because the MPCBPAA regarded the source of shoreline material to only be the Federal navigation, offshore borrow sites or land-based borrow sites are not necessary in this analysis.

The identified shorelines are shown on the shoreline study location map, included. None of the shoreline areas are designated as Federal projects. Appendix A is a fold-out spreadsheet that contains consolidated summary of data for each of the shoreline areas identified by the MPCBPPA. Each shoreline area has several data sets displayed in Appendix A. The first columns indicate a name for the identified shoreline and the county that serves or would serve as the local sponsor in the area of the shoreline is listed. The remaining columns are intended to concisely display other physically characteristics of the shorelines. Below is additional information that explains the shoreline data column headings in Appendix A:

Physical Characteristics

For the purposes of this report, orders of magnitude calculations were performed in order to perform economic scenario evaluations for determining gross average annual costs. Work outside of the scope of this study is required in order to refine the results, determine uncertainties and probabilities, etc. Also beyond the scope of this study are field investigations to test sediments. No grain size comparison analyses were performed, and no comparison of native versus borrow material was made. Also, beyond the scope of the study was evaluations of shoreline ownership and subaqueous bottom leases, research for potential resource conflicts such as Submerged Aquatic Vegetation and Oyster Grounds, or an evaluation of the legal considerations surrounding placement of material from Federal channels onto private property.

No borrow sources were identified for this report as the source of material for the shorelines was assumed to the only the Federal navigation channels. The calculations reveal that, depending upon the final design template, the shorelines probably contain much more capacity than could be filled by the sediment available in the Federal navigation channel dredging templates (e.g., there is not enough material available in the Federal navigation channels to fill the beach templates). Therefore, if there is a desire to fill a length of beach with a design template, additional material could be required.

The purposes of the cost estimates included in the physical characteristics section is not intended to be construction estimates, nor intended for single-project budgeting, but rather for relative comparison of the seventeen shorelines and for the purposes of obtaining a rough estimate of average annual costs required

to periodically nourish these shorelines on a regular basis. The cost data in the spreadsheets accompanying this report is show either cost increases or decreases for the projects. In the case of a cost increase, generally the increase is due to (1) additional shaping and grading of the material to meet more stringent beach construction methods than would be necessary for just placing the material in a least cost environmentally acceptable approach and (2) requirements to add booster pumps in the dredge system to increase the pumping distances to more remote sections of the identified shorelines.

Referencing the Shoreline Projects section at the bottom of the spreadsheet in Appendix A, the physical characteristics of the shoreline "Potential Future Physical Characteristics" is a theoretical analysis to calculate the potential shoreline capcity for future dredged material storage. It disregards any environmental resource conflicts, grain size compabtibility issues, land ownership issues; physical constructability has not been reviewed, etc.

The physical characteristic columns in Appendix A include:

Navigation Material Compatible for Beach: For each shoreline area, this column indicates the probability of using material from the navigation channel to nourish shorelines identified by the MPCBPAA. Each shoreline considered in this study was examined for compatibility with typical materials encountered in the Federal navigation channels surrounding the shorelines. In some cases there is recent history of dredging. In other cases aerial imagery was examined to evaluate contents of existing upland sites. And in a few cases there was not enough information to make a determination.

Length: The length of shoreline indicated in Appendix A is a GIS-computed distance derived from shoreline information provided by the MPCBPAA.

Width: the width data cell indicates the assumed existing width of the beach below elevation 3' for the purposes of calculating a gross cubic yardage required to nourish the beach to an assumed cross-sectional template. Very little survey data could be located for use in this report. Therefore, an existing beach width of 20 feet was assumed in all cases.

Assumed Existing Foreshore Slope: Little survey data could be located for any of the beaches considered in this report. A foreshore slope of 1-foot vertical rise per 100-foot horizontal run was assumed to be the existing slope at these shorelines.

Assumed Beach Width: For the purposes of this report the assumed design width is to increase the existing beach width to 100 feet wide.

Assumed Foreshore Slope: A construction slope of 1 foot vertical rise per 100 feet horizontal run was assumed.

Estimated Sediment Capacity of Shoreline Site: This is the gross cubic yardage estimated to be available along the length of shoreline provided by the MPCBPAA. The volume in this calculation does not account for a reduction in volume should other interim beach nourishment efforts occur.

Financial Characteristics

The data cells in the Financial Characteristics of Appendix A were important inputs into the economic analysis supporting the findings in this report. Each of the data cells have great impact to the overall cost forecast for dredging in the MPCBPAA area. Given this consideration, sensitivity analyses were performed in order to bracket the range of costs. In Appendix A the most probable annualized costs are displayed.

Periodic Nourishment Cycle: Since the MPCBPAA chose to use the shorelines as beneficial use sites, the Periodic Nourishment cycle is equal to the dredging cycle frequency of the associated Federal channel, in this case the most probable frequency.

Annualized costs: A project-specific cost developed by forecasting future anticipated costs for depositing material beneficially along the shoreline. Much less historical data is available for these shorelines when compared to the navigation channels in this report. The most probable annualized costs are shown in Appendix A.

Similar as with cost sharing for navigation channel projects, the local sponsors could be required to financially participate in shoreline projects, as well. As events evolve during project development, various policies requirements can activate depending upon the circumstances that develop on individual projects. Items of local cooperation can be expensive items that the local sponsor may have to bear. Depending upon how a local sponsor and the Corps of Engineers develop a project, specific requirements for real estate acquisition, relocations, cost-sharing or contributed funds requirements could be activated. The local sponsor could be solely responsible for costs such as these, not the Federal government. In the backup analysis and results included in this report, cost sharing and local cooperation costs are not indicated. In the case of shorelines, a local sponsor may want a nourishment plan different than the Federal standard or the Corps of Engineers recommended plan. In this particular case the local sponsor must bear the burden of additional costs associated with the locally preferred plan or any identified betterments. Specific shoreline cases would have to be evaluated relative to governing policies at the time of preparation.

Usage Characteristics

The existing conditions for the shorelines vary from unprotected, eroding, and neglected to fairly well protected, healthy beaches.

Future shoreline solutions could include features such as storm damage reduction, environmental restoration, habitat creation, recreational beach, hardened shorelines or combinations. The potential for these has not been evaluated but could be attractive for engaging additional stakeholder interest.

Federal Authorizations and Policies

None of the shorelines identified are designated as Federal projects. But, whether designated as Federal project or not, any shoreline project is a complicated effort. Some legal and policy considerations: finding suitable borrow site with adequate quality and quantity of material to supplement the material from the navigation channels, finding suitable material of sufficient quantity to be environmentally acceptable as a beneficial use, managing multiple borrow demands at a single borrow site, obtaining environmental permits for borrow and placement of material, obtaining real estate agreements with land owners and water interests, public accessibility policies for specific shoreline areas need to be reviewed should future efforts look promising for development, utility relocations and resolution of conflicts of use can add significant cost, impacts to protected resources (Submerged Aquatic Vegetation and Tiger Beetle impacts are common), periodic monitoring of physical and environmental conditions along the shoreline and the borrow site, second order impacts such as evaluating long-term impacts due to migration of beach nourishment material, etc.

Federal Budget Process

The Federal budget process for receiving project funds typically spans about two years. During that time the Office of Management and Budget releases budget guidance, the budget capabilities are coordinated through various levels of government, appropriations bills are developed and approved by Congress, the President signs a proposed budget into law, and funds for a project are allocated by the Corps of Engineers headquarters for execution. In recent years the Office of Management and Budget policies have resulted in the Corps of Engineers implementing Performance-Based Budgeting process. A discussion of the some of the common project performance metrics is included in Appendix D. Under the current budget policy most shallow draft low use Navigation projects, such as those included in this report, have received low priority in recent years President's budgets. However, to express a capability to dredge these projects, the Corps of Engineers must include data to support the performance metrics. The purpose of the information is to show the importance of these projects to help provide justification as to the importance of dredging. This information is generally provided to the Corps District by local sponsors and stakeholders with the source of the data and facts cited in budget backup documentation. The Corps of Engineers has termed this information, "Value to the Nation." Some guidance for providing Value to the Nation data is included in Appendix D.

Most shallow draft low use navigation projects have not received funding since the performance-based budgeting process began. Over time the situation for shallow draft projects has worsened, with shallow draft projects receiving less funding with each successive year. This is due to Harbor Maintenance Trust Fund and Budget Ceiling constraints.

Harbor Maintenance Trust Fund

The Corps of Engineers each year submits a recommended budget that is considered as input into the Federal Budget process. The inputs are individual project capabilities that, in the case of navigation projects, could be dredged if they are funded. The inputs must be consistent with the Corps of Engineers performance-based budgeting guidance that is derived from Office of Management and Budget's fiscal policies. This process has been documented by the Corps of Engineers Public Affairs Office in 2005 (included as part of Appendix D). Even though the date of the document is 2005 and the membership of the Congressional committees and subcommittees has changed, the process and timeline is relatively unchanged.

The Corps of Engineers annual Civil Works funding comes from several sources. Example sources include the Inland Waterways Trust Fund, Special Recreation User Fees, Disposal Facilities User Fees, Coastal Wetlands Restoration Trust Fund, and other sources such as the Harbor Maintenance Trust Fund. The Harbor Maintenance Trust Fund is the source of funds for most maintenance dredging projects that are included in Congressional appropriations.

Individual navigation projects do not receive appropriations directly from the Harbor Maintenance Trust Fund. The HMTF is not a grant, but an account in the Treasury Department that is funded from a 0.125% Harbor Maintenance Tax (HMT) imposed on cargo (reference: Public Law 101-508, Omnibus Budget Reconciliation Act of 1990) to recover 100% of the Corps' port O&M expenditures. However, 100% recovery of the Corps' port O&M expenditures does not mean that 100% of the Corps' capability is funded.

Budget Ceilings

There have been some proposals to increase the amount of the HMTF transfer into the O&M account in order to fund more of the Corps' backlog capability (which includes many shallow draft navigation

projects). But, even with an increased transfer the Corps' capability would still constrained since the Corps' civil works accounts are capped by OMB ceilings. Without revisions to ceiling amounts an increase for O&M navigation might require a decrease for flood risk management, for example.

Performance Based Budgeting Metrics

For several years the Corps of Engineers has used Performance-Based Budgeting for requesting funds on various projects. For navigation channels, the general metric for receiving priority on a project is 1 million tons of commerce. However, many shallow draft navigation projects do not meet this single criterion. General guidelines for performance measures are given in the following two tables.

Navigation Objectives and Performance Measures	
Program Objectives	**Performance Measures**
Invest in navigation infrastructure when the benefits exceed the costs.	- Benefit Cost Ratio (BCR) (project specific measures) -Annual net benefits
Support sustainable regional, basin-wide, or watershed planning and activities in partnership with others.	- Percent of projects recommended in Chief's reports that apply watershed principles
Enhance Life-Cycle Infrastructure Management. Improve the reliability of water resources infrastructure using risk informed asset management strategy.	- Percent of navigation asset inventory with recent structural/operational risk assessments, including SPRA (Screening for Portfolio Risk Assessment) assessments. - Percent of navigation asset inventory risk assessments that reveal a significant level of risk (including DSAC (Dam Safety Action Classification) Class I, II, III projects). - Number of funded actions underway that address assets where there is significant level of risk.
Operate and manage the navigation infrastructure so as to maintain justified levels of service in terms of the availability to commercial traffic of high use navigation infrastructure (waterways, harbors, channels).	-Risk and Reliability: Operational Condition Assessment and Impacts

Navigation Budget Performance Measures	
Budget Strategy	**Ranking Criteria**
Keep ongoing studies or PEDs (Preconstruction Engineering and Design) going if likely to produce recommendation for project or start new phase of studies or PEDs	-Date of Agreement – executed or expected -Commercial tonnage increase -% reduction in delay costs -Years to complete -Watershed study – y/n -Benefit to Cost Ratio (BCR) – Feasibility & PED only
Complete ongoing construction to start getting benefits of high performing navigation projects (each contract should be separate line item)	-BCR -Inland Waterways Users Board priority for Inland Waterways -Availability of Inland Waterways Trust Fund (IWTF) funding for Inland Waterways -Years to complete -Other Business Line purpose outputs
Initiate and complete rehabilitations (each contract should be separate line item)	-Inland Waterways Users Board priority for Inland Waterways -Availability of Inland Waterways Trust Fund (IWTF) funding for Inland Waterways -Relative risk of failure, Operational Condition Assessment (OCA) & DSAC -BCR -Years to complete
Initiate and complete dam safety assurance/ seepage control/ static instability correction projects	-Relative risk of failure – risk compared to other --- -Corps dams (portfolio risk assessment if available in Program Year) -Critical loss of pool and /or navigation
Operations – Assure that projects perform as designed	-Cumulative benefits -Cumulative O&M costs for above benefits (over set time period)
Maintenance – Make sure projects are safe to operate (managing risk)	-Navigation channel availability -Lock closures exceeding 24 hours and one week duration due to mechanical failures- scheduled and unscheduled -OCA and consequences/impact -Relative Risk Rating -Cumulative benefits -Cumulative O&M costs for above benefits (over set time period)
Fund adequate data collection	-Consequence of inadequate data

In recent years each project funding request must include responses to several performance metrics. For all navigation projects funding requests the Corps District must submit responses to many data points. A sample of the queried performance metrics follow. The Corps District's responses to several of these metrics are derived from Value to the Nation data provided by a project's local sponsor.

PRIOR - CONDITION ASSESSMENT CLASS: The condition assessment based on risk assessment analysis, at the time of or just prior to budget year.

PRIOR – CONSEQUENCE CATEGORY: The consequence assessment, based on risk assessment analysis, at the time of or just prior to budget year.
AFTER – CONDITION ASSESSMENT CLASS: The condition assessment that is anticipated or estimated assuming the work is funded.

AFTER - CONSEQUENCE CATEGORY: The consequence assessment that is anticipated assuming the budget work package is funded.

BEFORE AND AFTER CONTRACT METRICS: Several metrics related to government contracting issues are measured for project performance.

BEFORE AND AFTER BUDGET METRICS: Several metrics related to budget history are measured for project performance.

BEFORE AND AFTER APPROPRIATION METRICS: Several metrics related to appropriation history are measured for project performance.

AGREEMENT METRICS: Several metrics related to cost sharing agreements, design agreements, and project partnership/cooperation agreements are populated.

WATERWAY TYPE: Metric related to Navigation Activity, Harbor or Waterway Type. There are currently several waterway types: High Use Shallow Draft Harbor, Moderate Use Shallow Draft Harbor, Low Use Shallow Draft Harbor, High Use Deep Draft Harbor, Moderate Use Deep Draft Harbor, Low Use Deep Draft Harbor, High Use Waterway, Moderate Use Waterway, and Low Use Waterway.

SUBSISTENCE HARBOR: If project is a subsistence harbor the project is identified.

CRITICAL HBR OF REFUGE: If project is a critical harbor of refuge the project is identified.

U.S. COAST GUARD STATION PRESENCE: Required for all projects if the USCG is present. Activity of the Station must be described.

NATIONAL SECURITY PRESENCE: Required for all projects if DOD or DHS activities are present. Nature of the activity must be described.

PUBLIC TRANSPORTATION USE: Includes Ferry (Public) Transportation.

LATEST COMMERCIAL TONNAGE: The commercial tons for the latest available year from US Waterborne Commerce Statistics Center data

5-YEAR AVERAGE COMMERCIAL TONNAGE: The last five-year average annual commercial tons from US Waterborne Commerce Statistics Center data

LATEST SYSTEM TON-MILES: The system or trip ton-miles for the latest available year from US Waterborne Commerce Statistics Center data.

PROBLEMS, NEEDS, AND OPPORTUNITIES

Shallow-Draft Navigation

An evaluation of a range of costs to provide for the needs of maintaining (dredging) navigation access was made for each of the 17 navigation channels (listed by county): Essex County (Hoskins Creek, Rappahannock River), Gloucester County (Aberdeen Creek), King William County and King and Queen County (Mattaponi River, Pamunkey River), Mathews County (Davis Creek, Horn Harbor, Queens Creek, Winter Harbor, Milford Haven), and Middlesex County (Broad Creek, Jackson Creek, Locklies Creek, Mill Creek, Parrotts Creek, Urbanna, Whitings Creek), and the Rappahannock and Mattaponi Rivers each servicing multiple counties in the study area. Estimates were made for each project consisting of the initial year for dredging, dredging frequency (also known as dredging cycle and measured in years), and the costs associated with dredging each project. There was no focus on prioritizing the projects but rather a focus on developing and understanding what the costs would be on an average annual basis as presented below. The costs were developed based on a long term assessment rather than focusing on the costs of the most recent dredging efforts and should be viewed as averages. The estimated long term cost for maintenance of these projects as a group would range from $550,000 per year to $4,917,000 per year with a most probable annual cost of $1,630,000. These costs are displayed by project in the tables below.

Navigation Channel Low Bound Average Annual Cost		
Federal Navigation Project	**Estimated Low Bound Dredging Cycle (years)**	**Estimated Low Bound Average Annual Cost**
Hoskins Creek	8	$124,000
Rappahannock River	70	$31,000
Aberdeen Creek	16	$38,000
Mattaponi River	70	$33,000
Pamunkey River	70	$24,000
Davis Creek	30	$60,000
Horn Harbor	14	$26,000
Queens Creek	10	$39,000
Winter Harbor	14	$30,000
Milford Haven	200	$1,000
Broad Creek	20	$34,000
Jackson Creek	60	$14,000
Locklies Creek	70	$7,000
Mill Creek	70	$7,000
Parrotts Creek	14	$13,000
Urbanna Creek	60	$30,000
Whitings Creek	8	$39,000
	Total Low Bound AAC =	$550,000

Navigation Channel Most Probable Average Annual Cost		
Federal Navigation Project	**Estimated Most Probable Dredging Cycle (years)**	**Estimated Most Probable Average Annual Cost**
Hoskins Creek	4	$468,000
Rappahannock River	35	$67,000
Aberdeen Creek	8	$93,000
Mattaponi River	35	$71,000
Pamunkey River	35	$53,000
Davis Creek	15	$144,000
Horn Harbor	7	$80,000
Queens Creek	5	$131,000
Winter Harbor	7	$105,000
Milford Haven	100	$3,000
Broad Creek	10	$108,000
Jackson Creek	30	$29,000
Locklies Creek	35	$16,000
Mill Creek	35	$14,000
Parrotts Creek	7	$48,000
Urbanna Creek	30	$73,000
Whitings Creek	4	$127,000
	Total Most Probable AAC =	$1,630,000

Navigation Channel High Bound Average Annual Cost		
Federal Navigation Project	**Estimated High Bound Dredging Cycle (years)**	**Estimated High Bound Average Annual Cost**
Hoskins Creek	2	$1,843,000
Rappahannock River	17.5	$139,000
Aberdeen Creek	4	$398,000
Mattaponi River	17.5	$147,000
Pamunkey River	17.5	$109,000
Davis Creek	7.5	$274,000
Horn Harbor	3.5	$152,000
Queens Creek	2.5	$253,000
Winter Harbor	3.5	$214,000
Milford Haven	50	$11,000
Broad Creek	5	$401,000
Jackson Creek	15	$73,000
Locklies Creek	17.5	$34,000
Mill Creek	17.5	$29,000
Parrotts Creek	3.5	$116,000
Urbanna Creek	15	$217,000
Whitings Creek	2	$507,000
	Total High Bound AAC =	$4,917,000

Shoreline Protection

An evaluation of a range of costs to provide for the needs of shoreline protection was made for each of 17 shoreline sites in the study area. Estimates were made for each project consisting of the initial year for placement as a beneficial use site, periodic nourishment frequency (in years) to match corresponding maintenance cycles of adjacent navigation channels, and the increased or decreased costs associated with initial placement and renourishment. There was no focus on prioritize the projects, but rather a focus on developing and understanding what the costs would be on an average annual basis as represented below. The costs were developed based on a long tern assessment rather than focusing on the costs of the most recent dredging efforts and should be viewed as averages. The estimated long term cost for maintenance of these projects as a group would range from $24,000 per year to $247,000 per year with a most probable annual cost of $111,000. These costs are display by project in the tables below.

Shoreline Beneficial Use Site Low Bound Average Annual Cost			
Federal Project	**Shoreline Descriptor**	**Estimated Low Bound Renourishment Cycle (years)**	**Estimated Low Bound Average Annual Cost**
Horn Harbor	Mathews RSM Target site	14	$9,000
Queens Creek	Mathews RSM Target site	10	$6,500
Winter Harbor	Mathews RSM Target site	14	$14,300
Milford Haven	Mathews RSM Target site	200	$200
Jackson Creek	1 mile up and down river	60	$2,000
Locklies Creek	1 mile up and down river	70	$900
Mill Creek	1 mile up and down river	70	$900
Parrotts Creek	1 mile up and down river	14	$1,500
Urbanna Creek	From Rose Gill to 1 mile up river	60	$1,300
*Broad Creek	1 mile up and down river	0	($13,000)
Hoskins Creek	Rt. 360 to Jones Pt.	No cost counted since the upland placement site already exists.	
Rappahannock River	N & S shore - 1 mile upriver	No cost prepared since an upland placement site needs to be identified due to the shoreline not being suitable.	
Aberdeen Creek	1 mile N & S		
Mattaponi River	Wakema 1 mile N & S		
Pamunkey River	Up and down river		
Davis Creek	1 mile upriver, south side		
Whitings Creek	1 mile up and down river	No cost counted since there is existing shoreline placement.	

Total Low Bound AAC = $23,600

Shoreline Beneficial Use Site Most Probable Average Annual Cost			
Federal Project	**Shoreline Descriptor**	**Estimated Most Probable Renourishment Cycle (years)**	**Estimated Most Probable Average Annual Cost**
Horn Harbor	Mathews RSM Target site	7	$45,400
Queens Creek	Mathews RSM Target site	5	$21,800
Winter Harbor	Mathews RSM Target site	7	$47,600
Milford Haven	Mathews RSM Target site	100	$700
Jackson Creek	1 mile up and down river	30	$4,500
Locklies Creek	1 mile up and down river	35	$2,000
Mill Creek	1 mile up and down river	35	$2,000
Parrotts Creek	1 mile up and down river	7	$6,300
Urbanna Creek	From Rose Gill to 1 mile up river	30	$3,200
*Broad Creek	1 mile up and down river	0	($22,200)
Hoskins Creek	Rt. 360 to Jones Pt.	No cost counted since the upland placement site already exists.	
Rappahannock River	N & S shore - 1 mile upriver	No cost prepared since an upland placement site needs to be identified due to the shoreline not being suitable.	
Aberdeen Creek	1 mile N & S		
Mattaponi River	Wakema 1 mile N & S		
Pamunkey River	Up and down river		
Davis Creek	1 mile upriver, south side		
Whitings Creek	1 mile up and down river	No cost counted since there is existing shoreline placement.	

Total Most Probable AAC = $111,300

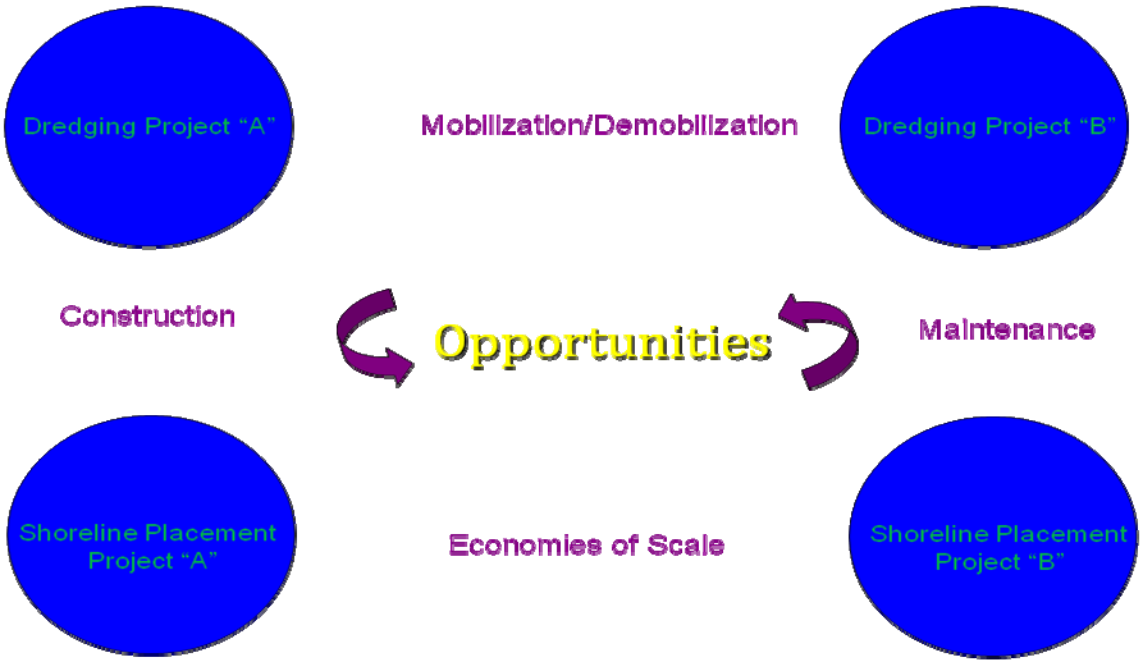
Shoreline Beneficial Use Site High Bound Average Annual Cost			
Federal Project	**Shoreline Descriptor**	**Estimated High Bound Renourishment Cycle (years)**	**Estimated High Bound Average Annual Cost**
Horn Harbor	Mathews RSM Target site	8	$87,100
Queens Creek	Mathews RSM Target site	10	$42,200
Winter Harbor	Mathews RSM Target site	7	$96,400
Milford Haven	Mathews RSM Target site	1	$2,100
Jackson Creek	1 mile up and down river	1	$12,500
Locklies Creek	1 mile up and down river	1	$4,200
Mill Creek	1 mile up and down river	1	$4,200
Parrotts Creek	1 mile up and down river	5	$15,300
Urbanna Creek	From Rose Gill to 1 mile up river	4	$17,400
*Broad Creek	1 mile up and down river	0	($34,200)
Hoskins Creek	Rt. 360 to Jones Pt.	No cost counted since the upland placement site already exists.	
Rappahannock River	N & S shore - 1 mile upriver	No cost prepared since an upland placement site needs to be identified due to the shoreline not being suitable.	
Aberdeen Creek	1 mile N & S		
Mattaponi River	Wakema 1 mile N & S		
Pamunkey River	Up and down river		
Davis Creek	1 mile upriver, south side		
Whitings Creek	1 mile up and down river	No cost counted since there is existing shoreline placement.	

Total High Bound AAC = $247,200

MAINTENANCE ALTERNATIVES

Federal Participation Alternatives

The principal Federal alternatives involve combining dredging and/or shoreline protection needs in ways that effectively and efficiently manage scarce Federal resources. Principal in that effort are looking for combinations of projects that seek to reduce mobilization and demobilization costs for dredging and/or shoreline protection as displayed and described below:



State Participation Alternatives

The list of state participation alternatives include (1) use of the Commonwealth Port Fund (Aid to Local Ports), special service tax districts, and user taxes. These alternatives will be described in consultation with the study sponsors, to include discussions about broader alternatives brought about from the companion study of the Middle Peninsula localities as it is developed.

Local Participation Alternatives

The list of local participation alternatives includes special service tax districts and user taxes. These alternatives will be described in consultation with the study sponsors, to include discussions about broader alternatives brought about from the companion study of the Middle Peninsula localities as it is developed.

Combination Alternatives

These alternatives will consist of various combinations of Federal, State, and Local actions that would be available as either specific to navigation needs, specific to shoreline needs, or a combination of both as desired by the study sponsors.

Two potential solutions sets describing combinations of shallow draft dredging and shore protection projects as displayed and described below:

Potential Solution Set
Combining One Shore Protection (SP) Project
With
Two Shallow Draft (SD) Navigation Projects

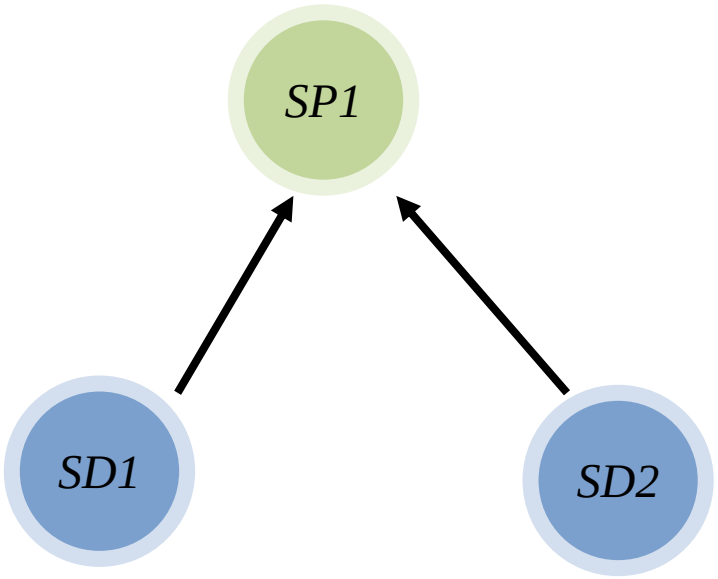


Table of Possible Saving by Combining Projects

Costs Associated with Project If Performed as a Stand Alone Project

Project	Mob/Demob	Unit Cost of Dredging of Channel	Cubic Yards Dredged	Total Contract Cost
SD1	$ 200,000	$ 4.00	20,000	$ 280,000
SD2	$ 300,000	$ 4.00	20,000	$ 380,000
SP1	$ 200,000	$ 20.00	100,000	$ 2,200,000
			Total cost of Standalone Projects =	$ 2,860,000

Costs Associated with Project If Performed as a Combined Project

Project	Mob/Demob	Unit Cost of Dredging of Channel	Cubic Yards Dredged	Total Contract Cost
SD1	$ 150,000	$ 10.00	20,000	$ 350,000
SD2	$ 150,000	$ 15.00	20,000	$ 450,000
SP1	$ 150,000	$ 20.00	60,000	$ 1,350,000
			Total cost of Combined Projects =	$ 2,150,000

Potential Cost Savings as a Result of Combining Projects = $ 710,000

Potential Solution Set
Combining Two Shore Protection (SP) Projects
With Two Shallow Draft (SD) Navigation Projects

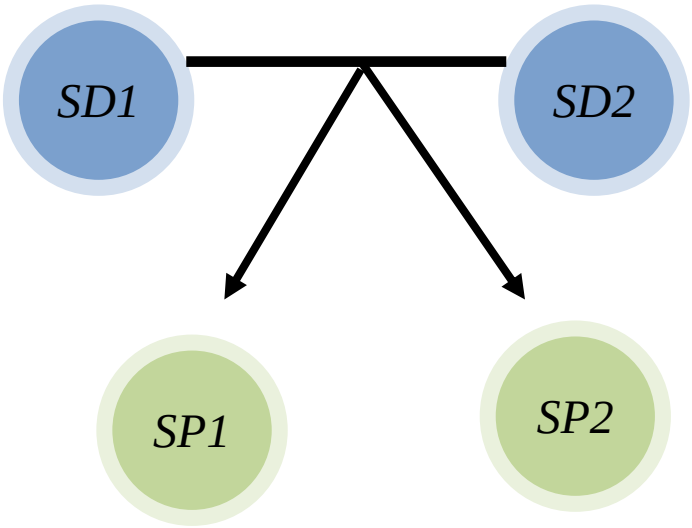


Table of Possible Saving by Combining Projects

Costs Associated with Project If Performed as a Stand Alone Project

Project	Mob/Demob	Unit Cost of Dredging of Channel	Cubic Yards Dredged	Total Contract Cost
SD1	$ 200,000	$ 4.00	20,000	$ 280,000
SD2	$ 300,000	$ 4.00	20,000	$ 380,000
SP1	$ 200,000	$ 20.00	100,000	$ 2,200,000
SP2	$ 200,000	$ 25.00	100,000	$ 2,700,000
			Total cost of Standalone Projects =	$ 5,560,000

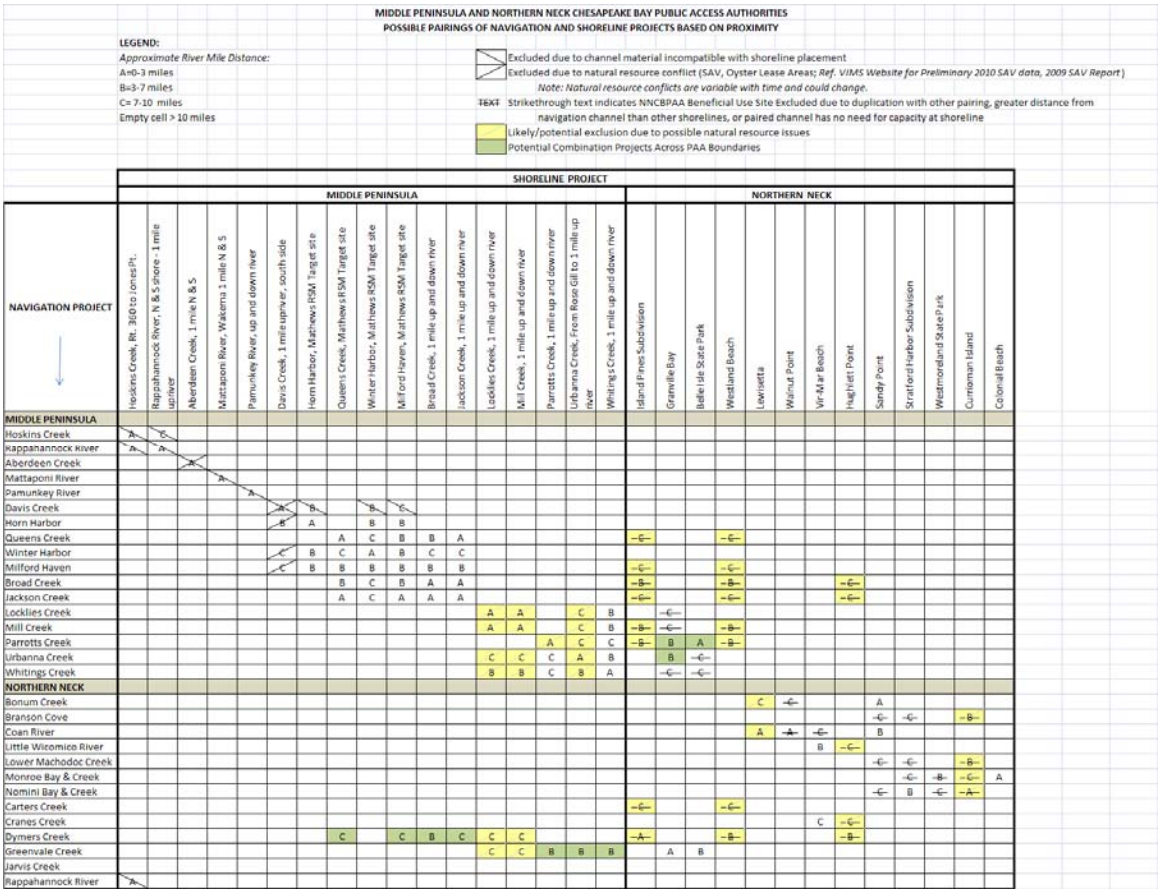
Costs Associated with Project If Performed as a Combined Project

Project	Mob/Demob	Unit Cost of Dredging of Channel	Cubic Yards Dredged	Total Contract Cost
SD1	$ 150,000	$ 10.00	20,000	$ 350,000
SD2	$ 150,000	$ 15.00	20,000	$ 450,000
SP1	$ 150,000	$ 20.00	80,000	$ 1,750,000
SP2	$ 150,000	$ 25.00	80,000	$ 2,150,000
			Total cost of Combined Projects =	$ 4,700,000

Potential Cost Savings as a Result of Combining Projects = $ 860,000

Interpretation of the Combination Matrix

Included in this report is a matrix that lists all the Federal Navigation Projects and all the potential shoreline beneficial use locations identified by the Middle Peninsula and Northern Neck Chesapeake Bay Public Access Authorities to be included into this study. The matrix has the general appearance as shown below. This report section provides guidelines for interpreting the data shown in the matrix.



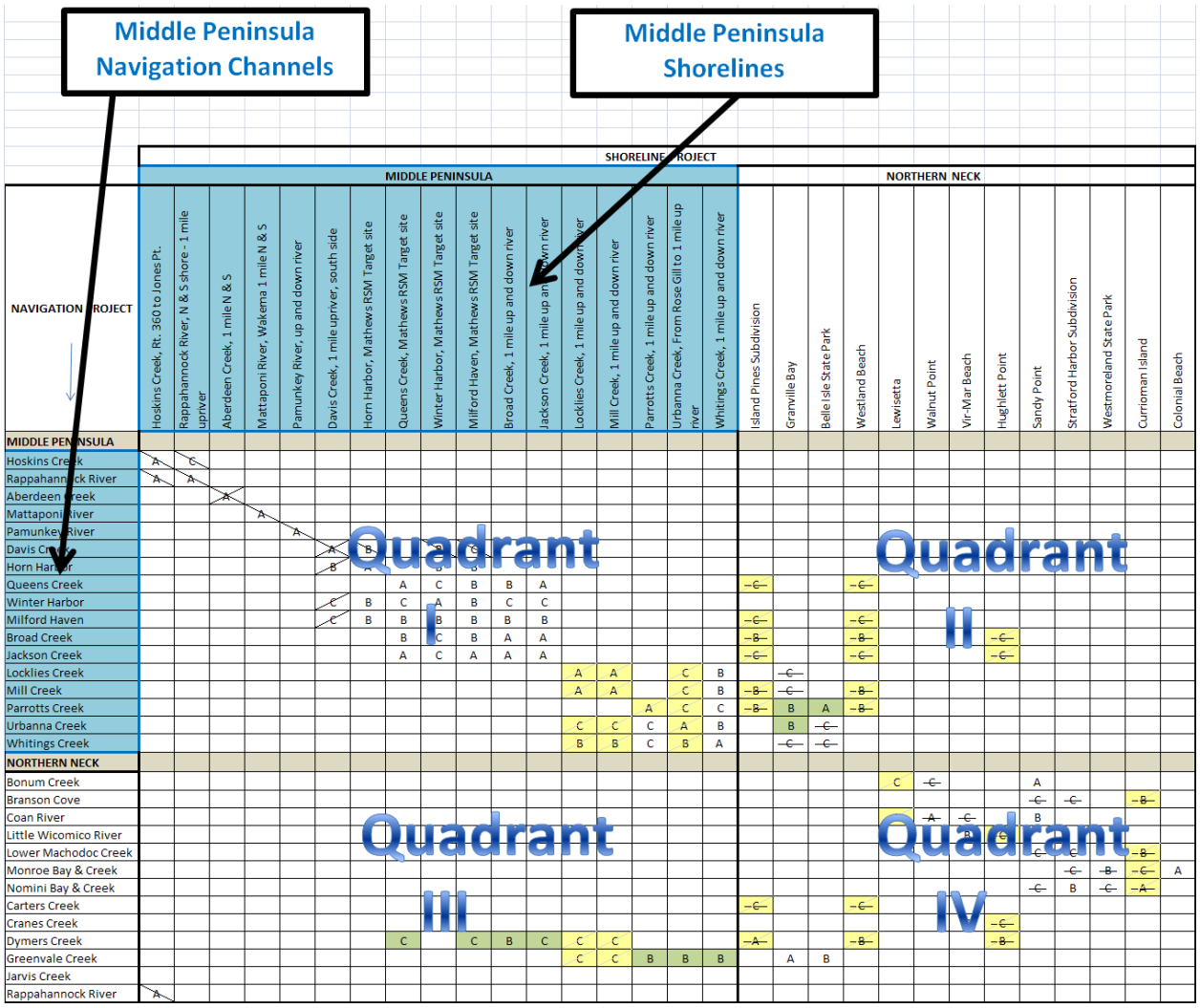
MIDDLE PENINSULA AND NORTHERN NECK CHESAPEAKE BAY PUBLIC ACCESS AUTHORITIES
POSSIBLE PAIRINGS OF NAVIGATION AND SHORELINE PROJECTS BASED ON PROXIMITY

LEGEND:
Approximate River Mile Distance:
A=0-3 miles
B=3-7 miles
C= 7-10 miles
Empty cell > 10 miles

Excluded due to channel material incompatible with shoreline placement
Excluded due to natural resource conflict (SAV, Oyster Lease Areas; *Ref. VIMS Website for Preliminary 2010 SAV data, 2009 SAV Report*)
Note: Natural resource conflicts are variable with time and could change.
~~TEXT~~ Strikethrough text indicates NNCBPAA Beneficial Use Site Excluded due to duplication with other pairing, greater distance from navigation channel than other shorelines, or paired channel has no need for capacity at shoreline
Likely/potential exclusion due to possible natural resource issues
Potential Combination Projects Across PAA Boundaries

NAVIGATION PROJECT	SHORELINE PROJECT: MIDDLE PENINSULA — Hoskins Creek, Rt. 360 to Jones Pt.	Rappahannock River, N & S shore - 1 mile up river	Aberdeen Creek, 1 mile N & S	Mattaponi River, Wakema 1 mile N & S	Pamunkey River, up and down river	Davis Creek, 1 mile upriver, south side	Horn Harbor, Mathews RSM Target site	Queens Creek, Mathews RSM Target site	Winter Harbor, Mathews RSM Target site	Milford Haven, Mathews RSM Target site	Broad Creek, 1 mile up and down river	Jackson Creek, 1 mile up and down river	Locklies Creek, 1 mile up and down river	Mill Creek, 1 mile up and down river	Parrotts Creek, 1 mile up and down river	Urbanna Creek, From Rose Gil to 1 mile up river	Whitings Creek, 1 mile up and down river	NORTHERN NECK — Island Pines Subdivision	Granville Bay	Belle Isle State Park	Westland Beach	Lewisetta	Walnut Point	Vir-Mar Beach	Hughlett Point	Sandy Point	Stratford Harbor Subdivision	Westmoreland State Park	Curtsman Island	Colonial Beach
MIDDLE PENINSULA																														
Hoskins Creek	A	C																												
Rappahannock River	A	A																												
Aberdeen Creek			A																											
Mattaponi River				A																										
Pamunkey River					A																									
Davis Creek						A	B		B	C																				
Horn Harbor						B	A		B	B																				
Queens Creek								A	C	B	B	A						~~C~~			~~C~~								
Winter Harbor						C	B	C	A	B	C	C																		
Milford Haven						C	B	B	B	B	B	B						~~C~~			~~C~~								
Broad Creek								B	C	B	A	A						~~B~~			~~B~~				~~C~~				
Jackson Creek								A	C	A	A	A						~~C~~			~~C~~				~~C~~				
Locklies Creek													A	A		C	B		~~C~~										
Mill Creek													A	A		C	B	~~B~~	~~C~~		~~B~~								
Parrotts Creek															A	C	C	~~B~~	B	A	~~B~~								
Urbanna Creek													C	C	C	A	B		B	~~C~~									
Whitings Creek													B	B	C	B	A		~~C~~	~~C~~									
NORTHERN NECK																														
Bonum Creek																						C	~~C~~			A				
Branson Cove																										~~C~~	~~C~~		~~B~~	
Coan River																						A	~~A~~	~~C~~		B				
Little Wicomico River																									B	~~C~~				
Lower Machodoc Creek																										~~C~~	~~C~~		~~B~~	
Monroe Bay & Creek																											~~C~~	~~B~~	~~C~~	A	
Nomini Bay & Creek																										~~C~~	B	~~C~~	~~A~~	
Carters Creek																		~~C~~			~~C~~									
Cranes Creek																									C	~~C~~				
Dymers Creek								C		C	B	C	C	C				~~A~~			~~B~~					~~B~~				
Greenvale Creek													C	C	B	B	B		A	B										
Jarvis Creek																														
Rappahannock River	A																													

The horizontal axis lists the identified shorelines for potential beneficial use nourishment. The vertical axis lists the Federal navigation channels. The shorelines are grouped according to PAA geographic boundary. As an example, the graphic below shows how to identify the Middle Peninsula shorelines and navigation channels on the matrix. Extending the line downward from the shoreline list and across from the navigation channel list allows the reader to find potential shorelines that may pare well with the associated navigation channel.



Cells that show a letter against white background or green background with no strikethrough text are the shoreline/navigation channel combinations that survive the screening. The white background indicates that the navigation channel/shoreline combination is within a PAA boundary. The green background indicates cross-PAA combinations.

The letters A, B, and C indicate a distance from the navigations channel to the shoreline. The letter "A" indicates a relatively short dredge pumping distance (also assumed to be the least cost) with "B" and "C" being feasible, but more distant (and likely more expensive).

For example, combinations of Middle Peninsula Shorelines and Middle Peninsula Navigation channels that survive the shoreline placement screening are identified in Quadrant I with the letters A, B, and C. If the letter has a strikethrough or is highlighted in yellow then the shoreline is not suitable to accept material from the associated channel.

In summary, for Quadrant 1 the white cells with letter text "A", "B", or "C" are possible channel/shoreline combinations within the Middle Peninsula CBPAA.
For Quadrant II, the green cells with letter text "A", "B", or "C" are possible Middle Peninsula channel projects that may pare well with Northern Neck shorelines.

For Quadrant III, the green cells with letter text “A”, “B”, or “C” are possible Northern Neck channel projects that may pare well with Middle Peninsula shorelines.

For Quadrant IV, the white cells with letter text “A”, “B”, or “C” are possible channel/shoreline combinations within the Northern Neck CBPAA.

Shoreline/Navigation project combinations that do survive the screening are assumed to require a confined upland placement area.

Project Combination Alternatives

To summarize the findings of the combination matrix, the following table shows the possible project combinations that appear to have potential within the Middle Peninsula Chesapeake Bay Public Access Authority. A viable combination appears with a checkmark.

Intra-MPCBPAA Channel and Shoreline Possible Combinations

	Horn Harbor, Mathews Regional Sediment Management Target site	Queens Creek, Mathews Regional Sediment Management Target site	Winter Harbor, Mathews Regional Sediment Management Target site	Milford Haven, Mathews Regional Sediment Management Target site	Broad Creek, 1 mile up and down river	Jackson Creek, 1 mile up and down river	Parrotts Creek, 1 mile up and down river	Whitings Creek, 1 mile up and down river
Horn Harbor	☑		☑	☑				
Queens Creek		☑	☑	☑	☑	☑		
Winter Harbor	☑	☑	☑	☑	☑	☑		
Milford Haven	☑	☑	☑	☑	☑	☑		
Broad Creek		☑	☑	☑	☑	☑		
Jackson Creek		☑	☑	☑	☑	☑		
Locklies Creek								☑
Mill Creek								☑
Parrotts Creek								☑
Urbanna Creek							☑	☑
Whitings Creek							☑	☑

MIDDLE PENINSULA AND NORTHERN NECK CHESAPEAKE BAY PUBLIC ACCESS AUTHORITIES
POSSIBLE PAIRINGS OF NAVIGATION AND SHORELINE PROJECTS BASED ON PROXIMITY

LEGEND:

Approximate River Mile Distance:
A=0-3 miles
B=3-7 miles
C= 7-10 miles
Empty cell > 10 miles

Excluded due to channel material incompatible with shoreline placement
Excluded due to natural resource conflict (SAV, Oyster Lease Areas; *Ref. VIMS Website for Preliminary 2010 SAV data, 2009 SAV Report*)
Note: Natural resource conflicts are variable with time and could change.
~~TEXT~~ Strikethrough text indicates NNCBPAA Beneficial Use Site Excluded due to duplication with other pairing, greater distance from navigation channel than other shorelines, or paired channel has no need for capacity at shoreline
Likely/potential exclusion due to possible natural resource issues
Potential Combination Projects Across PAA Boundaries

	SHORELINE PROJECT																														
	MIDDLE PENINSULA																			NORTHERN NECK											
NAVIGATION PROJECT ↓	Hoskins Creek, Rt. 360 to Jones Pt.	Rappahannock River, N & S shore - 1 mile upriver	Aberdeen Creek, 1 mile N & S	Mattaponi River, Wakema 1 mile N & S	Pamunkey River, up and down river	Davis Creek, 1 mile upriver, south side	Horn Harbor, Mathews RSM Target site	Queens Creek, Mathews RSM Target site	Winter Harbor, Mathews RSM Target site	Milford Haven, Mathews RSM Target site	Broad Creek, 1 mile up and down river	Jackson Creek, 1 mile up and down river	Locklies Creek, 1 mile up and down river	Mill Creek, 1 mile up and down river	Parrotts Creek, 1 mile up and down river	Urbanna Creek, From Rose Gill to 1 mile up river	Whitings Creek, 1 mile up and down river	Island Pines Subdivision	Granville Bay	Belle Isle State Park	Westland Beach	Lewisetta	Walnut Point	Vir-Mar Beach	Hughlett Point	Sandy Point	Stratford Harbor Subdivision	Westmoreland State Park	Curriioman Island	Colonial Beach
MIDDLE PENINSULA																															
Hoskins Creek	~~A~~	~~C~~																													
Rappahannock River	~~A~~	~~A~~																													
Aberdeen Creek			~~A~~																												
Mattaponi River				~~A~~																											
Pamunkey River					~~A~~																										
Davis Creek						~~A~~	~~B~~		~~B~~	~~C~~																					
Horn Harbor						~~B~~	A		B	B																					
Queens Creek								A	C	B	B	A						~~C~~			~~C~~									
Winter Harbor						~~C~~	B	C	A	B	C	C																			
Milford Haven						~~C~~	B	B	B	B	B	B						~~C~~			~~C~~									
Broad Creek								B	C	B	A	A						~~B~~			~~B~~			~~C~~						
Jackson Creek								A	C	A	A	A						~~C~~			~~C~~			~~C~~						
Locklies Creek													A	A		C	B		~~C~~											
Mill Creek													A	A		C	B	~~B~~	~~C~~		~~B~~									
Parrotts Creek															A	C	C	~~B~~	B	A	~~B~~									
Urbanna Creek													C	C	C	A	B		B	~~C~~										
Whitings Creek													B	B	C	B	A		~~C~~	~~C~~										
NORTHERN NECK																															
Bonum Creek																						C	~~C~~			A				
Branson Cove																										~~C~~	~~C~~		~~B~~		
Coan River																						A	~~A~~	~~C~~		B					
Little Wicomico River																								B	~~C~~						
Lower Machodoc Creek																										~~C~~	~~C~~		~~B~~		
Monroe Bay & Creek																											~~C~~	~~B~~	~~C~~	A		
Nomini Bay & Creek																										~~C~~	B	~~C~~	~~A~~		
Carters Creek																		~~C~~			~~C~~										
Cranes Creek																								C	~~C~~						
Dymers Creek								C		C	B	C	C	C				~~A~~			~~B~~				~~B~~						
Greenvale Creek													C	C	B	B	B		A	B											
Jarvis Creek																															
Rappahannock River	~~A~~																														

Possible Channel and Shoreline Combinations between Middle Peninsula and Northern Neck

	Queens Creek, Mathews RSM Target site	Milford Haven, Mathews RSM Target site	Broad Creek, 1 mile up and down river	Jackson Creek, 1 mile up and down river	Parrotts Creek, 1 mile up and down river	Urbanna Creek, From Rose Gill to 1 mile up river	Whitings Creek, 1 mile up and down river	Granville Bay	Belle Isle State Park
Parrotts Creek								☑	☑
Urbanna Creek								☑	
Dymers Creek	☑	☑	☑	☑					
Greenvale Creek					☑	☑	☑		

FUNDING ALTERNATIVES

Federal Alternatives

As stated earlier, the Harbor Maintenance Trust Fund is the source of funds for most maintenance dredging projects that are included in Congressional appropriations. Individual navigation projects do not receive appropriations directly from the Harbor Maintenance Trust Fund. There is not a direct correlation of Trust Fund recovery and Corps' dredging capability (e.g. one hundred percent recovery of the Corps' port O&M expenditures does not mean that 100% of the Corps' capability is funded). An increase in the amount of federal dollars appropriated with the Trust Fund would likely need to be enacted via change in existing law as described in the following table.

State Alternatives

The list of state participation alternatives include (1) use of the Commonwealth Port Fund (Aid to Local Ports), and (2) State funds collected through a concept similar to that used in other States (example is the Florida Inland Navigation District). Both are described in the following table.

Local/Regional Alternatives

The list of local and/or regional participation alternatives include (1) special service tax districts, and (2) maintenance provided by private interests (alone or in partnership with Public entities). Both are described in the following table.

Combination Alternatives

These alternatives will consist of various combinations of Federal, State, and Local/Regional actions that would be available as either specific to navigation needs, specific to shoreline needs, or a combination of both as desired by the study sponsors. These combinations can be difficult to align as fiscal years and funding allocation timelines may be difficult to synchronize. Also, environmental permit and legal liability responsibilities must be clearly defined when combining funding sources

Funding Alternatives Summary

The following table presents the various funding alternatives the public policy decision makers may want to consider in concert with other criteria to be used in deciding on how to fund these water resources initiatives in the future. Pros and cons of each alternative are provided along with a listing of related (other) considerations.

Funding Alternatives Summary			
Funding Alternative	**Pros**	**Cons**	**Other Considerations**
1. Changes to Federal Funding through the Harbor Maintenance Trust Fund	• Funding source already exists • Funds do not need any local contributions, aside from any items of local cooperation typically required • Many projects in the maintenance inventory already have active permits and secured placement sites • No Corps permit required	• These funds are prioritized for deep draft projects (currently defined as projects authorized to depths greater 15 feet) and that have more than 1 million annual tons of commodities • Recent history has shown that shallow draft low use projects are not receiving funds for dredging in recent Presidential Budgets • The percentage of funding transferred out of the Harbor Maintenance Trust Fund is approved by Congress annually and varies, but is typically less than 50% of the account balance. • Only eligible for Federal levels of government to apply for these funds	• Congressional legislation would need to change the eligibility requirements for the funds, and allow a larger amount of funds to be used for dredging projects • Even with congressional changes to Harbor Maintenance Trust Fund, shallow draft low use projects may not fare well without budget policy guidance changes, as well. • In addition to any Harbor Maintenance Trust Fund issues, the Corps also has budgetary ceilings that are limiting. Changes to budgetary ceiling constraints would also need to occur.
2. State Funding through the Aid to Local Ports/Commonwealth Port Fund	• Funding source already exists • Funds do not need any local contributions, local governments just need to request funds	• Currently, only funded at $2 million annually for the entire state • Highly competitive for limited funds • Competition for these limited	• Funding could increase with congressional lobbying • Existing environmental permits acquired by the Corps for Federal channel dredging may have limiting language with respect to transfer to other entities, and in some cases may not be

	• May be potential to transfer funds to the Corps for designing, procurement, and administering dredging contracts	funds will increase as Federal funding is decreasing • When compared to Corps execution of a project funded by Harbor Maintenance Trust fund alternative, there is additional permitting needed • Some projects in the PAA region have not been dredged in quite some time and do not have existing permits and placement sites. Such projects may require significant up- front design and permitting work prior to dredging	possible. • Placement sites may have restrictions that only allow the Corps of Engineers to deposit dredged material into them. Locality may have to obtain a separate placement site. • Locality may have to obtain some or all of their own permits. • Such an initiative could be advantageous to Value to the Nation performance metrics • If locality wants to transfer funds to the Corps, a formal Memorandum of Agreement may be required. However, there have been recent measures to simplify this process.
3. State Funding collected through a concept similar to the Florida Inland Navigation District (FIND)	• There is flexibility in provided funds to the Federal Government with a Contributed Funds Agreement. • It is useful for the Corps to act as the contractor for the local sponsor due to the Corps having historically managed and maintained these projects. • This has proven to be effective for FIND. • May be potential to transfer funds to the Corps for designing, procurement, and administering dredging contracts	• The process of creating a Contributed Funds agreement with the Corps can be time consuming and must be approved by Corps headquarters. • FIND currently only needs to provide funds for the Corps to do the actual maintenance of the dredging project. Limited funds are still available at the Federal level for the management, design and surveying of this project.	• Existing environmental permits acquired by the Corps for Federal channel dredging may have limiting language with respect to transfer to other entities, and in some cases may not be possible. • Placement sites may have restrictions that only allow the Corps of Engineers to deposit dredged material into them. Locality may have to obtain a separate placement site. • Locality may have to obtain some or all of their own permits. • Such an initiative could be advantageous to Value to the Nation performance metrics • If locality wants to transfer funds to the Corps, a formal Memorandum of Agreement may be required. However, there have been recent measures to simplify this process.

4. Local/Regional Funding through Special Service Tax Districts	• Funding for projects by the people who benefit from each project • May be able to be controlled at the local level • May be potential to transfer funds to the Corps for designing, procurement, and administering dredging contracts	• Would mean an increase in tax rate (likely real estate) that would need approval of the community • Special tax service district may require Corps review for legal sufficiency prior to transfer to the Corps if the Corps the locality wants to transfer funds to the Corps for dredging. If structured inadequately, then transfer may not be possible.	• Additional enabling legislation may be required • For the Corps to be a partner in using these funds a Contributed Funds Agreement must be approved and this can be a difficult for the Corps to approve • Placement sites may have restrictions that only allow the Corps of Engineers to deposit dredged material into them. Locality may have to obtain a separate placement site. • Locality may have to obtain some or all of their own permits. • Such an initiative could be advantageous to Value to the Nation performance metrics • If locality wants to transfer funds to the Corps, a formal Memorandum of Agreement may be required. However, there have been recent measures to simplify this process.
5. Private Interest Funding (Alone or in Partnership with Public Funds)	• Jackson Creek and Greenvale Creek projects are already using this idea or a variation of the concept • It may be possible to maintain the project differently than the Federal authorization allows • If private funds participate in maintenance efforts with public funds, there could be appealing leveraging opportunities	• Needs private interest with capability • Corps would likely be unable to accept a transfer of funds to allow the Corps for designing, procurement, and administering dredging contracts	• Placement sites may have restrictions that only allow the Corps of Engineers to deposit dredged material into them. Locality may have to obtain a separate placement site. • Locality may have to obtain some or all of their own permits. • Locality would likely need to assume responsibility for communicating dredging status to US Coast Guard, an action typically performed by the Corps during Federal dredging events • Such an initiative could be advantageous to Value to the Nation performance metrics

CONCLUSIONS

The purpose of this report is to provide the MPCBPAA with a probable average annual cost for maintaining all the Federal navigation channels within the geographic boundaries of the PAA.

This report has summarized the history of individual projects in the MPCBPAA region. Historical costs were researched from Corps of Engineers Annual Reports published to date. Financial cost data from years after the 2009 Annual Report were derived from accounting database records.

Future costs considered prior year costs, but were reviewed to insure the future costs reflected a realistic projection of future conditions that the projects would be maintained under. For instance, permitting and construction quality control requirements have gotten more stringent over time rather than less. The future costs consider that these constraints will remain in place. Also, the future costs are reported as most probable average annual cost for maintaining a dredging program for the Federal channels within the MPCBPAA. The most probable average annual cost is bracketed by a low and high bound average annual cost. This captures a cost range to account for an uncertain future (for example: maintenance dredging interval uncertainties, discount rate uncertainties, dredging industry uncertainties, etc.)

Considering these variations, the most probable average annual cost for maintaining a shallow draft navigation program on the Middle Peninsula is $1,630,000 per year. But the cost for dredging could be as low as $550,000 per year or as high as $4,917,000 per year. A supplemental $111,000 per year would most probably be required in order to use any available sandy material in a beneficial manner along nearby shorelines. The supplemental cost could be as low as $24,000 per year or as high as $247,000 per year.

APPENDIX A – EXISTING CONDITIONS

1. Navigation Projects/Channels
2. Shoreline Protection Projects

APPENDIX A:
NAVIGATION PROJECTS/CHANNELS

				PHYSICAL CHARACTERISTICS							FINANCIAL CHARACTERISTICS					USAGE CHARACTERISTICS			
				Authorized Dimensions			Maintained Dimensions (If Different From Authorized Dimensions)							Dredged Material Placement Site Available					
Federal Navigation Project/Channel	Location	Project Status (2)	Feature (3)	Length (Feet)	Width (Feet)	Depth (Feet) (4)	Feature (3)	Length (Feet)	Width (Feet)	Depth (Feet) (4)	Date of Last Maintenance (Fiscal Year)	Total Cost of Maintenance ($1,000's) (5)	Estimated Dredging Cycle (Years)	Federal (Y/N)	State/Local (Y/N)	Average Number of Commodities	Principal Commodities	Latest Annual Tonnage (7)	Recreation (Y/N) (6)
Hoskins Creek	Essex County	A/M	C	5,800	80-100	10					2009	3,945	4	N	Y	1	GRAIN	209,000	Y
Hoskins Creek	Essex County	A/M	TB	INCLUSIVE	200	10					INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE
Rappahannock River (1)	Essex County, Mangoright Bar	A/N	C	10,000	200	10				6	1970	1,969	6	N	N	7	Grain	291,000	Y
Aberdeen Creek	Gloucester County	A/N	C	5,280	80	6					1974	274	8	N	N	1	Fish	None reported	Y
Aberdeen Creek	Gloucester County	A/N	TB	450	400	6					INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	1	Fish	None reported	INCLUSIVE
Mattaponi River	King and Queen County	A/N	C	180,000	100-150	7-9					1941	216	Insufficient history	N	N	None reported	None reported	None reported	Y
Mattaponi River	King William County	A/N	C	180,000	100-150	7-9					1941	216	Insufficient history	N	N	None reported	None reported	None reported	Y
Pamunkey River	King William County	A/N	C	250,000	100	7					1942	161	Insufficient history	N	N	5	Forestry products	182,000	Y
Davis Creek	Mathews County	A/N	C	4,130	80	10					1971	234	15	N	N	1	Fish	None reported	Y
Davis Creek	Mathews County	A/N	TB	720	165-230	10					INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE
Horn Harbor	Mathews County	A/M	C	3,700	100	7					2003	504	7	Y	N	1	Fish	None reported	Y
Queens Creek	Mathews County	A/M	C	4,100	60	6					2009	798	5	Y	Y	1	Fish	None reported	Y
Queens Creek	Mathews County	A/M	TB	400	200	6					INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE
Winter Harbor	Mathews County	A/M	C	7,600	100	12				6	2010	2,894	7	Y	N	1	Fish	None reported	Y
Winter Harbor	Mathews County	A/M	TB	400-700	400	12				6		INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE
Milford Haven	Mathews County	A/N	C	5,280	200	10					1936	34	--	N	N	1	Fish, USCG Base	None reported	Y
Milford Haven	Mathews County	A/N	J	1,183	NA	NA					NA	INCLUSIVE	NA	NA	NA	NA	NA	NA	NA
Broad Creek	Middlesex County	A/M	C	4,100	100	7					2010	1,804	10	Y	N	2	Fish, Boatbuilding	None reported	Y
Jackson Creek	Middlesex County	A/N	C	2,640	60-80	8					1970	28	30	N	Y	1	Fish	None reported	Y
Locklies Creek	Middlesex County	A/N	C	3,300	100	4					1924	69	Unknown	N	N	1	Fish	None reported	Y
Mill Creek	Middlesex County	A/N	C	1,400	100	11					1936	22	Unknown	N	N	1	Fish	None reported	Y
Mill Creek	Middlesex County	A/N	TB	300	300	11					INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE
Parrotts Creek	Middlesex County	A/N	C	4,800	60	6					1956	69	7	N	N	1	Fish	None reported	Y
Parrotts Creek	Middlesex County	A/N	TB	120	120	6					INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE
Urbanna	Middlesex County	A/N	C	3,700	150	10					1956	116	30	N	N	1	Fish	None reported	Y
Urbanna	Middlesex County	A/N	TB	1,575	400	10					INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE	INCLUSIVE
Urbanna	Middlesex County	A/N	J (two)	717; 1,895	NA	NA					NA	NA	NA	NA	NA	NA	NA	NA	NA
Whitings Creek	Middlesex County	A/M	C	1,100	70	4					2003	490	4	Y	N	1	Fish	None reported	Y

N.A. = Not Applicable
INCLUSIVE indicates that the project feature is already accounted for in a previous row of the same Federal Navigation Project or Channel.

Notes:
(1) Project located in Caroline County, Essex County, King George County, Lancaster County, Middlesex County, Richmond County, Spotsylvania County, Stafford County, and Westmoreland County
(2) A/M -- Actively Used and Maintained. A/N -- Actively Used and Not Maintained for Whatever Reason
(3) Channel (C) and/or Turning Basin (TB), Jetty (J)
(4) Datum is Mean Low Water
(5) Federal Costs Through September 30, 2009
(6) Pre-project Depth could (Yes) or could not (No) support recreational usage
(7) Ref: Waterborne Commerce of the United States, Calendar Year 2008, Part 1- Waterways and Harbors Atlantic Coast

APPENDIX A CONTINUED:
SHORELINE PROTECTION PROJECTS

		EXISTING PHYSICAL CHARACTERISTICS				POTENTIAL FUTURE PHYSICAL CHARACTERISTICS			FINANCIAL CHARACTERISTICS		
Shoreline Protection Needs	**Location**	**Navigation Material Compatible For Beach?**	**Length (Feet)**	**Width (Feet)**	**Foreshore Slope**	**Width (Feet)**	**Foreshore Slope**	**Estimated Sediment Capacity of Shoreline Site (1000 CY) (1)**	**Initial Maint Cycle Cost Over Associated NAV Cost ($1000)**	**Periodic Nourishment Cycle (2)**	**Annualized Costs ($1000)**
1. Route 360 Bridge to Jones Point (Hoskins Creek)	Essex County	N	12,725	20	1v:100h	100	1v:20h	160	Upland Req'd	4	Upland Req'd
2. Smith Mount Landing to Paynes Island (Rappahannock River)	Essex County	Low probability	27,168	20	1v:100h	100	1v:20h	340	Upland Req'd	35	Upland Req'd
3. Shoreline 1 mile upstream and downstream of the mouth of Aberdeen Creek	Gloucester County	Low probability	10,840	20	1v:100h	100	1v:20h	130	Upland Req'd	8	Upland Req'd
4. Shoreline 1 mile upstream and downstream of Wakema on the Mattaponi River	King and Queen County	Low probability	8,914	20	1v:100h	100	1v:20h	110	Upland Req'd	35	Upland Req'd
5. Shoreline near Pamunkey Indian Resrvation (Pamunkey River)	King William County	Low probability	9,916	20	1v:100h	100	1v:20h	120	Upland Req'd	35	Upland Req'd
6. RSM Site for Davis Creek	Mathews County	Low probability	2,500	20	1v:100h	100	1v:20h	30	Upland Req'd	15	Upland Req'd
7. RSM Site for Horn Harbor	Mathews County	Y	2,000	20	1v:100h	100	1v:20h	20	300	7	45
8. RSM Site for Queens Creek	Mathews County	Y	2,000	20	1v:100h	100	1v:20h	20	100	5	22
9. RSM Site for Winter Harbor	Mathews County	Y	5,000	20	1v:100h	100	1v:20h	60	350	7	48
10. RSM Site for Milford Haven	Mathews County	Y	2,000	20	1v:100h	100	1v:20h	20	100	100	1
11. Shoreline 1 mile upstream and downstream of the mouth of Broad Creek	Middlesex County	Y	9,821	20	1v:100h	100	1v:20h	120	0	10	-22
12. Shoreline 1 mile upstream and downstream of the mouth of Jackson Creek	Middlesex County	Y	10,641	20	1v:100h	100	1v:20h	130	100	30	5
13. Shoreline 1 mile upstream and downstream of the mouth of Locklies Creek	Middlesex County	Y	10,834	20	1v:100h	100	1v:20h	130	100	35	2
14. Shoreline 1 mile upstream and downstream of the mouth of Mill Creek	Middlesex County	Y	10,834	20	1v:100h	100	1v:20h	130	100	35	2
15. Shoreline 1 mile upstream and downstream of the mouth of Parrotts Creek	Middlesex County	Y	12,197	20	1v:100h	100	1v:20h	150	100	7	6
16. Shoreline 1 mile upstream and downstream of the mouth of Urbanna	Middlesex County	Y	6,024	20	1v:100h	100	1v:20h	70	100	30	3
17. Shoreline 1 mile upstream and downstream of the mouth of Whitings Creek	Middlesex County	Y	10,510	20	1v:100h	100	1v:20h	130	0	4	No change over existing

INCLUSIVE indicates that the project feature is already accounted for in a previous row of the same Federal Navigation Project or Channel.

Notes:
(1) In order to provide a 50-foot wide beach
(2) To be based on a range of years

APPENDIX B - AUTHORIZING LEGISLATION

ABERDEEN CREEK, VIRGINIA

Condition of Improvement, 30 June 1971

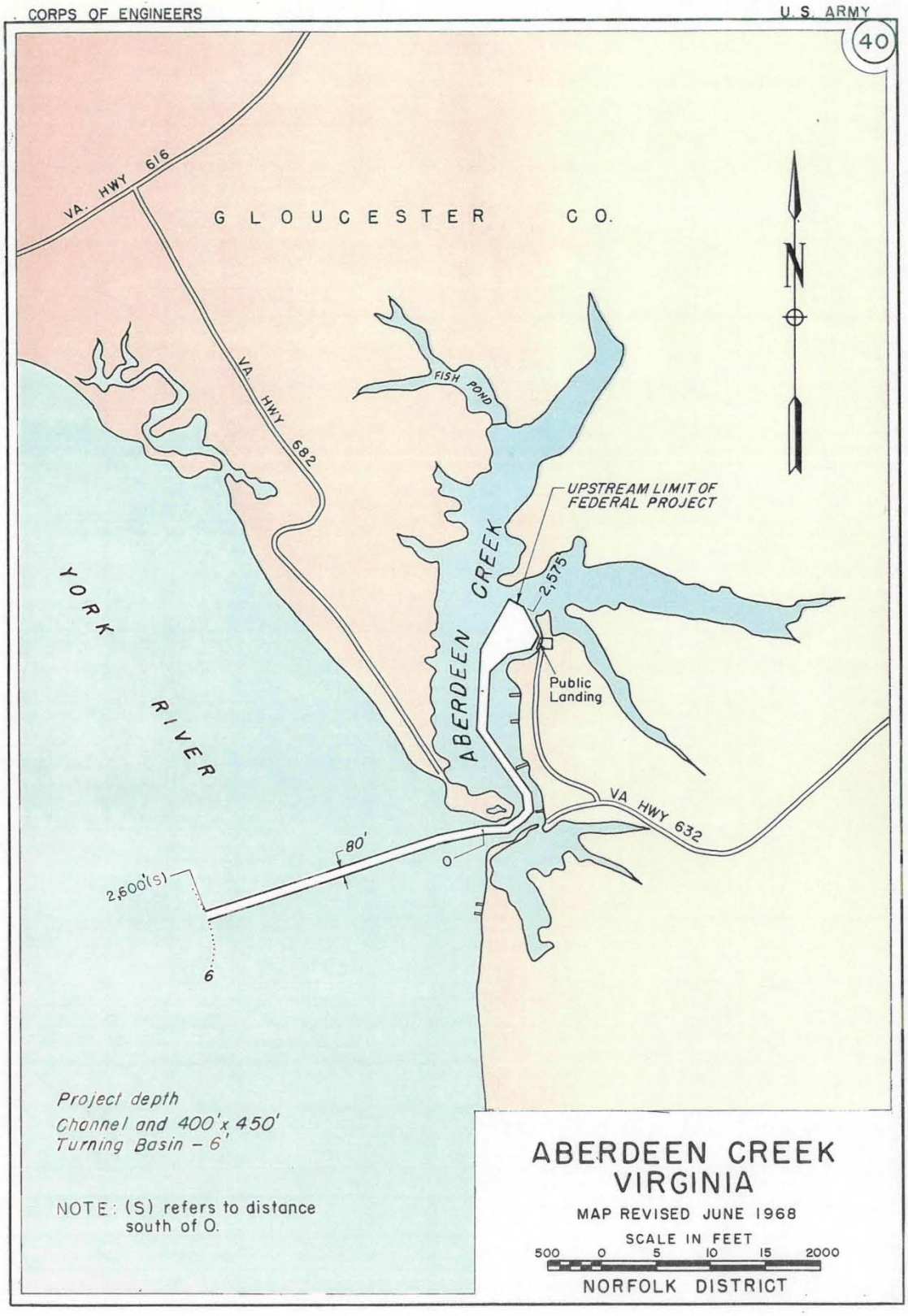
AUTHORITY: The project was approved by the Chief of Engineers under authority of Section 107 of the River and Harbor Act of 1960.

PROJECT: A channel 1.0 mile long, 80 feet wide, and 6 feet deep from that depth in York River to and including a turning basin of the same depth, 450 feet long and 400 feet wide opposite the public landing. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $109,643, excluding $11,300 contributed funds.

APPROXIMATE MEAN RANGE OF TIDE: 2.8 feet.


CORPS OF ENGINEERS
U. S. ARMY
40
VA. HWY 616
GLOUCESTER CO.
N
VA. HWY 682
FISH POND
UPSTREAM LIMIT OF FEDERAL PROJECT
ABERDEEN CREEK
2,575
YORK RIVER
Public Landing
VA HWY 632
80'
2,600'(S)
O
6
Project depth
Channel and 400'x 450'
Turning Basin – 6'
NOTE: (S) refers to distance south of O.
ABERDEEN CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
500 0 5 10 15 2000
NORFOLK DISTRICT

BROAD CREEK, VIRGINIA

Condition of Improvement, 30 June 1969

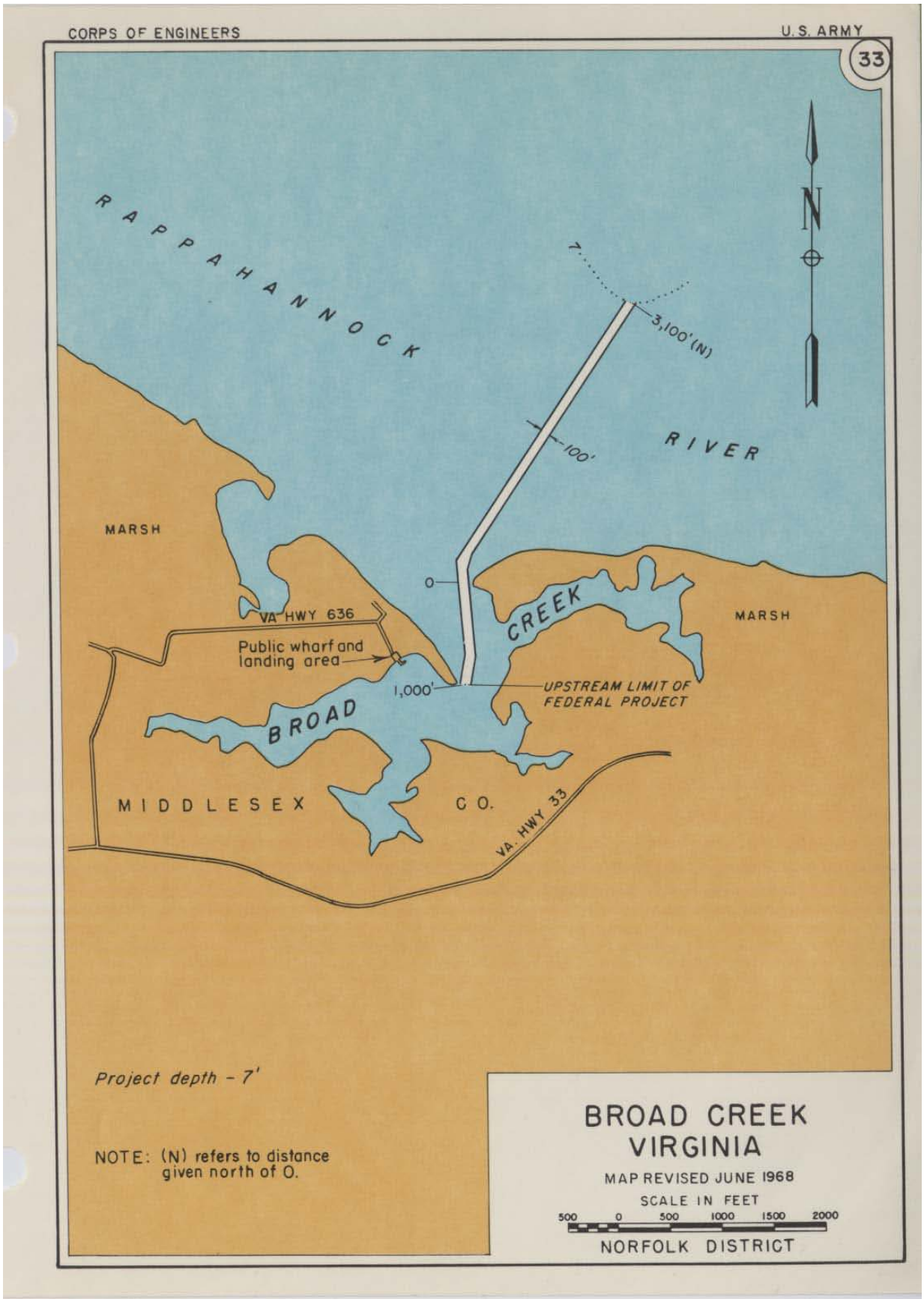
AUTHORITY: The project was authorized by the River and Harbor Act of 2 March 1945.

PROJECT: A channel 7 feet deep and 100 feet wide from deep water in Rappahannock River to deep water in Broad Creek, a distance of about 4,100 feet. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $27,888.

APPROXIMATE MEAN RANGE OF TIDE: 1.2 feet at Windmill Point.


CORPS OF ENGINEERS
U.S. ARMY
33
RAPPAHANNOCK
RIVER
N
7'
3,100'(N)
100'
MARSH
0
VA. HWY 636
Public wharf and landing area
CREEK
MARSH
1,000'
UPSTREAM LIMIT OF FEDERAL PROJECT
BROAD
MIDDLESEX
CO.
VA. HWY 33
Project depth - 7'
NOTE: (N) refers to distance given north of O.
BROAD CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
500 0 500 1000 1500 2000
NORFOLK DISTRICT

DAVIS CREEK, VIRGINIA

Condition of Improvement, 30 June 1971

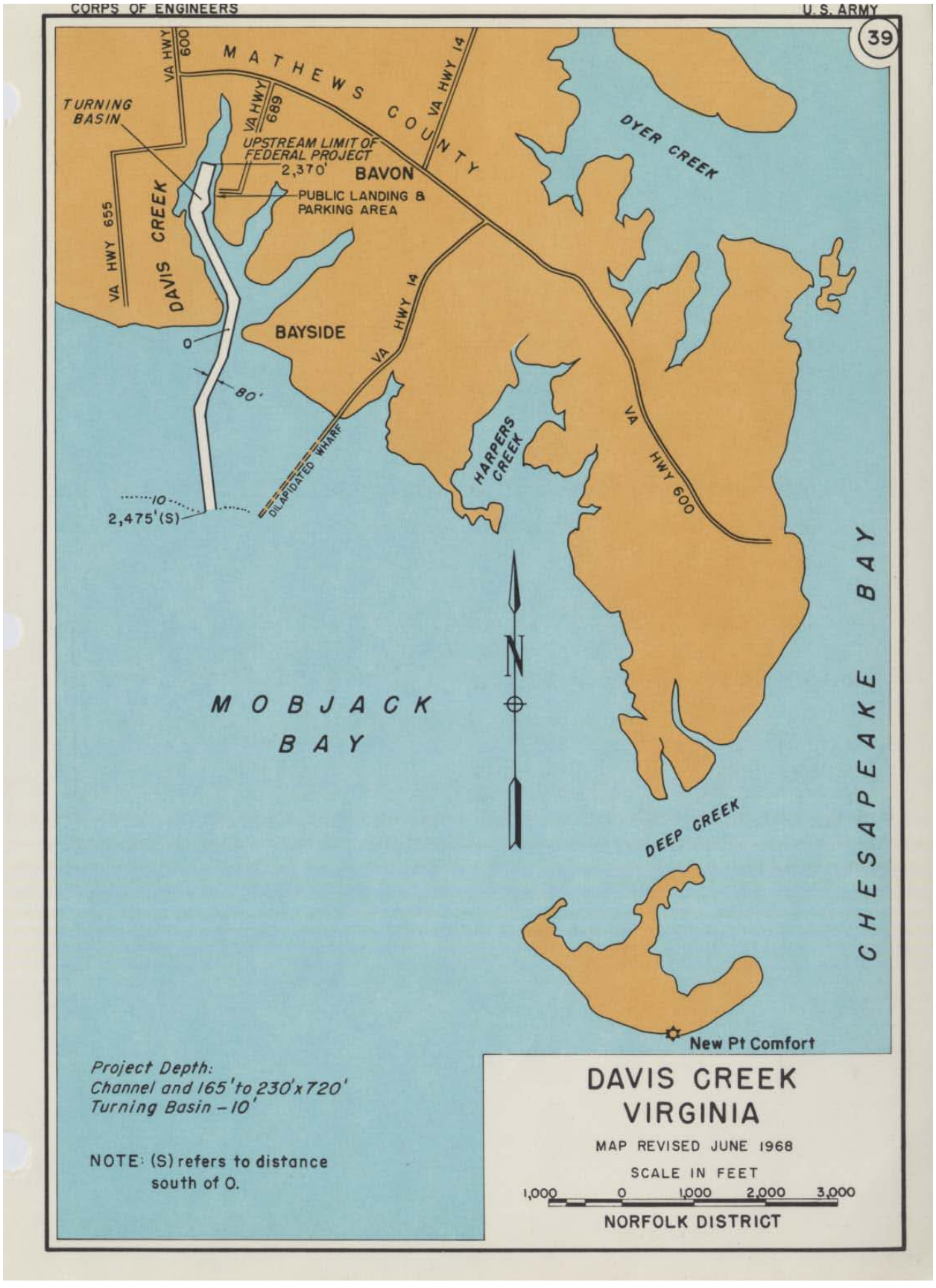
AUTHORITY: The project was authorized by the River and Harbor Act of 17 May 1950.

PROJECT: A channel 10 feet deep and 80 feet wide, extending from the 10-foot contour in Mobjack Bay into the western arm of Davis Creek to a point near the existing public landing, a distance of approximately 4,130 feet, and an anchorage and turning basin opposite the public landing 10 feet deep, 165 feet to 230 feet wide, and 720 feet long. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $97,612, excluding $4,000 contributed funds.

APPROXIMATE MEAN RANGE OF TIDE: 2.4 feet.


CORPS OF ENGINEERS
U.S. ARMY
39
MATHEWS COUNTY
VA HWY 600
VA HWY 689
VA HWY 14
TURNING BASIN
UPSTREAM LIMIT OF FEDERAL PROJECT
2,370'
BAVON
PUBLIC LANDING & PARKING AREA
DYER CREEK
VA HWY 655
DAVIS CREEK
BAYSIDE
0
80'
10
2,475'(S)
DILAPIDATED WHARF
HARPERS CREEK
VA HWY 600
MOBJACK BAY
N
CHESAPEAKE BAY
DEEP CREEK
New Pt Comfort
Project Depth:
Channel and 165' to 230' x 720'
Turning Basin – 10'
NOTE: (S) refers to distance south of 0.
DAVIS CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
1,000 0 1,000 2,000 3,000
NORFOLK DISTRICT

HOSKINS CREEK, VIRGINIA

Condition of Improvement, 30 June 1972

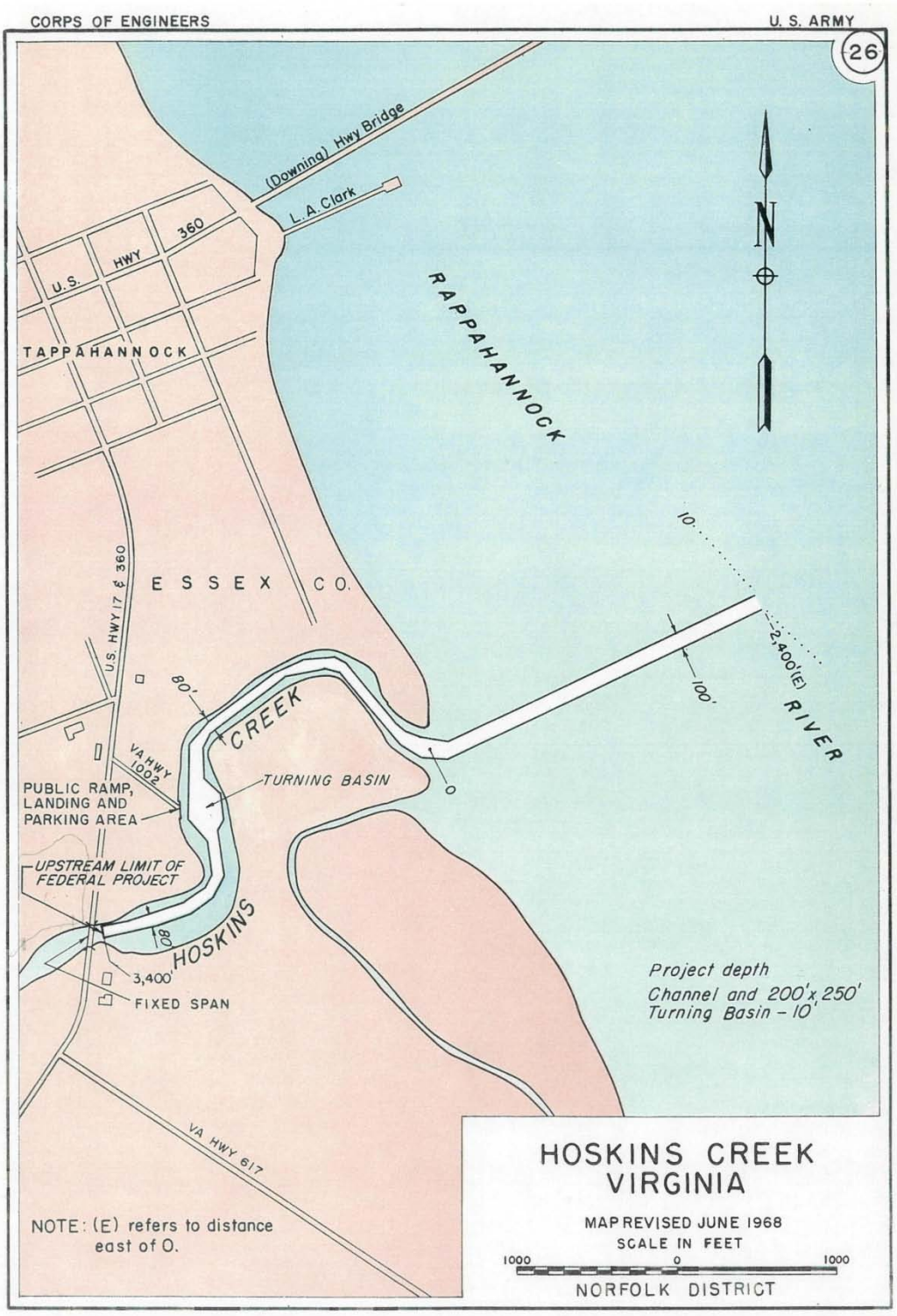
AUTHORITY: The project was authorized by the River and Harbor Act of 26 August 1937 and modified by the River and Harbor Act of 2 March 1945.

PROJECT: A channel 10 feet deep from Rappahannock River to highway bridge on US Route 17; 100 feet wide in entrance channel, 80 feet wide within creek with turning basin 250 feet long and 200 feet wide at public wharf. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $44,100, excluding $500 contributed funds.

APPROXIMATE MEAN RANGE OF TIDE: 1.6 feet.


CORPS OF ENGINEERS
U. S. ARMY
26
(Downing) Hwy Bridge
L. A. Clark
U.S. HWY 360
TAPPAHANNOCK
RAPPAHANNOCK RIVER
N
10'
2,400'(E)
100'
ESSEX CO.
U.S. HWY 17 & 360
80'
CREEK
VA HWY 1002
TURNING BASIN
0
PUBLIC RAMP, LANDING AND PARKING AREA
UPSTREAM LIMIT OF FEDERAL PROJECT
80'
HOSKINS
3,400'
FIXED SPAN
Project depth
Channel and 200'x 250'
Turning Basin - 10'
VA HWY 617
NOTE: (E) refers to distance east of O.
HOSKINS CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
1000 0 1000
NORFOLK DISTRICT

HORN HARBOR, VIRGINIA

CONDITION OF IMPROVEMENT, 30 June 1968

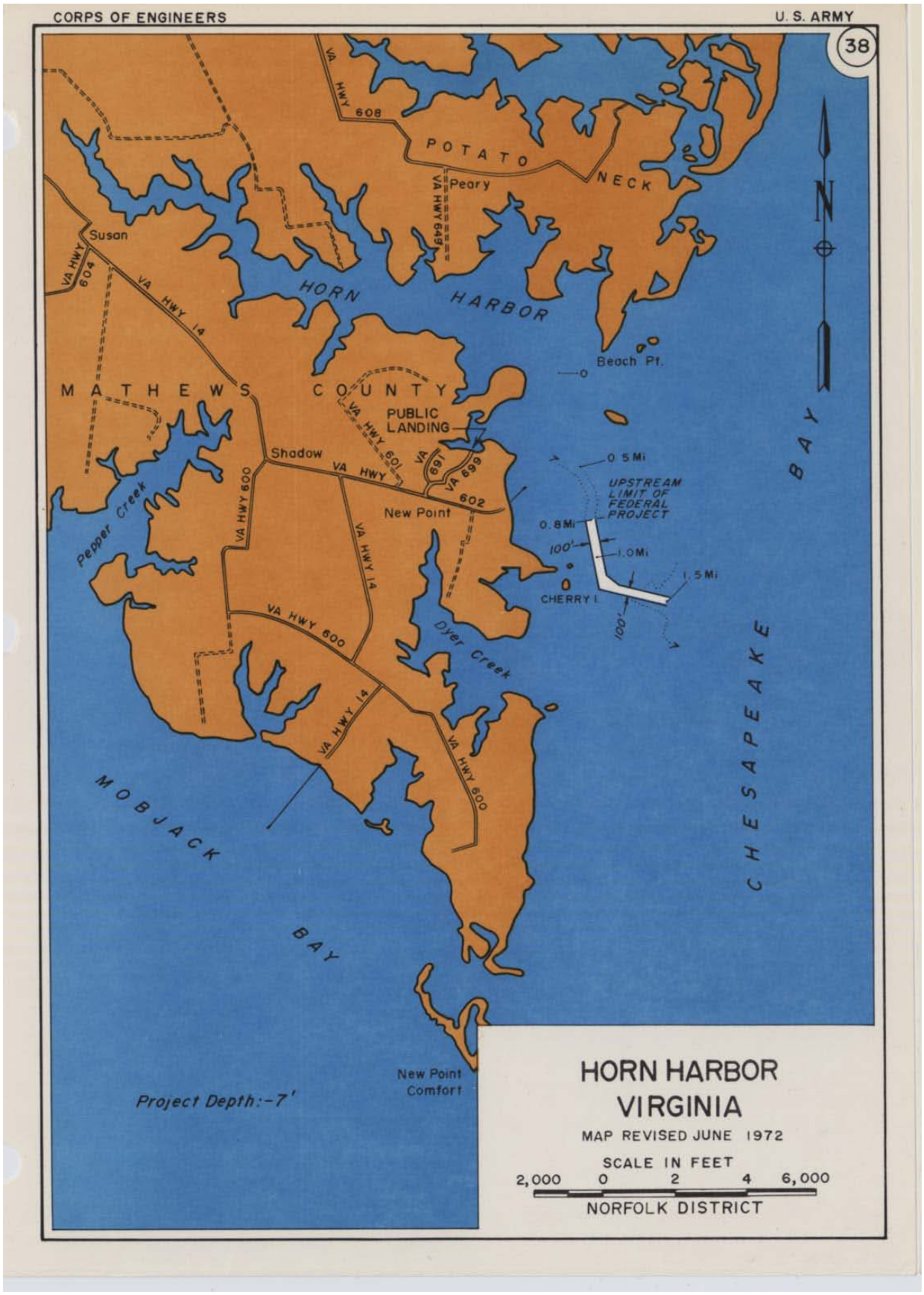
AUTHORITY: The project was authorized by the River and Harbor Act of 3 July 1930 and modified by the River and Harbor Act of 30 August 1935.

PROJECT: A channel 7 feet deep at mean low water and 100 feet wide across the entrance bar.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $13,987.

APPROXIMATE MEAN RANGE OF TIDE: 1.8 feet.


CORPS OF ENGINEERS
U. S. ARMY
38
VA HWY 608
POTATO NECK
Peary
VA HWY 649
Susan
VA HWY 604
VA HWY 14
HORN HARBOR
Beach Pt.
MATHEWS COUNTY
PUBLIC LANDING
VA HWY 601
VA 169
VA 699
Shadow
VA HWY 602
New Point
VA HWY 600
Pepper Creek
VA HWY 14
0.5 Mi
UPSTREAM LIMIT OF FEDERAL PROJECT
0.8 Mi
100'
1.0 Mi
1.5 Mi
CHERRY I.
Dyer Creek
CHESAPEAKE BAY
MOBJACK BAY
New Point Comfort
Project Depth:-7'
HORN HARBOR
VIRGINIA
MAP REVISED JUNE 1972
SCALE IN FEET
2,000 0 2 4 6,000
NORFOLK DISTRICT

JACKSON CREEK, VIRGINIA

Condition of Improvement, 30 June 1973

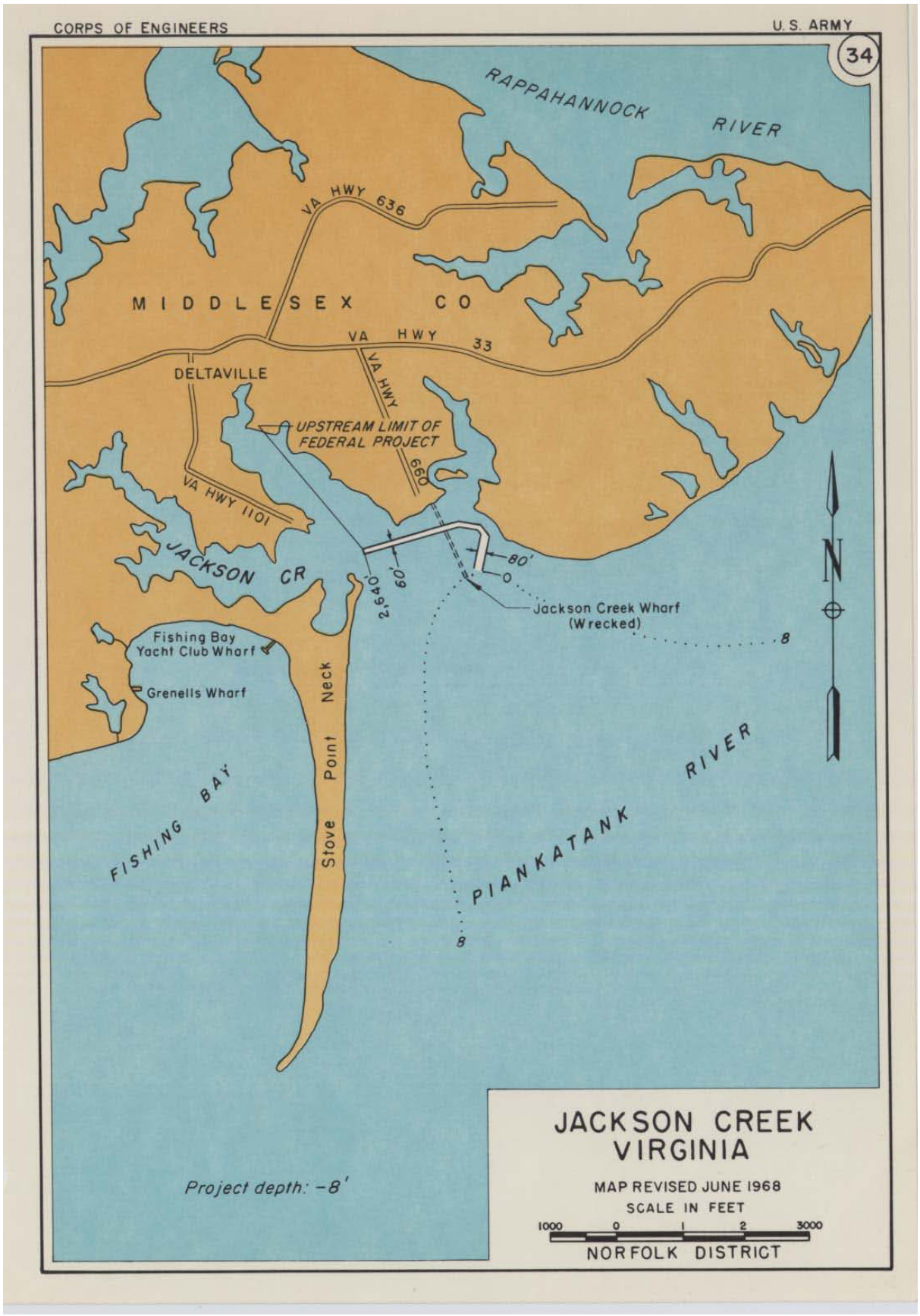
AUTHORITY: The project was authorized by the River and Harbor Act of 30 August 1935.

PROJECT: An entrance channel into Jackson Creek 8 feet deep and 60 feet wide increased to 80 feet at outer end in Piankatank River. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $8,500.

APPROXIMATE MEAN RANGE OF TIDE: 1.2 feet.


CORPS OF ENGINEERS
U.S. ARMY
34
RAPPAHANNOCK RIVER
VA HWY 636
MIDDLESEX CO
VA HWY 33
DELTAVILLE
VA HWY
UPSTREAM LIMIT OF FEDERAL PROJECT
660
VA HWY 1101
JACKSON CR
60'
2,640'
80'
Jackson Creek Wharf (Wrecked)
8
Fishing Bay Yacht Club Wharf
Grenells Wharf
Stove Point Neck
FISHING BAY
PIANKATANK RIVER
8
N
JACKSON CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
1000 0 1 2 3000
NORFOLK DISTRICT
Project depth: -8'

LOCKLIES CREEK, VIRGINIA

Condition of Improvement, 30 June 1960

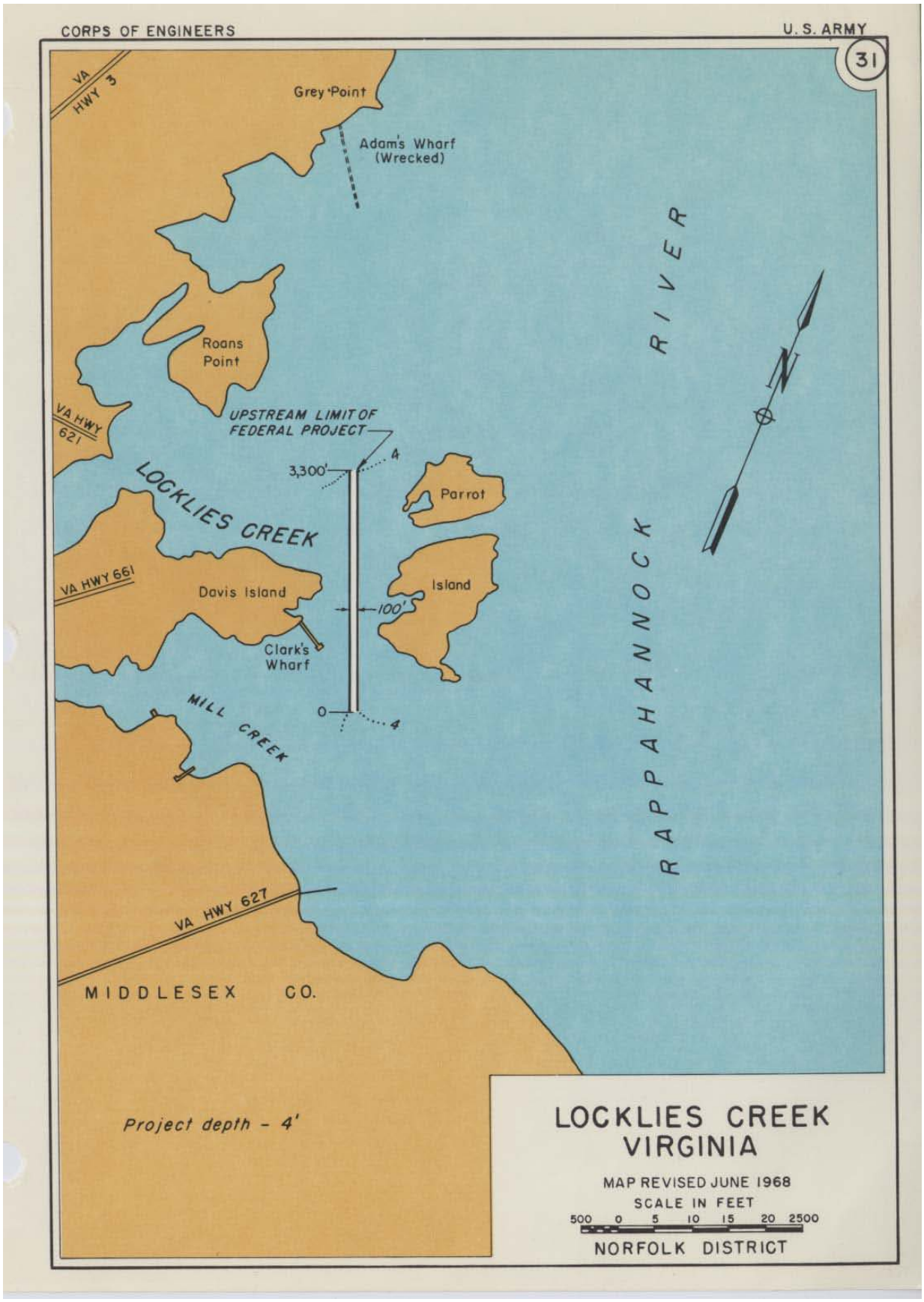
AUTHORITY: The project was authorized by the River and Harbor Act of 22 September 1922.

PROJECT: A channel 4 feet deep and 100 feet wide through the thoroughfare behind Parrott Island on Rappahannock River. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $11,581.

APPROXIMATE MEAN RANGE OF TIDE: 1.3 feet.


CORPS OF ENGINEERS
U.S. ARMY
31
VA HWY 3
Grey Point
Adam's Wharf (Wrecked)
RAPPAHANNOCK RIVER
Roans Point
VA HWY 621
UPSTREAM LIMIT OF FEDERAL PROJECT
3,300'
4
LOCKLIES CREEK
Parrot Island
VA HWY 661
Davis Island
100'
Clark's Wharf
0
4
MILL CREEK
VA HWY 627
MIDDLESEX CO.
Project depth - 4'
LOCKLIES CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
500 0 5 10 15 20 2500
NORFOLK DISTRICT

MATTAPONI RIVER, VIRGINIA

Condition of Improvement, 30 September 1979

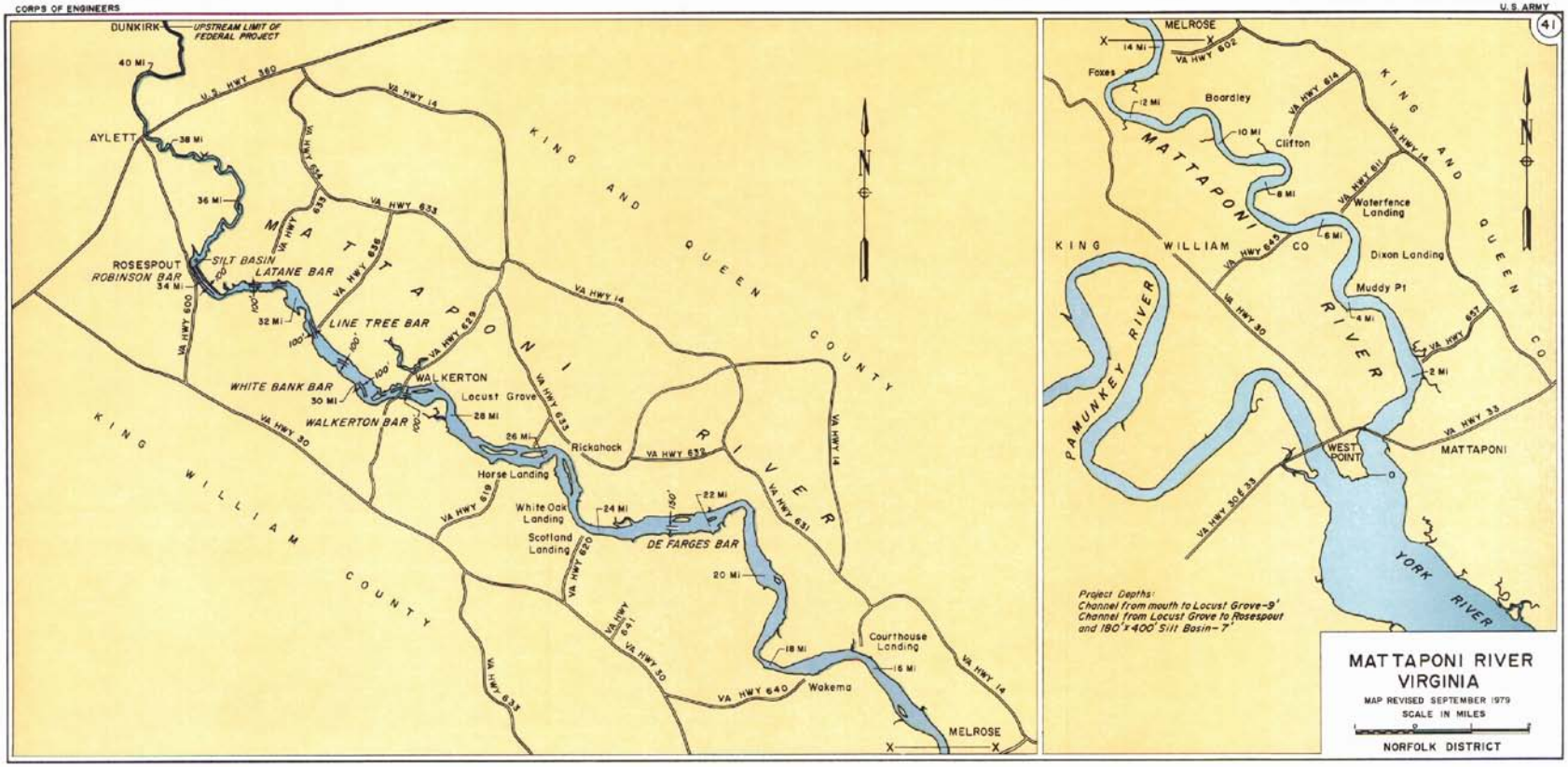
AUTHORITY: The project was authorized by the River and Harbor Act of 2 March 1919 and modified by the River and Harbor Act of 30 August 1935.

PROJECT: Channels 9 feet deep and 150 feet wide from the mouth to Locust Grove; 7 feet deep and 100 feet wide from Locust Grove to Rosespout; a silt basin at Rosespout Bend 180 feet by 400 feet by 7 feet deep; removal of snags between the mouth and Dunkirk. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $32,587, excluding $51,249 for previous projects.

APPROXIMATE MEAN RANGE OF TIDE: 3.0 feet at West Point, 3.4 feet at Wakema, and 3.9 feet at Walkerton.


CORPS OF ENGINEERS
U.S. ARMY
41
DUNKIRK
UPSTREAM LIMIT OF FEDERAL PROJECT
40 MI
U.S. HWY 360
AYLETT
38 MI
36 MI
VA HWY 14
VA HWY 633
KING AND QUEEN COUNTY
MATTAPONI RIVER
ROSESPOUT
ROBINSON BAR
34 MI
SILT BASIN
LATANE BAR
VA HWY 600
VA HWY 629
32 MI
LINE TREE BAR
WALKERTON
WHITE BANK BAR
30 MI
Locust Grove
28 MI
WALKERTON BAR
26 MI
Rickahock
VA HWY 633
VA HWY 14
KING WILLIAM COUNTY
VA HWY 30
Horse Landing
VA HWY 619
White Oak Landing
24 MI
22 MI
DE FARGES BAR
Scotland Landing
VA HWY 620
VA HWY 631
20 MI
VA HWY 641
18 MI
Courthouse Landing
16 MI
VA HWY 640
Wakema
VA HWY 633
MELROSE
MELROSE
14 MI
VA HWY 602
Foxes
12 MI
Boardley
VA HWY 614
10 MI
Clifton
8 MI
Waterfence Landing
VA HWY 611
KING AND QUEEN CO
KING WILLIAM CO
VA HWY 645
6 MI
Dixon Landing
Muddy Pt
4 MI
PAMUNKEY RIVER
VA HWY 657
2 MI
VA HWY 33
WEST POINT
MATTAPONI
VA HWY 30 & 33
YORK RIVER
Project Depths:
Channel from mouth to Locust Grove-9'
Channel from Locust Grove to Rosespout and 180'x400' Silt Basin-7'
MATTAPONI RIVER
VIRGINIA
MAP REVISED SEPTEMBER 1979
SCALE IN MILES
NORFOLK DISTRICT

MILFORD HAVEN, VIRGINIA

Condition of Improvement, 30 June 1973

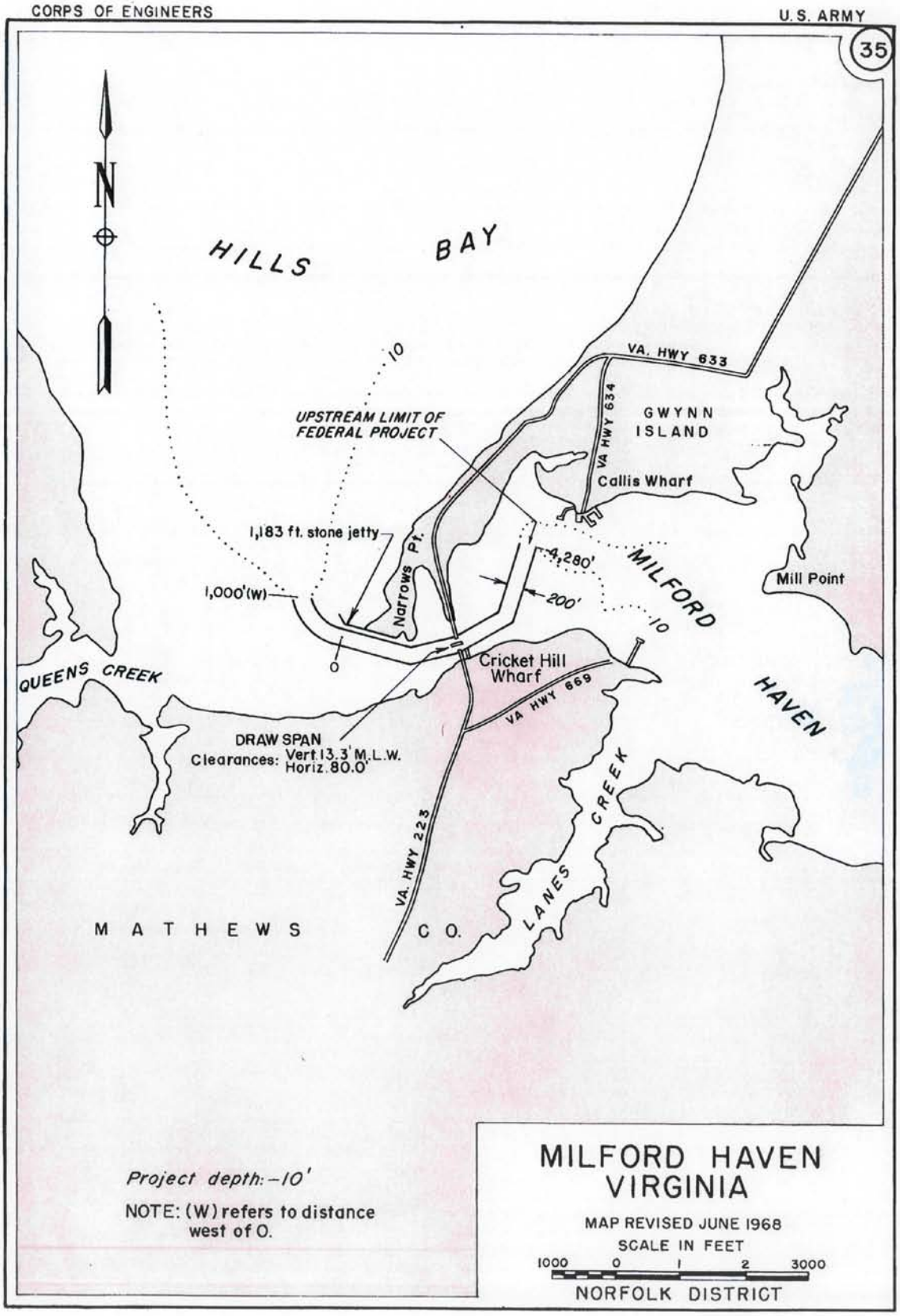
AUTHORITY: The project was authorized by the River and Harbor Act of 3 March 1899 and modified by the River and Harbor Act of 6 June 1900.

PROJECT: A channel 10 feet deep and 200 feet wide from Piankatank River through northwest entrance and between Cricket Hill and Callis Wharf; construction of a stone jetty 1,183 feet long at northwest entrance. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $24,568.

APPROXIMATE MEAN RANGE OF TIDE: 1.3 feet.


CORPS OF ENGINEERS
U.S. ARMY
35
N
HILLS BAY
10
UPSTREAM LIMIT OF FEDERAL PROJECT
VA. HWY 633
VA HWY 634
GWYNN ISLAND
Callis Wharf
1,183 ft. stone jetty
Narrows Pt.
4,280'
200'
MILFORD HAVEN
Mill Point
1,000'(W)
0
10
QUEENS CREEK
Cricket Hill Wharf
VA HWY 669
DRAW SPAN
Clearances: Vert. 13.3' M.L.W.
Horiz. 80.0'
VA. HWY 223
LANES CREEK
MATHEWS CO.
Project depth: -10'
NOTE: (W) refers to distance west of O.
MILFORD HAVEN
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
1000 0 1 2 3000
NORFOLK DISTRICT

MILL CREEK, VIRGINIA

Condition of Improvement, 30 June 1964

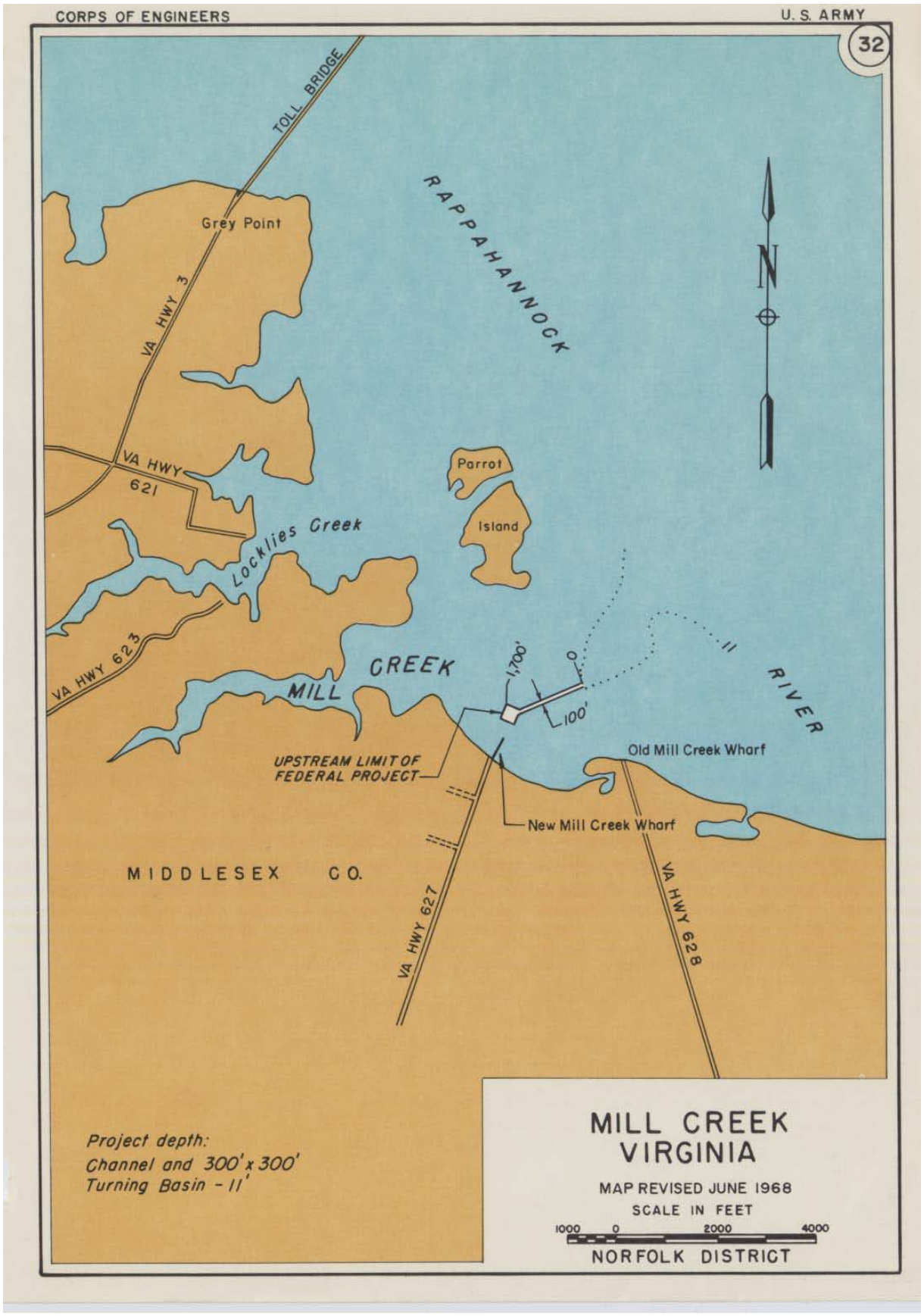
AUTHORITY: The project was authorized by the River and Harbor Act of 30 August 1935.

PROJECT: A channel 11 feet deep and 100 feet wide from Rappahannock River to new Mill Creek wharf with turning basin 300 feet square at head of project. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $5,445.

APPROXIMATE MEAN RANGE OF TIDE: 1.3 feet.


CORPS OF ENGINEERS
U. S. ARMY
32
TOLL BRIDGE
RAPPAHANNOCK
Grey Point
VA HWY 3
N
VA HWY 621
Parrot
Island
Locklies Creek
VA HWY 623
MILL CREEK
1,700'
0
100'
11
RIVER
Old Mill Creek Wharf
UPSTREAM LIMIT OF FEDERAL PROJECT
New Mill Creek Wharf
MIDDLESEX CO.
VA HWY 627
VA HWY 628
Project depth:
Channel and 300' x 300'
Turning Basin - 11'
MILL CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
1000 0 2000 4000
NORFOLK DISTRICT

PAMUNKEY RIVER, VIRGINIA

Condition of Improvement, 30 September 1987

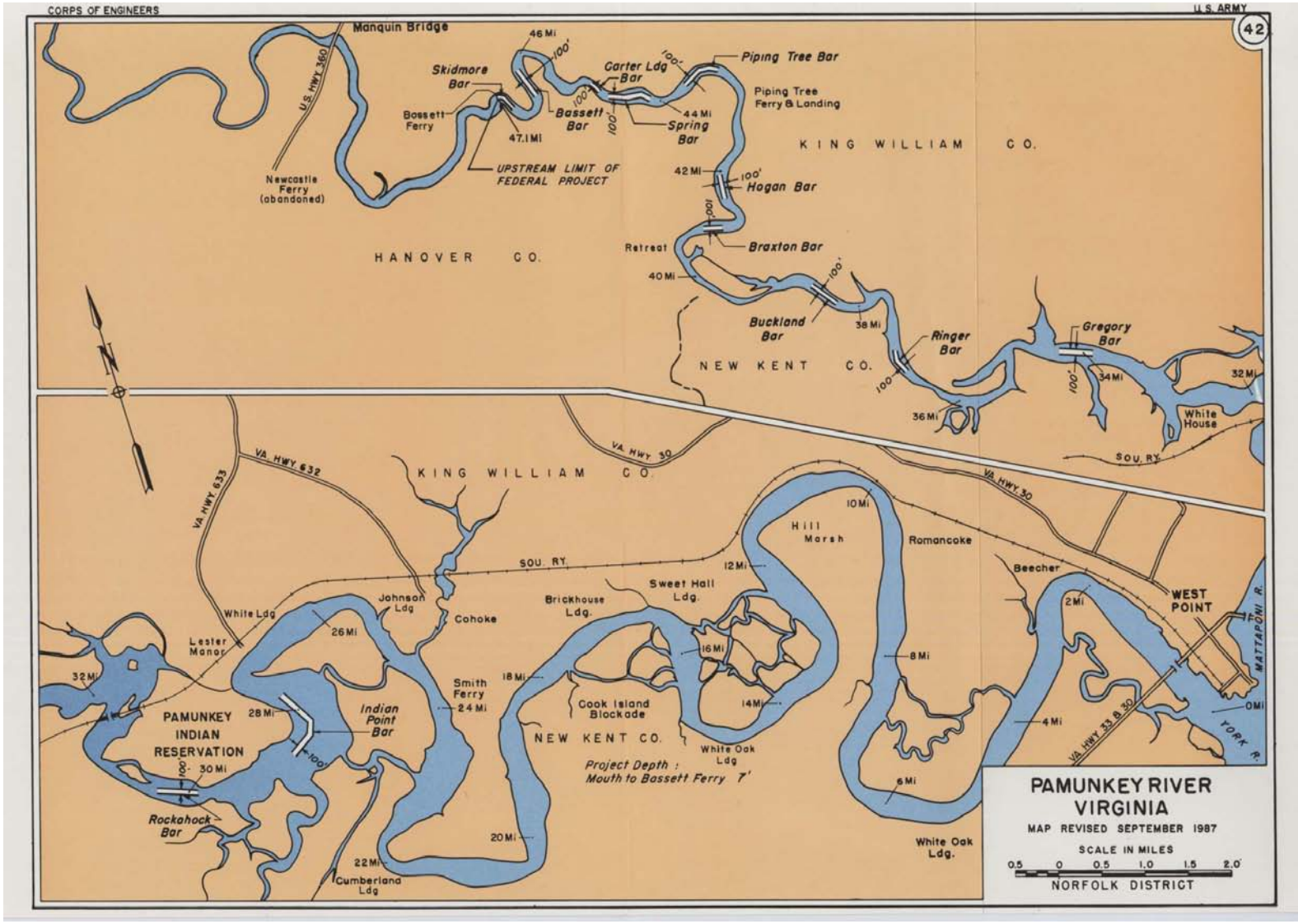
AUTHORITY. The project was authorized by the River and Harbor Act of 14 June 1880.

PROJECT: A channel 7 feet deep at mean low water and 100 feet wide from the mouth to Bassett Ferry.

PROGRESS: Project is completed.

COST OF CONSTRUCTION: $31,376

APPROXIMATE MEAN RANGE OF TIDE: 3.3 feet.


CORPS OF ENGINEERS
U.S. ARMY
42
Manquin Bridge
U.S. HWY 360
Newcastle Ferry (abandoned)
Skidmore Bar
Bossett Ferry
Bassett Bar
Carter Ldg Bar
Piping Tree Bar
Piping Tree Ferry & Landing
Spring Bar
46 Mi
47.1 Mi
44 Mi
42 Mi
UPSTREAM LIMIT OF FEDERAL PROJECT
Hogan Bar
Retreat
Braxton Bar
40 Mi
Buckland Bar
38 Mi
Ringer Bar
Gregory Bar
34 Mi
32 Mi
36 Mi
White House
SOU. RY.
KING WILLIAM CO.
HANOVER CO.
NEW KENT CO.
VA. HWY 30
VA. HWY 632
VA. HWY 633
Hill Marsh
10 Mi
Romancoke
Beecher
WEST POINT
2 Mi
MATTAPONI R.
12 Mi
Sweet Hall Ldg.
Brickhouse Ldg.
Johnson Ldg
White Ldg
Cohoke
Lester Manor
26 Mi
16 Mi
8 Mi
32 Mi
18 Mi
Smith Ferry
24 Mi
Cook Island Blockade
14 Mi
4 Mi
0 Mi
YORK R.
VA. HWY 33 & 30
PAMUNKEY INDIAN RESERVATION
28 Mi
Indian Point Bar
30 Mi
Rockahock Bar
Project Depth ; Mouth to Bassett Ferry 7'
White Oak Ldg
6 Mi
20 Mi
22 Mi
Cumberland Ldg
White Oak Ldg.
PAMUNKEY RIVER
VIRGINIA
MAP REVISED SEPTEMBER 1987
SCALE IN MILES
0.5 0 0.5 1.0 1.5 2.0
NORFOLK DISTRICT

PARROTTS CREEK, VIRGINIA

Condition of Improvement, 30 June 1971

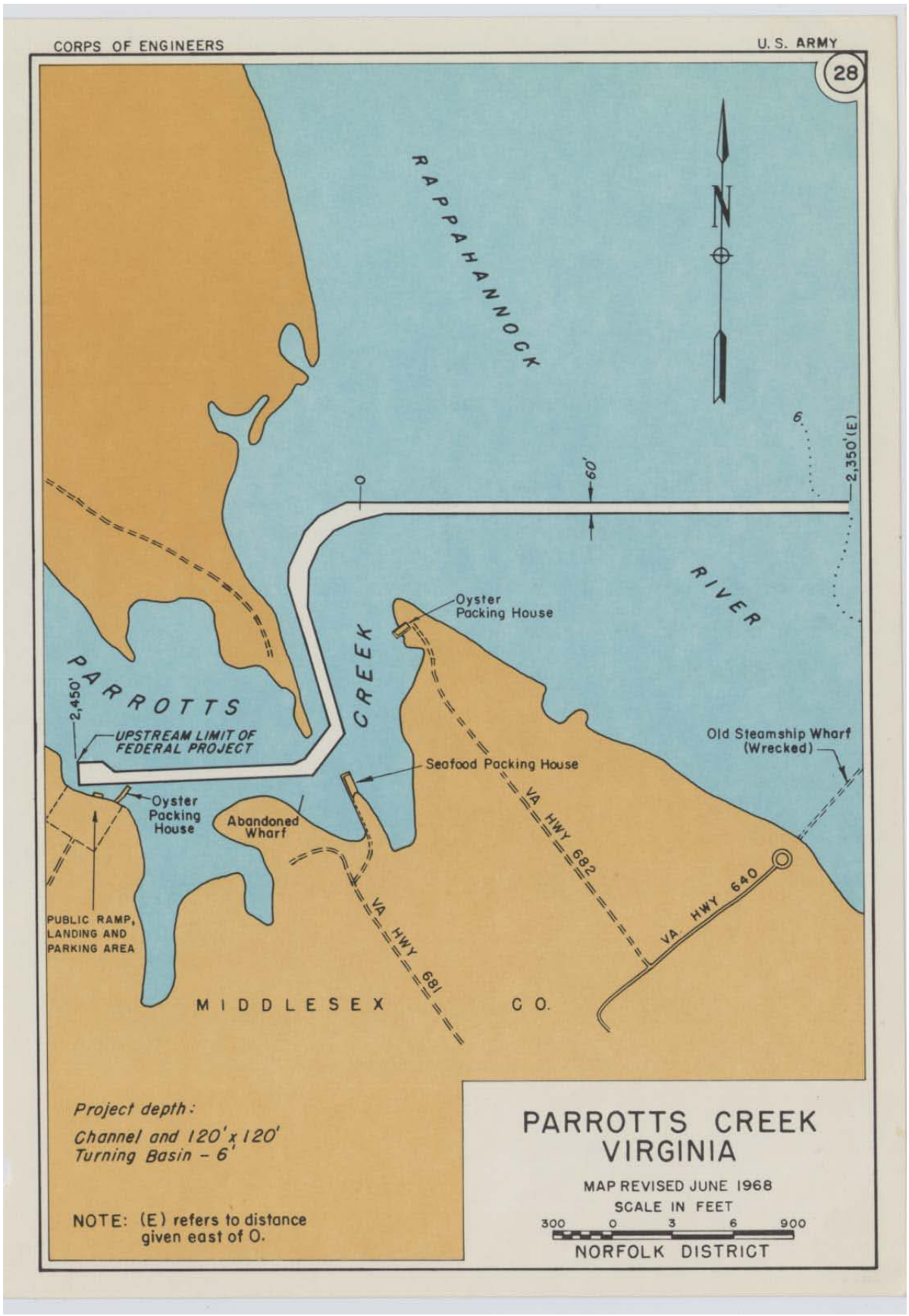
AUTHORITY: The project was authorized by the River and Harbor Act of September 1954.

PROJECT: A channel 6 feet deep, 60 feet wide, and 4,800 feet long from deep water in Rappahannock River through the entrance to Parrotts Creek, suitably widened at bends, with turning basin of same depth, 120 feet square, at public landing. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $37,045.

APPROXIMATE MEAN RANGE OF TIDE: 1.7 feet.


CORPS OF ENGINEERS
U. S. ARMY
28
RAPPAHANNOCK
RIVER
N
6'
2,350'(E)
60'
0
Oyster
Packing House
PARROTTS
CREEK
2,450'
UPSTREAM LIMIT OF
FEDERAL PROJECT
Old Steamship Wharf
(Wrecked)
Seafood Packing House
VA HWY 682
Oyster
Packing
House
Abandoned
Wharf
VA HWY 640
PUBLIC RAMP,
LANDING AND
PARKING AREA
VA HWY 681
MIDDLESEX
CO.
Project depth:
Channel and 120' x 120'
Turning Basin - 6'
NOTE: (E) refers to distance
given east of O.
PARROTTS CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
300 0 3 6 900
NORFOLK DISTRICT

QUEENS CREEK, VIRGINIA

Condition of Improvement, 30 June 1971

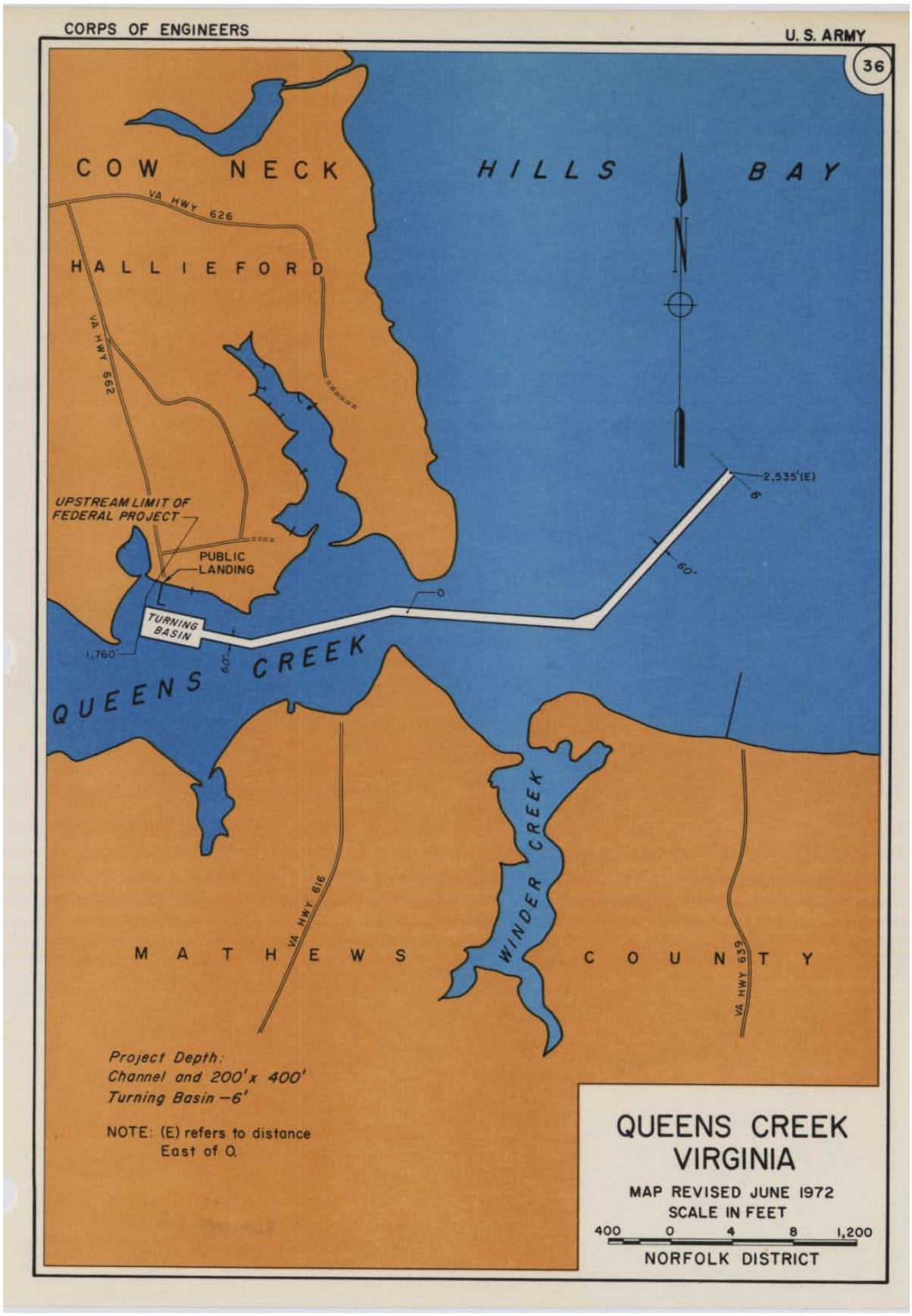
AUTHORITY: The project was approved by the Chief of Engineers under authority of Section 107, River and Harbor Act of 1960.

PROJECT: A channel 6 feet deep, 60 feet wide, and 4,100 feet long extending from that depth in Hills Bay into Queens Creek to a turning basin of the same depth 200 feet wide and 400 feet long. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $26,949, excluding $10,383 contributed funds.

APPROXIMATE MEAN RANGE OF TIDE: 1.2 feet.


CORPS OF ENGINEERS
U. S. ARMY
36
COW NECK
HILLS BAY
VA HWY 626
HALLIEFORD
VA HWY 662
N
2,535'(E)
6'
UPSTREAM LIMIT OF FEDERAL PROJECT
PUBLIC LANDING
60'
0
TURNING BASIN
1,760'
60'
QUEENS CREEK
WINDER CREEK
VA HWY 616
VA HWY 639
MATHEWS COUNTY
Project Depth:
Channel and 200' x 400'
Turning Basin -6'
NOTE: (E) refers to distance East of O.
QUEENS CREEK
VIRGINIA
MAP REVISED JUNE 1972
SCALE IN FEET
400 0 4 8 1,200
NORFOLK DISTRICT

RAPPAHANNOCK RIVER, VIRGINIA

Condition of Improvement, 30 September 1982

AUTHORITY: The project was authorized by the River and Harbor Act of 3 March 1905.

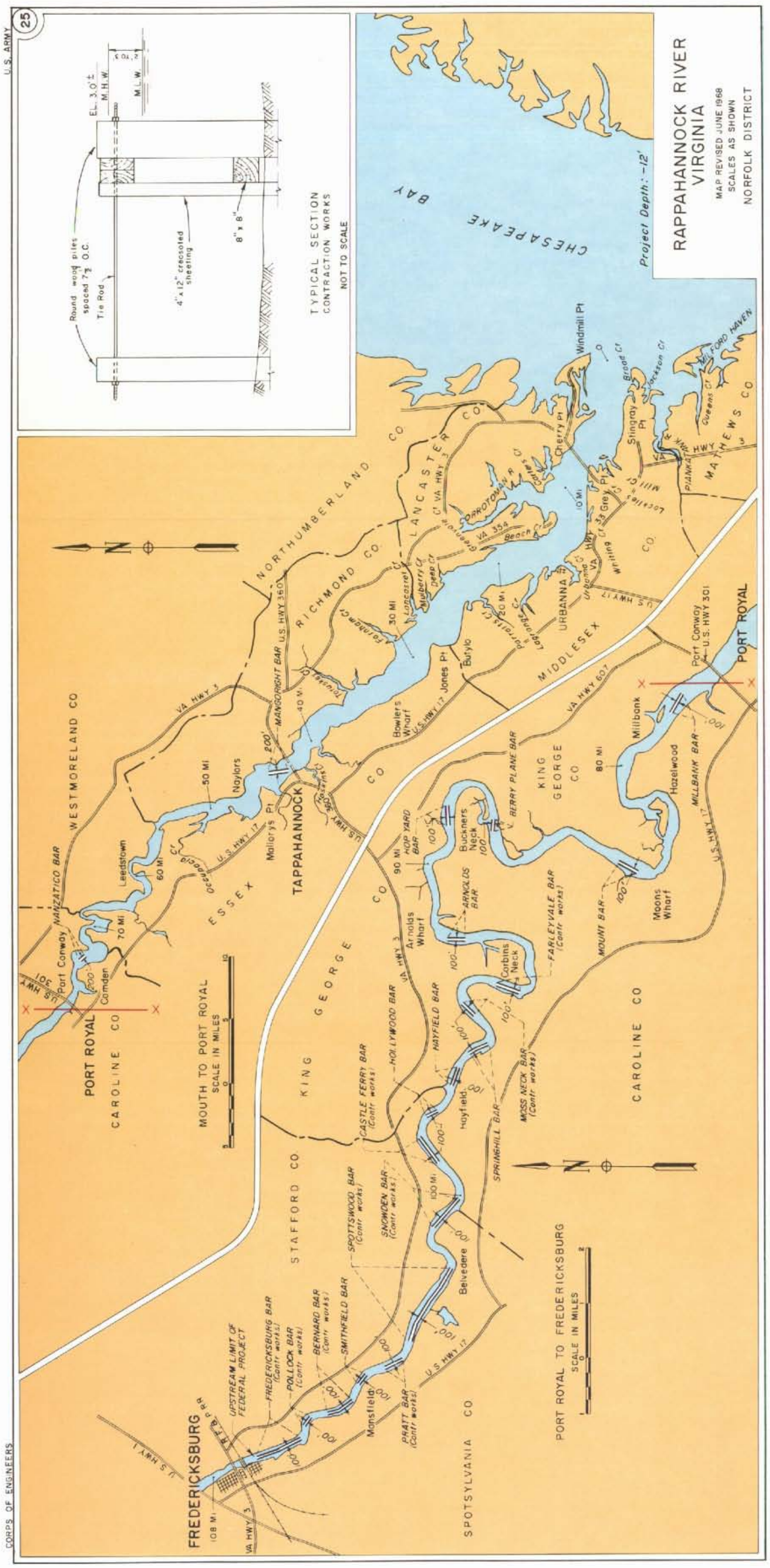
*PROJECT: A channel 12 feet deep and 200 feet wide from the mouth to Port Royal, Va., 77 miles; thence 12 feet deep and 100 feet wide to Fredericksburg, Va., 30 miles. The construction of 20,401 linear feet of crib and pile dikes and 1,906 linear feet of riprap stone dike. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $217,487, excluding $197,146 for previous projects and $168,091 for rehabilitation.

APPROXIMATE MEAN RANGE OF TIDE: Tappahannock, 1.6 feet; Fredericksburg, 2.8 feet.

*A traffic survey revealed that the maintenance of a 12-foot deep channel is not justified at this time. A 6-foot deep channel will be maintained until traffic indicates the need for a change.


U.S. ARMY
CORPS OF ENGINEERS
25
RAPPAHANNOCK RIVER
VIRGINIA
MAP REVISED JUNE 1968
SCALES AS SHOWN
NORFOLK DISTRICT
Project Depth: -12'
CHESAPEAKE BAY
TYPICAL SECTION
CONTRACTION WORKS
NOT TO SCALE
Round wood piles
Tie Rod
4" x 12" creosoted sheeting
8" x 8"
M.H.W.
M.L.W.
MOUTH TO PORT ROYAL
SCALE IN MILES
PORT ROYAL TO FREDERICKSBURG
SCALE IN MILES
FREDERICKSBURG
108 MI
UPSTREAM LIMIT OF FEDERAL PROJECT
FREDERICKSBURG BAR
POLLOCK BAR
BERNARD BAR
SMITHFIELD BAR
SPOTTSWOOD BAR
SNOWDEN BAR
CASTLE FERRY BAR
HOLLYWOOD BAR
HAYFIELD BAR
PRATT BAR
SPRINGHILL BAR
MOSS NECK BAR
FARLEYVALE BAR
ARNOLDS BAR
HOP YARD BAR
BERRY PLANE BAR
MOUNT BAR
MILLBANK BAR
NANZATICO BAR
MANGORIGHT BAR
Mansfield
Belvedere
Hayfield
Corbins Neck
Arnolds Wharf
Bucklers Neck
Moons Wharf
Hazelwood
Millbank
Port Conway
PORT ROYAL
Camden
Leedstown
Naylors
Mallorys Pt
TAPPAHANNOCK
Bowlers Wharf
Jones Pt
Butylo
URBANNA
Windmill Pt
Stingray Pt
SPOTSYLVANIA CO
STAFFORD CO
KING GEORGE CO
CAROLINE CO
ESSEX CO
WESTMORELAND CO
RICHMOND CO
NORTHUMBERLAND CO
LANCASTER CO
MIDDLESEX CO
MATHEWS CO

URBANNA CREEK, VIRGINIA

Condition of Improvement, 30 June 1970

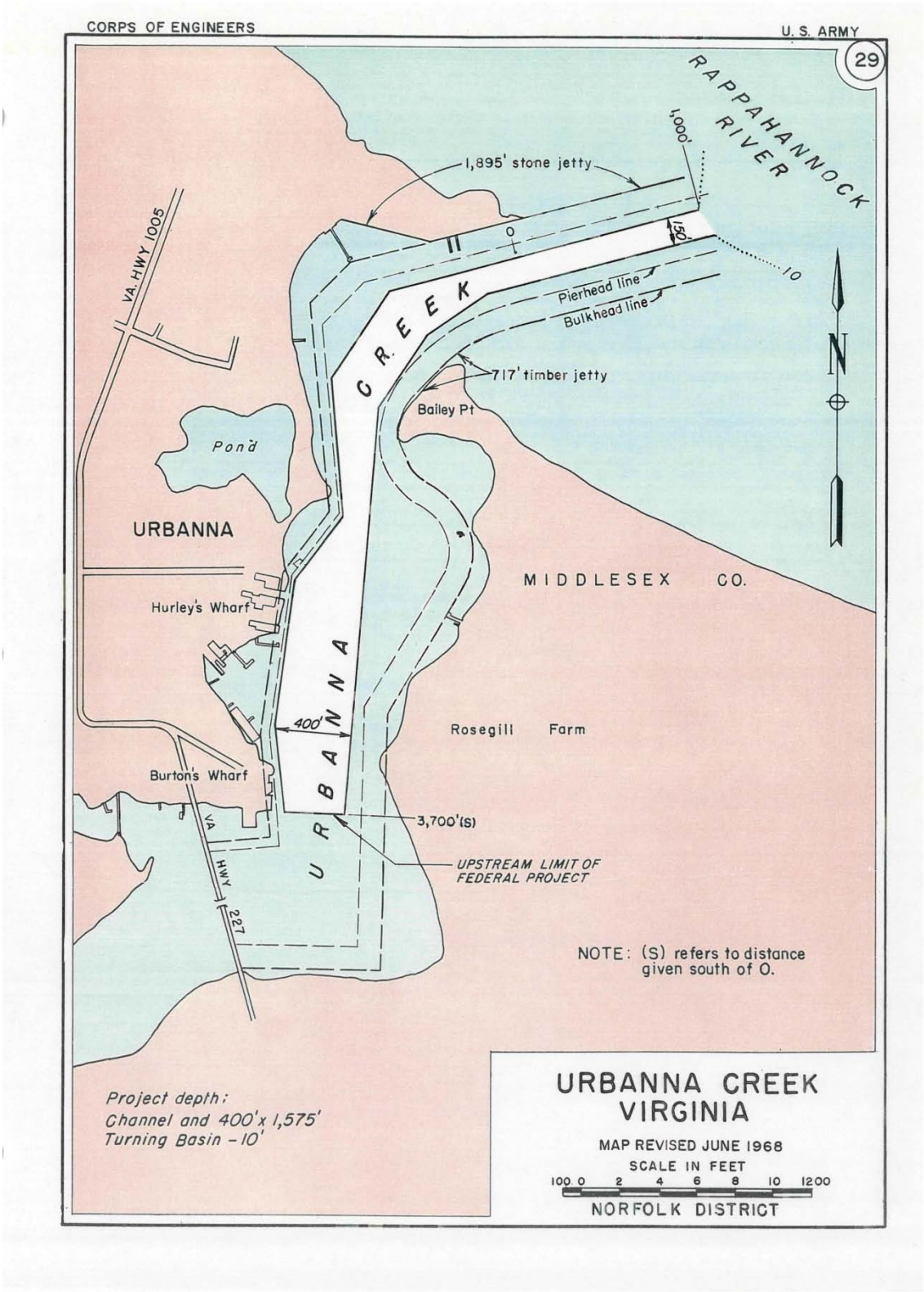
AUTHORITY: The project was authorized by the River and Harbor Act of 3 March 1879 and modified by the River and Harbor Act of 2 March 1945

PROJECT: A channel 10 feet deep, 150 feet wide from Rappahannock River to Burtons Wharf in Urbanna; turning basin of same depth 400 feet wide and 1.575 feet long; one stone jetty 1.895 feet long, one timber jetty 717 feet long at entrance. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $55,724, excluding $61,087 for rehabilitation.

APPROXIMATE MEAN RANGE OF TIDE: 1.5 feet.


CORPS OF ENGINEERS
U. S. ARMY
29
RAPPAHANNOCK RIVER
1,000'
1,895' stone jetty
VA. HWY 1005
0
150'
10
Pierhead line
Bulkhead line
CREEK
717' timber jetty
Bailey Pt
Pond
URBANNA
MIDDLESEX CO.
Hurley's Wharf
URBANNA
400'
Rosegill Farm
Burton's Wharf
VA
HWY
227
3,700'(S)
UPSTREAM LIMIT OF FEDERAL PROJECT
NOTE: (S) refers to distance given south of O.
N
Project depth:
Channel and 400' x 1,575'
Turning Basin - 10'
URBANNA CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
100 0 2 4 6 8 10 1200
NORFOLK DISTRICT

WHITINGS CREEK, VIRGINIA

Condition of Improvement, 30 June 1971

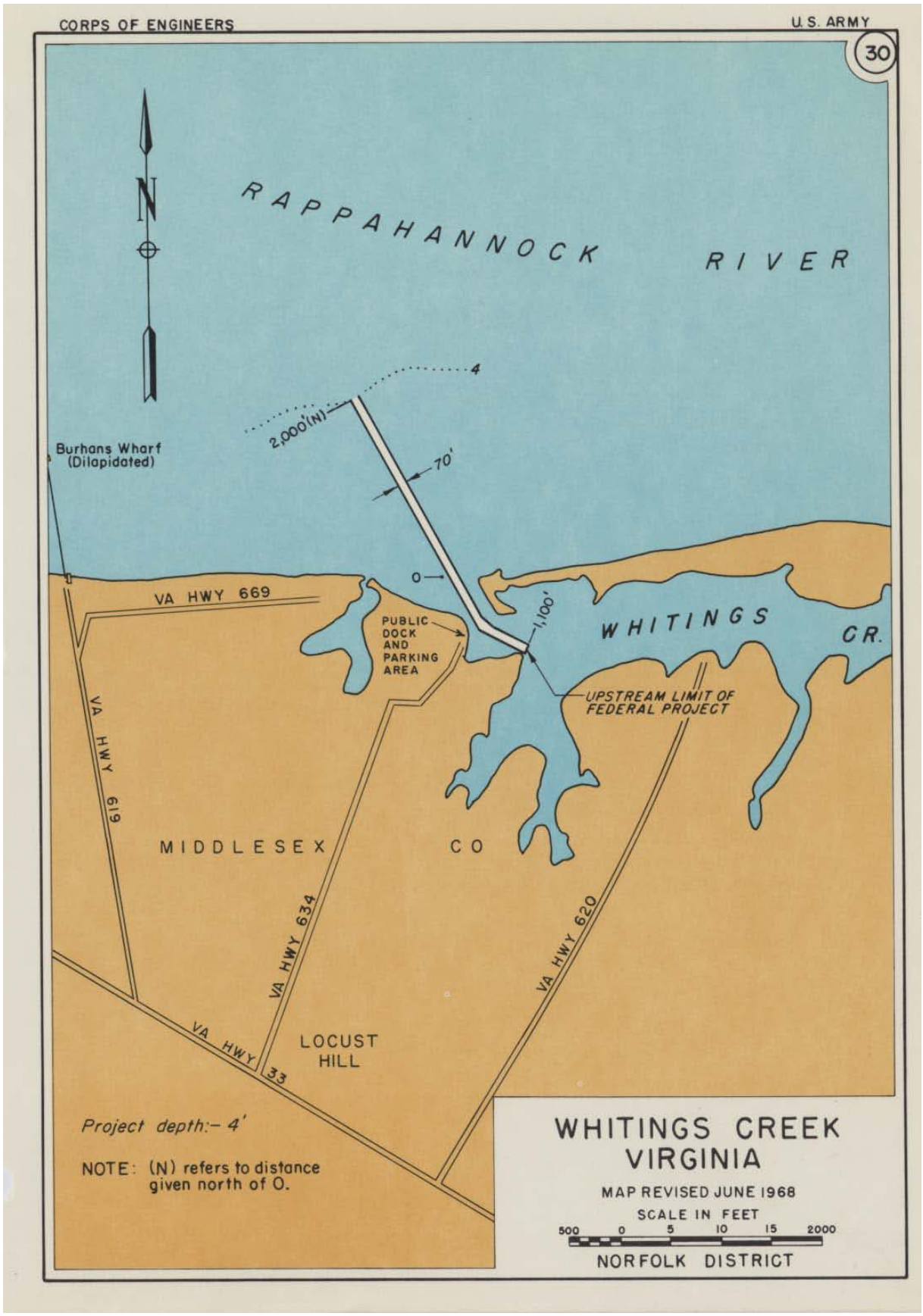
AUTHORITY: The project was authorized by the River and Harbor Act of 2 March 1945.

PROJECT: A channel 4 feet deep and 70 feet wide between the 4 foot depth in the Rappahannock River and the 4 foot depth in Whitings Creek. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $21,630, excluding $500 contributed funds.

APPROXIMATE MEAN RANGE OF TIDE: 1.5 feet.


CORPS OF ENGINEERS
U.S. ARMY
30
N
RAPPAHANNOCK RIVER
4
2,000'(N)
70'
Burhans Wharf
(Dilapidated)
0
VA HWY 669
PUBLIC DOCK AND PARKING AREA
1,100'
WHITINGS CR.
UPSTREAM LIMIT OF FEDERAL PROJECT
VA HWY 619
MIDDLESEX CO
VA HWY 634
VA HWY 620
VA HWY 33
LOCUST HILL
Project depth:- 4'
NOTE: (N) refers to distance given north of O.
WHITINGS CREEK
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
500 0 5 10 15 2000
NORFOLK DISTRICT

WINTER HARBOR, VIRGINIA

Condition of Improvement, 30 September 1982

AUTHORITY: The project was authorized by the River and Harbor Act of 17 May 1950.

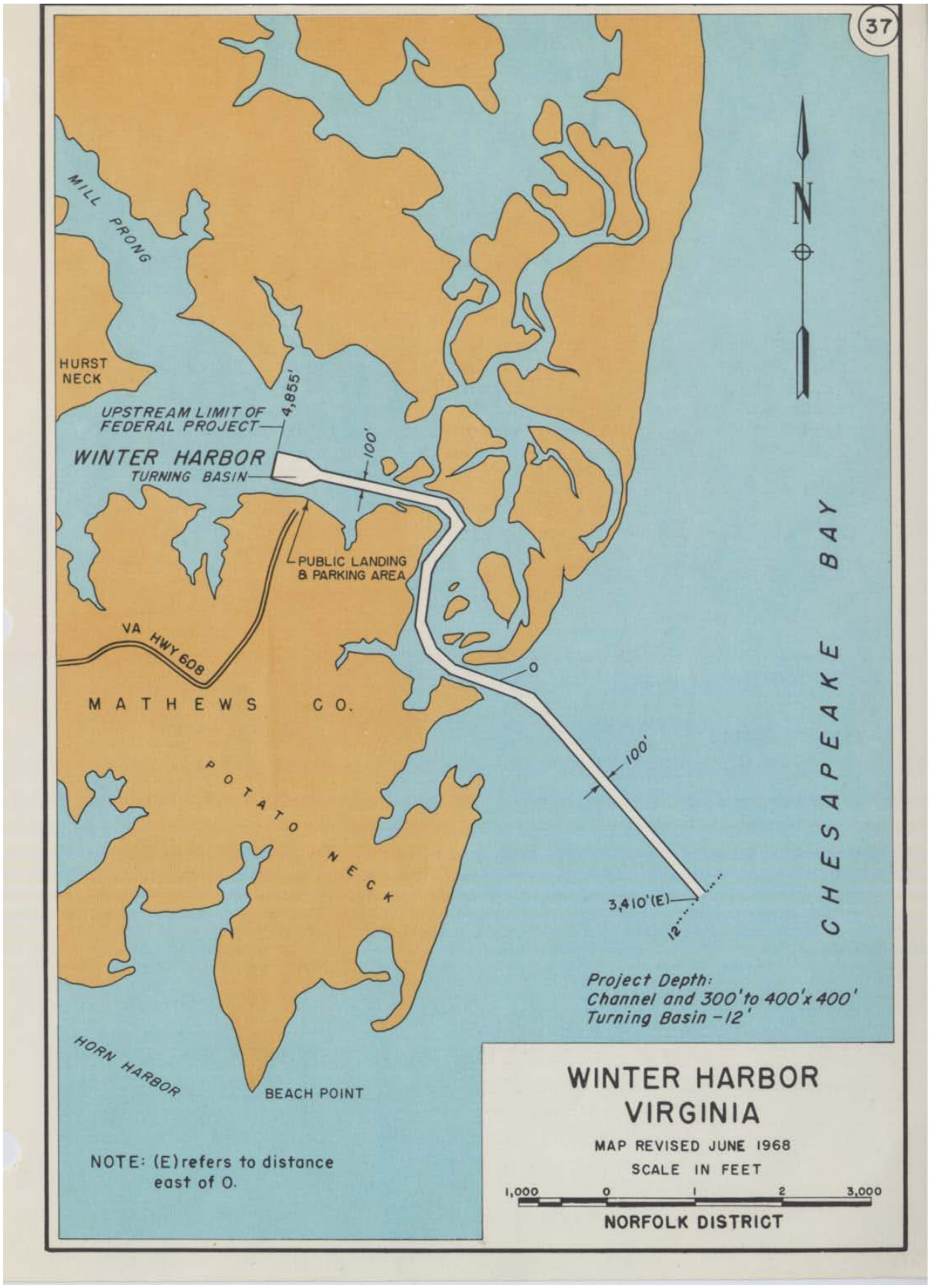
*PROJECT: A channel 12 feet deep and 100 feet wide, extending from the 12-foot contour in Chesapeake Bay into Winter Harbor to a point just east of the present public landing area, a distance of approximately 7,600 feet, and a mooring and turning basin opposite the public landing 12 feet deep and 400 square feet, with a flared entranced 300 feet long. All depths referred to mean low water.

PROGRESS: Project completed.

COST OF CONSTRUCTION: $171,334, excluding $5,000 contributed funds.

APPROXIMATE MEAN RANGE OF TIDE: 1.5 feet.

*A traffic survey revealed that the maintenance of a 12-foot deep channel is not justified at this time. A 6-foot deep channel will be maintained until traffic indicates the need for a change.


37
MILL PRONG
HURST NECK
UPSTREAM LIMIT OF FEDERAL PROJECT
4,855'
WINTER HARBOR
TURNING BASIN
100'
PUBLIC LANDING & PARKING AREA
VA HWY 608
MATHEWS CO.
POTATO NECK
0
100'
3,410'(E)
12'
CHESAPEAKE BAY
N
Project Depth:
Channel and 300' to 400' x 400'
Turning Basin - 12'
HORN HARBOR
BEACH POINT
NOTE: (E) refers to distance east of O.
WINTER HARBOR
VIRGINIA
MAP REVISED JUNE 1968
SCALE IN FEET
1,000 0 1 2 3,000
NORFOLK DISTRICT

APPENDIX C - DEFINITIONS OF KEYWORDS, PHRASES, AND CONCEPTS

Advance Maintenance Dredging: The additional depth and/or width specified to be dredged beyond the project channel dimensions for the purpose of reducing overall maintenance costs by decreasing the frequency of dredging. Advance maintenance must always be justified, approved, and funded.

Aids to Navigation: Buoys, beacons, fog signals, lights, radio beacons, range markers, and generally any charted or published information serving the interest of safe navigation.

Allowable Overdepth: Additional depth below the required section specified in a dredging contract. This additional depth is permitted (but not required) because of inaccuracies in the dredging process.

Appropriation: Congressional funding for the construction and maintenance of navigation channels and turning basins.

Authorization: Congressional approval for the construction and maintenance of navigation channels and turning basins.

Authorized Dimensions: Length, width, and depth dimensions of a navigation project as specified in the authorizing document.

Average Annual Cost: A discounting technique that converts a stream of unequal payments into an equivalent stream of equal payments, where both streams have the same present value.

Channel: Part of body of water deep enough to be used for navigation. Channels can be either natural or artificial waterways.

Constructed Dimensions: Channel dimensions which have been provided by initial or new work dredging.

Continuing Authorities Program (Navigation): Congressionally directed authority provided to the Chief of Engineers on an on-going basis for small navigation projects as defined by Section 107 of the River and Harbor Act of 1960, as amended.

Cross-Section: A view of the channel bottom and side slopes normal to the channel alignment.

Deauthorized Navigation Channel or Turning Basin: Navigation channels and turning basins (or portions thereof) which were never constructed and subsequently were removed from any further consideration as a result of a formal deauthorization process.

Discount Rate: The interest rate used in calculating the present and annualized values of expected yearly benefits and costs of projects.

Draft: The depth of water displaced by a vessel.

Dredging: The practice of excavating and removing material from underwater locations, either by mechanical or hydraulic means.

Dredging Cycle: The period of time (years) between dredging events. Also referred to as dredging frequency.

Dredging Process: Removal (usually from underwater), transportation, and placement of material, for the purpose of constructing new waterways, maintaining existing waterway dimensions, obtaining fill for land reclamation, beach nourishment, dike and levee construction, creating wetlands and marshes, obtaining materials from borrow areas or other beneficial uses.

Dredging Template: A cross-sectional view of the channel showing project depth, width, and side slopes.

Fuel Taxed Inland Waterways System: 27 waterways of the United States' interior, along the Atlantic and Gulf Coasts, and in the Pacific Northwest where fuel consumed by vessels transporting cargo is subject to a Federal tax (currently 20 cents per gallon). The fuel taxed waterways comprise near 11,000 miles of waterways at least 9 feet deep and includes 186 lock sites. These waterways move over 600 million tons and would cost over 125 billion dollars to replace. (REF: INLAND WATERWAYS USERS BOARD 23rd ANNUAL REPORT TO THE SECRETARY OF THE ARMY AND UNITED STATES CONGRESS, AUGUST 2009)

General Navigation Feature: Refers to any navigation channel, turning basin, anchorage, and dredged material placement area which is cost shared between the Federal government and the local sponsor of a Federally authorized project. It excludes Aids to Navigation which are paid fully by the Coast Guard as well as lands, easements, rights-of-way, relocations (LERRS) which are the responsibility of the local sponsor.

Hydraulic Dredging: Dredging performed by a hydraulic dredge, which generally moves bottom material via a centrifugal pump and pipeline or hopper directly toward a dredged material placement area.

Inactive Navigation Channel or Turning Basin: Navigation channels and turning basins which are no longer actively used for either commercial or recreation pursuits. In some cases, inactive projects might become eligible for deauthorization.

Internal Waterway Traffic: Vessel movements (origin and destination) which take place solely on inland waterways. An inland waterway is one geographically located within the contiguous 48 states or within the boundaries of the State of Alaska. The term internal traffic is also applied to these vessel movements: those which involve carriage on both inland waterways and the Great Lakes; those occurring between offshore areas and inland waterways (e.g., oil rig supplies and fish); and those taking place within Delaware Bay, Chesapeake Bay, Puget Sound, San Francisco Bay, which are considered internal bodies of water rather than arms of the ocean. About 90% of the internal tons and ton-miles of traffic occurs on the fuel taxed inland single lockage. A normal lockage cycle consists of an approach, entry, chambering, and exit.

Interest Rate: The rate of increase over time of a sum of money. This can also be used to determine its present value or annualized cost. It is often referred to as a discount rate when used to determine present value.

Items of Local Cooperation: Consist of all items in which the Local Cost Sharing Sponsor is responsible for in connection with construction and maintenance of a Federal project. These items are included in the Project Cooperation Agreement (PCA) which is the legal binding document executed between the Corps and the Local Sponsor. Item of Local Cooperation may include such items as cash contributions, lands, easements, and rights-of-way, relocations, and dredged material areas, and access channels and berthing areas.

Local Sponsor: A local, regional, or state entity which has the authority to provide all items of local cooperation including lands, easements, rights-of-way. They must also be financially able to meet obligations under Project Cooperation Agreements (PCA's). Cities, Counties, Towns, States and Port Authorities all serve as local sponsors.

Maintained Dimensions: Navigation channel dimensions (length, width, and depth) that are determined by using traffic, or other restrictions, which are less than or equal to authorized dimensions, or the constructed dimensions if less than the authorized dimensions.

Maintenance Dredging: The removal of shoal material from a constructed project.

Mean Lower Low Water (MLLW): A tidal datum established by the National Ocean Service. The average height of all lower low waters recorded over a specific 19-year period called the National Tidal Datum Epoch. It is the reference datum used for Federal navigation projects.

Mechanical Dredging: Dredging performed with a mechanical dredge which normally lift the dredged material above the waterline by means of buckets or scoops of various designs and deposit it in a barge or similar conveyance for transport and placement.

National Geodetic Vertical Datum of 1929 (NGVD 29): The vertical control datum established for the United States by the general adjustment of 1929. Formerly called Sea Level Datum of 1929. The term NGVD was officially adopted in 1976 and is a change in name only; the datum remained the same. The datum is based on an adjustment, holding fixed the observed heights of mean sea level at 26 tide stations in the United States and Canada. A new readjustment is in progress and will be termed the North American Vertical Datum of 1988 (NAVD 88). NGVD 29 was replaced by the North American Vertical Datum of 1988 (NAVD 88).

Navigation Channel: A project feature with authorized project limits/dimensions, which is designed, constructed and maintained for use by commercial and/or recreational navigation traffic. This definition includes appropriate harbors, canals, turning basins, anchorage/mooring areas and/or waterways.

North American Vertical Datum of 1988 (NAVD 88): A vertical control datum adopted for use in Canada, the United States and Mexico. It was established to resolve problems in NGVD 29. The datum is defined by only one tidal station in Quebec, Canada and is based on the mass or density of the earth instead of the varying heights of the seas. The datum is defined by one point at Point Rimouski/Father's Point in Quebec, Canada and is based on the mass or density of the earth instead of the varying heights of the seas.
Overdepth Dredging: Any dredging below the authorized depth (or constructed depth if less than the authorized depth) to include required, allowable and non pay dredging overdepth.

Project Dimensions: (see Authorized Dimensions).

Recreational Craft: Non-commercial vessels used for recreational activity.

Required Section: The channel dimensions required by a dredging contract.

RIMS II: Regional Input Modeling System developed by the U.S. Department of Commerce, Bureau of Economic Analysis which means changes in economic activity in terms of output, earnings and employment.

River and Harbor Act: Congressional Authorization for construction of Federal navigation channels and turning basins.

River Mile: A number specifying the location of a point along a waterway, obtained as the distance from a reference point designated as mile zero.

Shallow Draft Navigation System: Those navigation channels and turning basins with a depth of less than 15 feet when measured at MLW. (REF: Coastal Engineering Technical Note I-63, March 1999)

Shoaling Rate: This is the rate at which sediment fills a navigation channel or feature, usually measured in terms of cubic yards per year.

Ton-Mile: A unit of transportation production equal to the movement of 1 ton a distance of 1 statute mile.

Turning Basin: General navigation features which allow ships to make a U-turn and leave a channel the way they entered. They eliminate the need for long backing-out movements.

Vessels: Towboats, barges, and other waterborne craft.

Water Resources Development Act of 1986 -- Title I, Section 101 (Public Law 99-662): The non-Federal share of the cost of general navigation features is 10 percent for that portion of the project which has a depth not in excess of 20 feet.

Water Resources Development Act of 1996 -- Title II, Section 201 (Public Law 104-303): Designates that land based and aquatic dredged material disposal areas built for construction and operation and maintenance shall be considered a General Navigation Feature and cost shared in accordance with Title I of the Water Resources Development Act of 1986 (Public Law 99-662).

Water Resources Development Act of 2007 – Sections 2005, 2029 and 2037 (Public Law 110-114): To provide for the conservation and development of water and related resources, to authorize the Secretary of the Army to construct various projects for improvements to rivers and harbors of the United States, and for other purposes.

Waterborne Commerce: Commodities moved or transported by way of navigation channels.

Waterway: Any body of water wide enough and deep enough to accommodate the passage of water craft, particularly commercial vessels.

APPENDIX D - VALUE TO THE NATION

SHALLOW DRAFT NAVIGATION
"VALUE TO THE NATION"
GUIDE SHEET FOR LOCAL SPONSORS AND STAKEHOLDERS
TO PROVIDE INPUT TO THE CORPS FOR PROJECT BUDGET JUSTIFICATIONS

General:

- Whenever possible, cite the source of the factual information provided.
- If possible, information should be specific to the project**.**
- In addition to specific factual information, the sponsor or stakeholder may provide a narrative describing the importance of the project from their perspective.
- Not all factors apply to each project. Use the best information you can obtain in the categories that follow. Sooner is better. Provide what you can in the short term, and follow up with information that takes longer to obtain.

Commerce (commodities, tonnages, cargo value, transportation savings):

- Estimated annual tonnages by commodity moving on the project (sand/gravel, aggregates, petroleum, grain, fish, shellfish, etc.)
- Whenever possible, list by name the various businesses that use the project.
- For fish/shellfish, if available provide estimated cargo value relating to the tonnage.
- Estimated number, size, draft and type of commercial vessels using the project.
- Estimated annual trips for commercial vessels (count both inbound and outbound.)
- Estimated transportation savings vs. other mode or other harbor.
- If project were not dredged, estimate the additional costs for light loading, waiting for tide, using truck or rail, or going to another harbor.
- Are you already being forced to light load or wait for tide? Estimate savings to you if channel or harbor is dredged.
- List and describe other commercial uses with supporting information.
    - Seafood buyers and processors located on or adjacent to the project.
    - Charter boats, head boats – size, number of boats, estimated annual trips.
    - Ferries, tour boats, eco-tours, scientific and educational tours. Cite estimated annual vessel trips and estimated passengers carried on the project.
    - Boat repair yards, commercial marinas, etc.

Safety and Public Health:

- Does the project serve as a harbor of refuge? If so, estimate the typical number of vessels that use the harbor in a storm, and identify the next closest available harbor.
- US Coast Guard – use of the project as a base for Search & Rescue activities, ice-breaking, aids to navigation maintenance, etc.
- Life threatening situations caused by shoaling – cite sources if available.
- Groundings on shoals, accidents, injuries and fatalities at the project.

National, State and Local Security:

- Cite any military use such as Navy or Marines.
- Coast Guard use for Homeland Security activities.
- Shipment of any commodities or equipment used by the military.
- Use by local or state law enforcement activities.

Recreation:

- Estimated number of recreation boats using the project and vessel trips.
- Number of boat ramps and marinas on the project.

Environmental Factors:

- Does the project factor into a local, state or federal environmental initiative?
- What environmental benefits are to be gained from the project?
- Is the work required to support agreements with other agencies?
- Be sure to explain why such factors should influence priority.

Consequences:

- What happens if the project is not dredged?
- Jobs lost and businesses affected.
- Lost tax revenues.
- Describe extent and value of local investments that would go unrealized.
    - Local investments in dredging, dredged material placement sites and other real estate, bulkheads, piers, public landings, boat ramps, etc.
    - Private investments in businesses.

Other Remarks:

- Unique features available only at that project.
- Cultural or historic values.
- Why is the project important to you?

US Army Corps of Engineers®

Corps Points!

US Army Corps of Engineers, Public Affairs Office **2 May 2005**

A weekly compendium of facts and talking points to help leaders tell the Corps story.

WEEKLY FOCUS: USACE Civil Works program annual budget-development/appropriations process

While many people are familiar with the key events in the annual Civil Works budget and appropriations cycle – the release of the President's budget and the enactment of Congress's appropriations legislation into law – few are as familiar with the year-round budget process engaged in by the Corps and other federal agencies.

USACE Civil Works funding is a two-year development process that can be generally summarized as a develop-defend-execute program cycle. Using January 2005 (FY 05) as a start point, the development of the FY 07 budget is projected to proceed as follows:

- **JAN 05** – Office of Management and Budget (OMB) provides budget guidance for FY 07.
- **MAR/APR 05** – USACE headquarters provides FY 07 budget limits and program guidance within the Corps based on the OMB and additional ASA(CW) guidance.
- **MAY/JUL 05** – USACE field offices develop FY 07 program requirements based on the USACE guidance.
- **JUL 05** – USACE headquarters reviews the field-developed FY 07 requirements.
- **JUL/AUG 05** – The USACE-developed FY 07 budget is worked with the Secretary of the Army.
- **SEP 05** – The Army's FY 07 budget program is submitted for OMB review.
- **SEP-NOV 05** – OMB reviews with and then tells Army and USACE what its budget will be for CW program planning in FY 07. This is referred to as the OMB passback.
- **DEC-FEB 06** – The President's budget for FY 07 is finalized and submitted to Congress. It provides USACE with the specific budget details needed to plan FY 07 Civil Works program execution.
- **FEB-MAY 06** – Congress conducts appropriations (and, if necessary, authorization) hearings to discuss and ask detailed questions about the President's FY 07 budget submission. The Assistant Secretary of the Army (Civil Works) and USACE leadership testify before committees and subcommittees to address congressional concerns about the President's budget for the FY 07 Civil Works program.
- **JUN-SEP 06** – Appropriations bills for FY 07 are developed and approved by Congress.
- **SEP/OCT 06** – President signs the FY 07 appropriations legislation into law. The legislation provides USACE with specific CW program execution guidance by funding category and specifically authorized projects and studies.
- **OCT/DEC 06** – USACE headquarters allocates FY 07 funds within the Corps for fiscal year execution.

In the absence of congressional passage of an agency-specific appropriation, Civil Works annual funding is generally included in an all-encompassing "omnibus" bill as it was in November 2004 with the passage of the Consolidated Appropriations Act, 2005. This consolidated act included the Energy and Water Development Appropriations Act, 2005, which provided $4.705 billion for the USACE FY 05 Civil Works program.

Key funding legislation that serves as the "baseline" for the Corps' Civil Works program is Congressional passage of the Water Resources Development Act, expected every two years but last passed in 2000. WRDA is a comprehensive legislative package that provides for the conservation and development of water and related resources. It authorizes the Secretary of the Army, through the Chief of Engineers, to conduct studies and to construct projects and research the various activities that lead to improvements of rivers and harbors of the United States. WRDA is strictly an authorizing document; it does not include funding. The funding of WRDA-authorized studies and projects is accomplished separately as part of the annual appropriations process. WRDA legislation has been reintroduced in the current session of Congress and is undergoing debate.

Congressional committees and subcommittees that oversee the Corps and normally meet on an annual basis to address Senate and House member concerns about the President's budget and the need for additional Authorizations for the Civil Works program include the Senate Environment and Public Works Committee, chaired by Sen. Inhofe, R-Oklahoma; the Senate Energy and Water Development Appropriations Subcommittee, chaired by Sen. Domenici, R-New Mexico; the House Transportation and Infrastructure Committee, chaired by Rep. Young, R-Alaska; and the House Energy and Water Development Appropriations Subcommittee, chaired by Rep. Hobson, R-Ohio.

APPENDIX E - REGULATORY RULES AND RESPONSIBILITES

Navigable Waters of the United States

The Rivers and Harbors Act of 1899 grants permitting and enforcement authority in Navigable Waters of the United States (Section 10 waters) defined in 33 CFR 329 to the Secretary of the Army. 33 USC 403 States in part; "The creation of any obstruction not affirmatively authorized by Congress to the navigable capacity of any of the waters of the United States is prohibited". Section 403 then goes on to state; and it shall not be lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures etc; unless authorized by the Secretary of the Army.

Waters of the United States

33 U.S.C. 1344 and 33 CFR 320.3(f) authorizes the Corps to issue permits for the discharge of dredged or fill material into the waters of the United States pursuant to section 404 of the Clean Water Act (CWA). Waters of the United States (WOUS) are defined in 33 CFR 328.

Waters of the United States include most wetlands. Some wetlands can be difficult for the average person to recognize therefore we highly recommended and encouraged applicants to seek a Jurisdictional Determination from the Corps of Engineers Regulatory Branch prior to commencement of any work.

There are different types of federal permits available to authorize activities in Jurisdictional waters. The type of permit used depends on the scope, complexity, location, value of the resources being impacted, amount and type of the public interest along with several other factors.

In addition to Federal permits, state permits may be needed from the Department of Environmental Quality, Local Wetlands Board and the Virginia Marine Resource Commission. Processing the application is done concurrently by the permitting agencies. Processing times between agencies may vary significantly.

Federal Permits for "new" work generally take longer to review. During this review agencies such as EPA, the U.S Fish and Wildlife Service, and NOAA among others review the permit application to determine if essential fish habitat, endangered species, historical resources etc; will be impacted by the project and make recommendations that may become conditions in the permit authorizing the work. Processing time for new work depends on the scope, complexity, impacts and applicant flexibility among other things. 60 to 120 days is the typical processing time however, some have exceeded 3years.

Permits for maintenance work are generally processed within 60 day of receipt of the application. These permits are for maintenance only. Minor changes in materials are acceptable however changing the original foot print or increasing the overall depth of an existing channel, in the case of a dredging project, cannot be authorized with these types of permits.

During the initial planning phase of any project the corps will, upon request of the applicant, hold a pre-application meeting. This very simple process can save an applicant a tremendous amount of time and money. During the meeting the Corps representative can point out obvious problems you may encounter and make recommendations that can make the overall permit process much smoother. For larger more complex projects we may invite representative from other agencies so the applicant can better understand the process and what to expect.

It is important to note that planning or design work by Corps personnel does not guarantee that a federal permit will be granted for the project as designed.

A Joint Permit Application (JPA) must be submitted and reviewed by Regulatory Staff to determine the appropriate permit and process that will be used to authorize the proposed project. The permit processing time varies from 60 to 120 days depending of the type of permit and issues that may arise during the review process.

An electronic copy and instructions for use of the JPA can be obtained at:

http://www.nao.usace.army.mil/technical%20services/Regulatory%barnch/JPA.asp

You may need permits from the Virginia Marine Resources Commission, Virginia Department of Environmental Quality and the Local Wetlands Board as well.

33 CFR PART 328

DEFINITION OF WATERS OF THE UNITED STATES

Authority: 33 U.S.C. 1344.

Source: 51 FR 41250, Nov. 13, 1986, unless otherwise noted.

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§ 328.1 Purpose.

This section defines the term "waters of the United States" as it applies to the jurisdictional limits of the authority of the Corps of Engineers under the Clean Water Act. It prescribes the policy, practice, and procedures to be used in determining the extent of jurisdiction of the Corps of Engineers concerning "waters of the United States." The terminology used by section 404 of the Clean Water Act includes "navigable waters" which is defined at section 502(7) of the Act as "waters of the United States including the territorial seas." To provide clarity and to avoid confusion with other Corps of Engineer regulatory programs, the term "waters of the United States" is used throughout 33 CFR parts 320 through 330. This section does not apply to authorities under the Rivers and Harbors Act of 1899 except that some of the same waters may be regulated under both statutes (see 33 CFR parts 322 and 329).

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§ 328.2 General scope.

Waters of the United States include those waters listed in §328.3(a). The lateral limits of jurisdiction in those waters may be divided into three categories. The categories include the territorial seas, tidal waters, and non-tidal waters (see 33 CFR 328.4 (a), (b), and (c), respectively).

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§ 328.3 Definitions.

For the purpose of this regulation these terms are defined as follows:

(a) The term ***waters of the United States*** means

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(iii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section.

(8) Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.

(b) The term ***wetlands*** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(c) The term ***adjacent*** means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are “adjacent wetlands.”

(d) The term ***high tide line*** means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

(e) The term ***ordinary high water mark*** means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving,

changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

(f) The term ***tidal waters*** means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by hydrologic, wind, or other effects.

[51 FR 41250, Nov. 13, 1986, as amended at 58 FR 45036, Aug. 25, 1993]

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§ 328.4 Limits of jurisdiction.

(a) ***Territorial Seas.*** The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)

(b) ***Tidal waters of the United States.*** The landward limits of jurisdiction in tidal waters:

(1) Extends to the high tide line, or

(2) When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.

(c) ***Non-tidal waters of the United States.*** The limits of jurisdiction in non-tidal waters:

(1) In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or

(2) When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.

(3) When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland.

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§ 328.5 Changes in limits of waters of the United States.

Permanent changes of the shoreline configuration result in similar alterations of the boundaries of waters of the United States. Gradual changes which are due to natural causes and are perceptible only over some period of time constitute changes in the bed of a waterway which also change the boundaries of the waters of the United States. For example, changing sea levels or subsidence of land may cause some areas to become waters of the United States while siltation or a change in drainage may remove an area from waters of the United States. Man-made changes may affect the limits of waters of the United States; however, permanent changes should not be presumed until the particular circumstances have been examined and verified by the district engineer. Verification of changes to the lateral limits of jurisdiction may be obtained from the district engineer.

APPENDIX F - DETAILED COST ESTIMATES

1. Navigation High Bound Cost Estimate
2. Navigation Most Probable Cost Estimate
3. Navigation Low Bound Cost Estimate
4. Shoreline High Bound Cost Estimate
5. Shoreline Most Probable Cost Estimate
6. Shoreline Low Bound Cost Estimate

Navigation High Bound Estimate

Calculations Begin for Year 2012
Discount Rate is 2.500%

County	Project Designation	Project Name	District	Dredging Frequency	Year to begin dredging cycles	Number of Dredging Cycles	Initial Maintenance Cycle	Subsequent Maintenance Cycles	Source	Total Net Present Value Per Project	Project Average Annual Costs
Essex	A	Hoskins Creek	NAO	2	2013	25	$ 2,800,000	$ 3,800,000		$52,271,289	$1,842,984
Essex	B	Rappahannock River	NAO	17.5	2032	1	$ 6,600,000	$ 4,200,000		$3,929,549	$138,548
Gloucester	C	Aberdeen Creek	NAO	4	2032	8	$ 6,200,000	$ 3,200,000		$11,287,868	$397,988
King & Queen, King William	D	Mattaponi River	NAO	17.5	2032	1	$ 7,000,000	$ 4,000,000		$4,167,704	$146,945
King William	E	Pamunkey River	NAO	17.5	2032	1	$ 5,200,000	$ 4,000,000		$3,096,009	$109,159
Mathews	F	Davis Creek	NAO	7.5	2016	4	$ 4,600,000	$ 2,800,000		$7,768,966	$273,919
Mathews	G	Horn Harbor	NAO	3.5	2012	8	$ 1,200,000	$ 1,000,000		$4,310,683	$151,986
Mathews	H	Queens Creek	NAO	2.5	2012	10	$ 1,200,000	$ 1,200,000		$7,175,454	$252,993
Mathews	I	Winter Harbor	NAO	3.5	2016	7	$ 1,400,000	$ 1,600,000		$6,075,420	$214,207
Mathews	J	Milford Haven	NAO	50	2060	1	$ 1,000,000	$ 1,000,000		$298,216	$10,515
Middlesex	K	Broad Creek	NAO	5	2019	9	$ 2,400,000	$ 2,400,000		$11,376,974	$401,130
Middlesex	L	Jackson Creek	NAO	15	2019	1	$ 1,400,000	$ 1,000,000		$2,107,027	$74,290
Middlesex	M	Locklies Creek	NAO	17.5	2032	1	$ 1,600,000	$ 1,400,000		$952,618	$33,587
Middlesex	N	Mill Creek	NAO	17.5	2032	1	$ 1,400,000	$ 1,200,000		$833,541	$29,389
Middlesex	O	Parrotts Creek	NAO	3.5	2032	5	$ 1,800,000	$ 1,400,000		$3,276,625	$115,527
Middlesex	P	Urbanna Creek	NAO	15	2027	3	$ 4,800,000	$ 3,600,000		$6,148,705	$216,791
Middlesex	Q	Whitings Creek	NAO	2	2012	25	$ 1,000,000	$ 1,000,000		$14,379,778	$507,003

	Present Value	Average Annual Costs
Total	$139,456,425	$4,916,963

Navigation Most Probable Estimate

Calculations Begin for Year 2012
Discount Rate 4.125%

County	Project Designation	Project Name	District	Dredging Frequency	Year to begin dredging cycles	Number of Dredging Cycles	Initial Maintenance Cycle	Subsequent Maintenance Cycles	Source	Total Net Present Value Per Project	Project Average Annual Costs
Essex	A	Hoskins Creek	NAO	4	2013	13	$ 1,400,000	$ 1,900,000		$9,842,452	$468,018
Essex	B	Rappahannock River	NAO	35	2032	1	$ 3,300,000	$ 2,100,000		$1,412,078	$67,146
Gloucester	C	Aberdeen Creek	NAO	8	2032	4	$ 3,100,000	$ 1,600,000		$1,944,580	$92,467
King & Queen, King William	D	Mattaponi River	NAO	35	2032	1	$ 3,500,000	$ 2,000,000		$1,497,658	$71,215
King William	E	Pamunkey River	NAO	35	2032	1	$ 2,600,000	$ 2,000,000		$1,112,546	$52,903
Mathews	F	Davis Creek	NAO	15	2016	4	$ 2,300,000	$ 1,400,000		$3,028,576	$144,012
Mathews	G	Horn Harbor	NAO	7	2012	8	$ 600,000	$ 500,000		$1,687,088	$80,223
Mathews	H	Queens Creek	NAO	5	2012	10	$ 600,000	$ 600,000		$2,746,063	$130,578
Mathews	I	Winter Harbor	NAO	7	2016	7	$ 700,000	$ 800,000		$2,204,498	$104,826
Mathews	J	Milford Haven	NAO	100	2060	1	$ 500,000	$ 500,000		$68,988	$3,280
Middlesex	K	Broad Creek	NAO	10	2019	5	$ 1,200,000	$ 1,200,000		$2,265,745	$107,738
Middlesex	L	Jackson Creek	NAO	30	2019	1	$ 700,000	$ 500,000		$614,208	$29,206
Middlesex	M	Locklies Creek	NAO	35	2032	1	$ 800,000	$ 700,000		$342,322	$16,278
Middlesex	N	Mill Creek	NAO	35	2032	1	$ 700,000	$ 600,000		$299,532	$14,243
Middlesex	O	Parrotts Creek	NAO	7	2032	5	$ 900,000	$ 700,000		$1,005,667	$47,820
Middlesex	P	Urbanna Creek	NAO	30	2027	2	$ 2,400,000	$ 1,800,000		$1,537,364	$73,103
Middlesex	Q	Whitings Creek	NAO	4	2012	13	$ 500,000	$ 500,000		$2,668,491	$126,889

	Present Value	Average Annual Costs
Total	$34,277,857	$1,629,946

Calculations Begin for Year 2012
Discount Rate is 6.000%

Navigation Low Bound Estimate

County	Project Designation	Project Name	District	Dredging Frequency	Year to begin dredging cycles	Number of Dredging Cycles	Initial Maintenance Cycle	Subsequent Maintenance Cycles	Source	Total Net Present Value Per Project	Project Average Annual Costs
Essex	A	Hoskins Creek	NAO	8	2013	7	$ 700,000	$ 950,000		$1,959,910	$124,345
Essex	B	Rappahannock River	NAO	70	2032	1	$ 1,650,000	$ 1,050,000		$485,356	$30,793
Gloucester	C	Aberdeen Creek	NAO	16	2032	2	$ 1,550,000	$ 1,300,000		$606,472	$38,477
King & Queen, King William	D	Mattaponi River	NAO	70	2032	1	$ 1,750,000	$ 1,000,000		$514,772	$32,659
King William	E	Pamunkey River	NAO	70	2032	1	$ 1,300,000	$ 1,000,000		$382,402	$24,261
Mathews	F	Davis Creek	NAO	30	2016	2	$ 1,150,000	$ 700,000		$950,421	$60,299
Mathews	G	Horn Harbor	NAO	14	2012	4	$ 300,000	$ 250,000		$407,743	$25,869
Mathews	H	Queens Creek	NAO	10	2012	5	$ 300,000	$ 300,000		$612,184	$38,840
Mathews	I	Winter Harbor	NAO	14	2016	4	$ 350,000	$ 400,000		$478,083	$30,332
Mathews	J	Milford Haven	NAO	200	2060	1	$ 250,000	$ 250,000		$14,386	$913
Middlesex	K	Broad Creek	NAO	20	2019	3	$ 600,000	$ 600,000		$530,425	$33,652
Middlesex	L	Jackson Creek	NAO	60	2019	1	$ 350,000	$ 250,000		$219,594	$13,932
Middlesex	M	Locklies Creek	NAO	70	2032	1	$ 400,000	$ 350,000		$117,662	$7,465
Middlesex	N	Mill Creek	NAO	70	2032	1	$ 350,000	$ 300,000		$102,954	$6,532
Middlesex	O	Parrotts Creek	NAO	14	2032	3	$ 450,000	$ 350,000		$198,048	$12,565
Middlesex	P	Urbanna Creek	NAO	60	2027	1	$ 1,200,000	$ 900,000		$472,376	$29,970
Middlesex	Q	Whitings Creek	NAO	8	2012	7	$ 250,000	$ 250,000		$608,777	$38,623

	Present Value	Average Annual Costs
Total	$8,661,565	$549,527

Calculations Begin for Year 2012
Discount Rate is 2.500%

Shoreline High Bound Estimate

County	Project Designation	Project Name	Shoreline Descriptor	Dredging/ Placement Frequency	Year to begin Placement cycles	Number of Placement Cycles	Initial Maintenance Cycle Additional Cost over NAV Cost	Subsequent Maintenance Cycles Additional Cost over NAV Cost	Source	Total Net Present Value Per Project	Project Average Annual Costs
Essex	A	Hoskins Creek	Rt. 360 to Jones Pt.	2	2013	0	$ -	$ -			
Essex	B	Rappahannock River	N & S shore - 1 mile upriver	17.5	2032	0	$ -	$ -			
Gloucester	C	Aberdeen Creek	1 mile N & S	4	2032	0	$ -	$ -			
King & Queen, King William	D	Mattaponi River	Wakema 1 mile N & S	17.5	2032	0	$ -	$ -			
King William	E	Pamunkey River	up and down river	17.5	2032	0	$ -	$ -			
Mathews	F	Davis Creek	1 mile upriver, south side	7.5	2016	0	$ -	$ -			
Mathews	G	Horn Harbor	Mathews RSM Target site	3.5	2012	8	$ 600,000	$ 600,000		$2,469,337	$87,064
Mathews	H	Queens Creek	Mathews RSM Target site	2.5	2012	10	$ 200,000	$ 200,000		$1,195,909	$42,165
Mathews	I	Winter Harbor	Mathews RSM Target site	3.5	2016	7	$ 700,000	$ 700,000		$2,735,333	$96,443
Mathews	J	Milford Haven	Mathews RSM Target site	50	2060	1	$ 200,000	$ 200,000		$59,643	$2,103
Middlesex	K	Broad Creek	1 mile up and down river	5	2019	0	$ -	$ (200,000)		-$969,652	-$34,188
Middlesex	L	Jackson Creek	1 mile up and down river	15	2019	1	$ 200,000	$ 200,000		$355,746	$12,543
Middlesex	M	Locklies Creek	1 mile up and down river	17.5	2032	1	$ 200,000	$ 200,000		$119,077	$4,198
Middlesex	N	Mill Creek	1 mile up and down river	17.5	2032	1	$ 200,000	$ 200,000		$119,077	$4,198
Middlesex	O	Parrotts Creek	1 mile up and down river	3.5	2032	5	$ 200,000	$ 200,000		$434,067	$15,304
Middlesex	P	Urbanna Creek	From Rose Gill to 1 mile up river	15	2027	4	$ 200,000	$ 200,000		$491,808	$17,340
Middlesex	Q	Whitings Creek	1 mile up and down river	2	2012	0	$ -	$ -			

	Present Value	Average Annual Costs
Total	$7,010,346	$247,171

Calculations Begin for Year 2012
Discount Rate is 4.125%

Shoreline Most Probable Estimate

County	Project Designation	Project Name	Shoreline Descriptor	Dredging/ Placement Frequency	Year to begin Placement cycles	Number of Placement Cycles	Initial Maintenance Cycle Additional Cost over NAV Cost	Subsequent Maintenance Cycles Additional Cost over NAV Cost	Source	Total Net Present Value Per Project	Project Average Annual Costs
Essex	A	Hoskins Creek	Rt. 360 to Jones Pt.	4	2013	0	$ -	$ -			
Essex	B	Rappahannock River	N & S shore - 1 mile upriver	35	2032	0	$ -	$ -			
Gloucester	C	Aberdeen Creek	1 mile N & S	8	2032	0	$ -	$ -			
King & Queen, King William	D	Mattaponi River	Wakema 1 mile N & S	35	2032	0	$ -	$ -			
King William	E	Pamunkey River	up and down river	35	2032	0	$ -	$ -			
Mathews	F	Davis Creek	1 mile upriver, south side	15	2016	0	$ -	$ -			
Mathews	G	Horn Harbor	Mathews RSM Target site	7	2012	8	$ 300,000	$ 300,000		$954,630	$45,394
Mathews	H	Queens Creek	Mathews RSM Target site	5	2012	10	$ 100,000	$ 100,000		$457,677	$21,763
Mathews	I	Winter Harbor	Mathews RSM Target site	7	2016	7	$ 350,000	$ 350,000		$1,000,212	$47,561
Mathews	J	Milford Haven	Mathews RSM Target site	100	2060	1	$ 100,000	$ 100,000		$13,798	$656
Middlesex	K	Broad Creek	1 mile up and down river	10	2019	0	$ -	$ (400,000)		-$465,767	-$22,148
Middlesex	L	Jackson Creek	1 mile up and down river	30	2019	1	$ 100,000	$ 100,000		$93,894	$4,465
Middlesex	M	Locklies Creek	1 mile up and down river	35	2032	1	$ 100,000	$ 100,000		$42,790	$2,035
Middlesex	N	Mill Creek	1 mile up and down river	35	2032	1	$ 100,000	$ 100,000		$42,790	$2,035
Middlesex	O	Parrotts Creek	1 mile up and down river	7	2032	5	$ 100,000	$ 100,000		$131,441	$6,250
Middlesex	P	Urbanna Creek	From Rose Gill to 1 mile up river	30	2027	2	$ 100,000	$ 100,000		$67,951	$3,231
Middlesex	Q	Whitings Creek	1 mile up and down river	4	2012	0	$ -	$ -			

	Present Value	Average Annual Costs
Total	$2,339,415	$111,242

Calculations Begin for Year 2012
Discount Rate is 6.000%

Shoreline Low Bound Estimate

County	Project Designation	Project Name	Shoreline Descriptor	Dredging/ Placement Frequency	Year to begin Placement cycles	Number of Placement Cycles	Initial Maintenance Cycle Additional Cost over NAV Cost	Subsequent Maintenance Cycles Additional Cost over NAV Cost	Source	Total Net Present Value Per Project	Project Average Annual Costs
Essex	A	Hoskins Creek	Rt. 360 to Jones Pt.	8	2013	0	$ -	$ -			
Essex	B	Rappahannock River	N & S shore - 1 mile upriver	70	2032	0	$ -	$ -			
Gloucester	C	Aberdeen Creek	1 mile N & S	16	2032	0	$ -	$ -			
King & Queen, King William	D	Mattaponi River	Wakema 1 mile N & S	70	2032	0	$ -	$ -			
King William	E	Pamunkey River	up and down river	70	2032	0	$ -	$ -			
Mathews	F	Davis Creek	1 mile upriver, south side	30	2016	0	$ -	$ -			
Mathews	G	Horn Harbor	Mathews RSM Target site	14	2012	4	$ 150,000	$ 150		$141,584	$8,983
Mathews	H	Queens Creek	Mathews RSM Target site	10	2012	5	$ 50,000	$ 50,000		$102,031	$6,473
Mathews	I	Winter Harbor	Mathews RSM Target site	14	2016	4	$ 175,000	$ 175,000		$225,508	$14,307
Mathews	J	Milford Haven	Mathews RSM Target site	200	2060	1	$ 50,000	$ 50,000		$2,877	$183
Middlesex	K	Broad Creek	1 mile up and down river	20	2019	0	$ -	$ (800,000)		-$205,303	-$13,025
Middlesex	L	Jackson Creek	1 mile up and down river	60	2019	1	$ 50,000	$ 50,000		$31,371	$1,990
Middlesex	M	Locklies Creek	1 mile up and down river	70	2032	1	$ 50,000	$ 50,000		$14,708	$933
Middlesex	N	Mill Creek	1 mile up and down river	70	2032	1	$ 50,000	$ 50,000		$14,708	$933
Middlesex	O	Parrotts Creek	1 mile up and down river	14	2032	3	$ 50,000	$ 50,000		$24,090	$1,528
Middlesex	P	Urbanna Creek	From Rose Gill to 1 mile up river	60	2027	1	$ 50,000	$ 50,000		$19,682	$1,249
Middlesex	Q	Whitings Creek	1 mile up and down river	8	2012	0	$ -	$ -			

	Present Value	Average Annual Costs
Total	$371,256	$23,554