GENERAL REEVALUATION REPORT
ST. LOUIS HARBOR, MISSOURI
AND ILLINOIS PROJECT

FINAL

October 2005

US Army Corps of Engineers
St. Louis District®

EXECUTIVE SUMMARY

This General Reevaluation Report investigates the feasibility and Federal interest of the authorized St. Louis Harbor, Missouri and Illinois project. The report concludes that there is no Federal interest in constructing the project at this time due to Administration policy. For 21 years Administration policy has been to recommend against inland harbor projects that cut into fast land and can recover the costs of improvement through sale or lease of adjacent lands.

The geographic scope of the study area coincides with the Port of Metropolitan St. Louis. This includes the Mississippi River and its banks between the southern boundary of Jefferson County, Missouri, and the northern boundary of Madison County, Illinois. The Congress authorized this project for study beginning in 1964, with further study authority added in 1971. The 1982 Feasibility Report recommended an L-shaped dike to address sedimentation problems at the City of St. Louis Municipal dock, and a 6900-foot harbor facility on the Chain of Rocks Canal near Granite City, Illinois. A 1986 Limited Reevaluation Report recommended a different solution for the St. Louis municipal dock known as the Prototype River Access Improvement Structure, or PRAIS. In May 1986 the Lower Mississippi Valley Division (LMV) approved the Limited Reevaluation Report but directed that the design effort on the St. Louis Harbor project be terminated "because Federal accomplishment of this project is not in accord with the Administration's policies…" Since that time the Administration has consistently opposed inland harbors that are created by cutting into fast land, where it is presumed the cost of construction can be recovered by local interests via sale or lease of lands adjacent to the new harbor. Despite this Administration policy, Congress authorized the St. Louis Harbor project in the Water Resources Development Act of 1986. The St. Louis District continued preconstruction engineering and design and in 1992 completed a Letter Report recommending a different configuration for the 6900-foot harbor facilities along the Chain of Rocks Canal in Illinois. Corps Headquarters guidance in 1992 was to complete a full General Revaluation Report with Engineering Appendix. Congress provided additional authority in the Water Resources Development Act of 1996 to conduct a Limited Reevaluation Report on evacuating interior waters collecting along the Chain of Rocks Canal East Levee.

This General Reevaluation analyzed numerous alternative locations for new harbor facilities along the Chain of Rocks Canal in Illinois. After Tri-City Regional Port District, the potential local sponsor, acquired the former Charles Melvin Price Support Center, which has waterfront access directly on the Mississippi River, the reevaluation added an open river location for a harbor adjacent to the former Charles Melvin Price Support Center, now called River's Edge. The sponsor's preferred plan is to construct a new harbor facility at this location just downstream of the mouth of the Chain of Rocks Canal and upstream of the Merchants Bridge. This location would provide the northernmost harbor in Illinois not dependent on Mississippi River locks. However the site's location between the mouth of the canal and bridge piers causes concern for navigation safety. The many barge tows currently using the canal must carefully navigate the reach between the canal and bridge piers. Future increases in harbor traffic would

have to be carefully orchestrated to avoid accidents. Tri-City Regional Port District has committed to working with the navigation industry to ensure safety concerns are addressed should a project be constructed.

The estimated project benefits have been reduced compared to the 1982 feasibility report, since much of the commodity tonnage increases predicted in the 1982 feasibility report proved to be overly optimistic. As a result, the project had to be scaled back to what was considered more appropriate for future needs. The reevaluation concluded that it was economically infeasible to construct both the PRAIS for the St. Louis Municipal Dock and the new harbor in Illinois. The City of St. Louis would have to acquire hundreds of acres of industrial land, much of it in productive use today, and clear it for the exclusive use of future water-dependent industries. Because of these requirements the City of St. Louis chose not to further pursue the project as a sponsor. The economic benefits were therefore accrued to a new harbor facility in Illinois.

After the floods of 1993 and 1995 there were concerns with interior drainage waters collecting along the Chain of Rocks East Levee. Since this was part of the anticipated development area if a new harbor were to be constructed along the Chain of Rocks Canal, analysis of this problem was added to the project reevaluation. Efforts to reduce this problem are not economically justified, and would be entirely the responsibility of a local sponsor to address as a site development cost under current cost-sharing law related to inland harbors. There is no local sponsor interested in paying for this in relation to a new harbor. However, interior drainage improvements related to the Chain of Rocks East Levee, which is Federally owned and maintained, have reduced most of the interior drainage concerns.

The National Economic Development benefits to be realized with the construction of the St. Louis Harbor Project are dependent upon commodity tonnage projections and the need for future site development to handle such tonnage. The benefits are the reduced site modification costs afforded by the economies of scale in constructing the Harbor Project, which provides sites adjacent to each other and all at one time, as compared with the higher development costs of individual site modifications at various scattered Port of Metropolitan St. Louis locations, over the next 50 years. Although a project alternative could initially be economically justified at the former Charles Melvin Price Support Center location, the project is still not in accord with Administration policy relating to harbors cut into fast land. Recent actual tonnage data suggest that projections of future tonnage may again prove overly optimistic, especially for grain shipments.

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Appendixes

1: Introduction and Study Authority

This Final General Reevaluation Report concludes the reevaluation and terminates further Federal expenditure on the authorized St. Louis Harbor, Missouri and Illinois, Project.

The original authorization to study St. Louis Harbor was in 1964 as follows:

"*Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports on the Mississippi River between Coon Rapids Dam, Minnesota, and the mouth of the Ohio River, printed in house Document Numbered 669, Seventy-sixth Congress, Third Session, with a view to determining the causes of sedimentation in the St. Louis Harbor, Missouri and Illinois, and the most feasible means of reducing or eliminating the sedimentation problem; provided, that nothing in this resolution shall be taken to indicate any intent on the part of the Committee on Public Works to vary from the normal distribution of Federal and non-Federal participation in the work and costs of any navigation improvements or modifications to existing improvements that might be recommended, particularly with respect to the established practice of the assumption by local interest of the costs of dredging in the vicinity of the piers and docks beyond the limits of the Federal portion of the projects*."

Figure 1-1.
Sedimentation Problem at St. Louis Municipal Dock, December 1963

Congress provided additional authorization in 1971 as follows:

"*Resolved by the Committee on Public Works of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under the provisions of Section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby requested to review the reports of the Chief of Engineers on the Mississippi River between Coon Rapids Dam, Minnesota, and the mouth of the Ohio River, published as House Document Numbered 669, Seventy-sixth Congress, and other pertinent reports, with a view to determining the advisability of providing improved commercial harbor facilities at and in the vicinity of*
St. Louis, Missouri."

Congress provided a third authorization under Section 415 of the Water Resources Development Act of 1996:

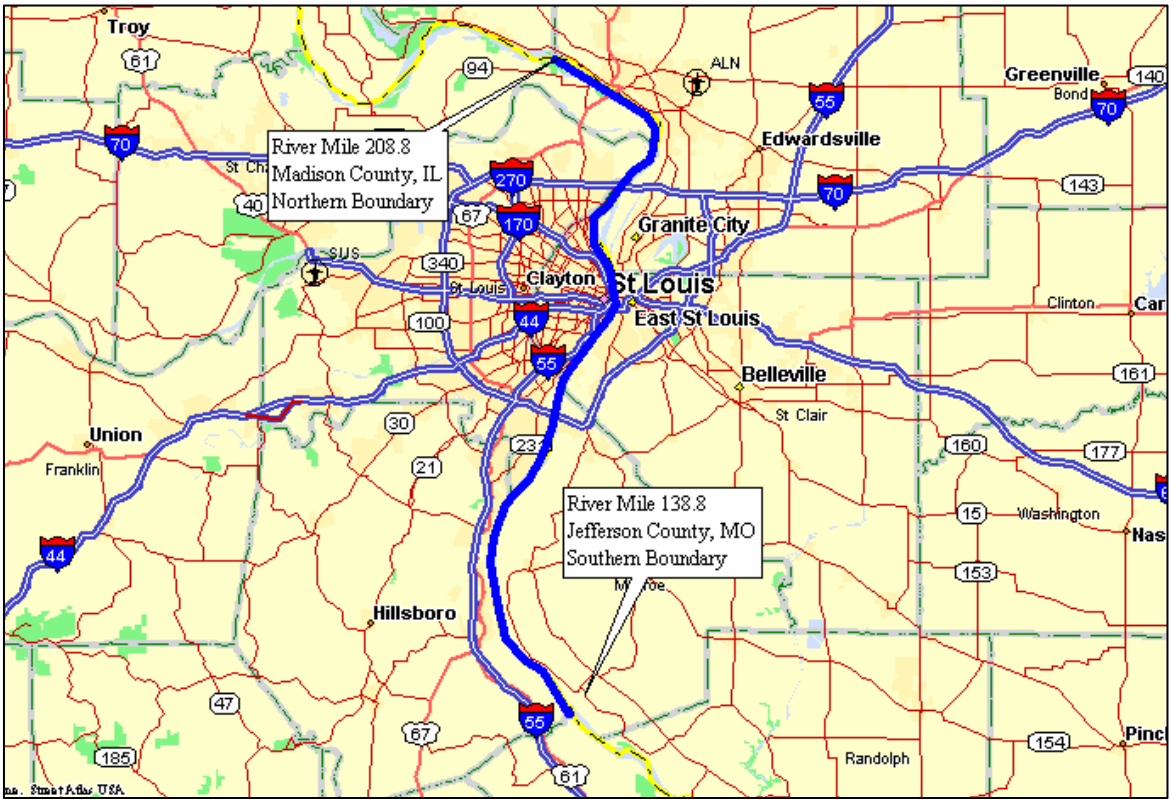
"*The Secretary shall complete a limited reevaluation of the authorized St. Louis Harbor Project in the vicinity of the Chain of Rocks Canal, Illinois, consistent with the authorized purposes of that project, to include evacuation of waters collecting on the land side of the Chain of Rocks Canal East Levee*."

2. Study Purpose and Scope

The purpose of this General Reevaluation Report is to reanalyze the project authorized in the Water Resources Development Act of 1986, using current planning criteria and policies, which is required due to changed conditions and assumptions. The results may affirm the previous plan; reformulate and modify it, as appropriate; or find that no plan is currently justified.

As shown in Figure 2-1, the geographic scope of the study area coincides with the Port of Metropolitan St. Louis. This includes the Mississippi River and its banks between River Mile 138.8, the southern boundary of Jefferson County, Missouri, and River Mile 208.8, the northern boundary of Madison County, Illinois.

Figure 2-1. St. Louis Harbor Study Area.

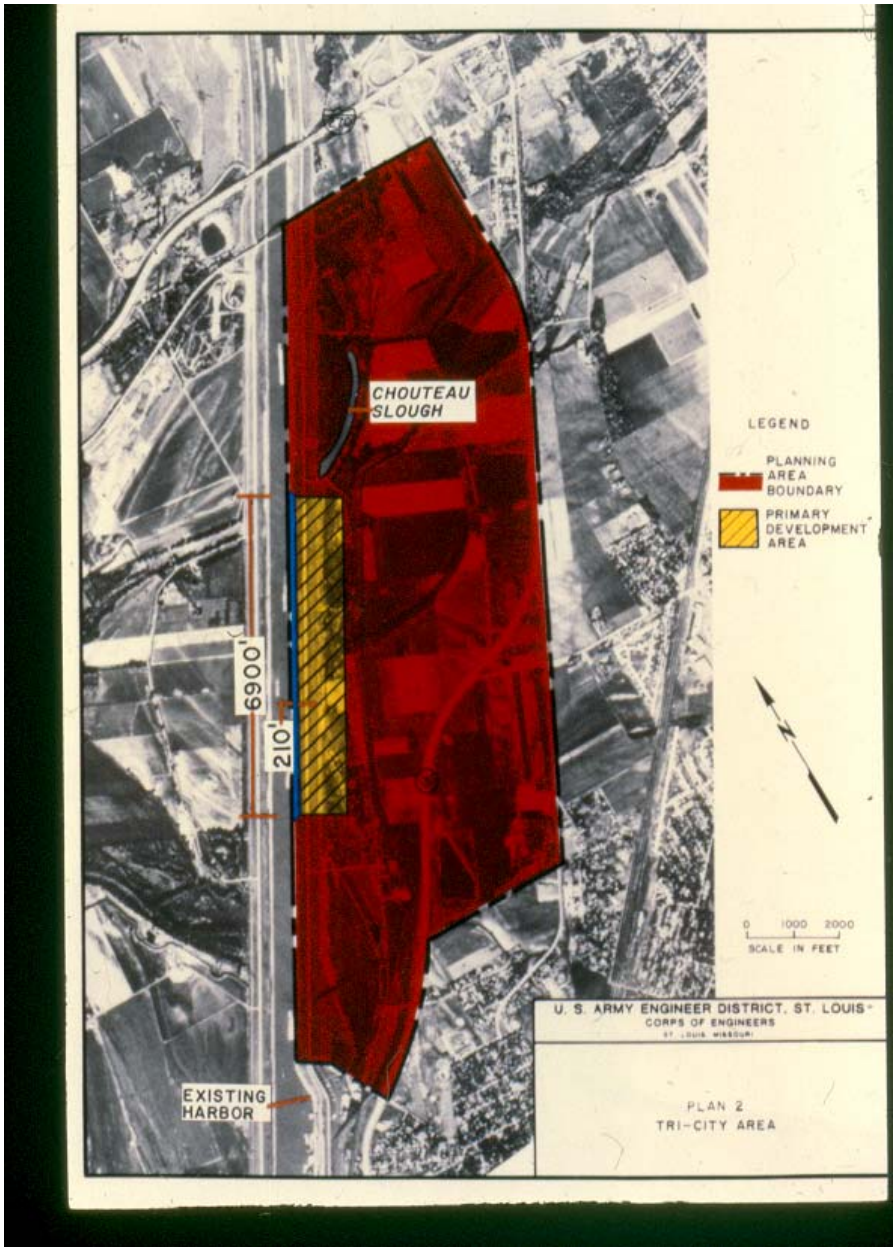


3. Prior Studies, Reports, and Existing Water Projects

The St. Louis Harbor Feasibility Report dated September 1982 recommends Federal participation in a project that provides (1) a structural solution to the most severe sedimentation problem in the study area, at the St. Louis Municipal Dock on the Missouri bank, and (2) harbor improvements along the east bank of the Chain of Rocks Canal north of the Tri-City Regional Port District harbor in Illinois. It also recommends phased construction of the project. Phase 1 includes the St. Louis Municipal Dock project (see Figure 3-1) and half of the Tri-City harbor improvement. The other half of the harbor improvement would be constructed as Phase 2 when demand is sufficient, which was estimated to be 10 years after Phase 1. Figure 3-2 shows the two phases of the proposed Tri-City Harbor in the 1982 feasibility report. The feasibility report describes three structural solutions for the sedimentation problem at the St. Louis Municipal Dock: dredging, either a local responsibility or shared by local and Federal interests; a floating cargo handling facility (conveyor) to extend past the sedimentation problem area; and a sedimentation control structure, an example of which is an "L" dike. The feasibility report selected the "L" dike as the best alternative, subject to model testing to determine if it will block passage of the sand bedload into the dock area.

Figure 3-1.
Proposed "L" Dike to Address Sedimentation at St. Louis Municipal Dock

Figure 3-2
Proposed Harbor Along the Chain of Rocks Canal from 1982 Feasibility Report



In 1982, Corps of Engineers cost sharing policy for harbor projects specified that berthing areas (where vessels are moored) are a non-Federal cost and navigation areas are a Federal cost. The cost sharing proposed in the feasibility report for the "L" dike was 50% non-Federal and 50% Federal because the "dike would serve to control sedimentation problems for both the dock area and the public channel within the dike" and "it is assumed that the dock and channel area will be roughly equal." For the proposed 6,900 foot long, 210 foot wide harbor along the Chain of Rocks Canal and its

associated set back of the Federal flood control levee adjacent to the canal, the proposed cost sharing was 50% non-Federal and 50% Federal because "50% of the harbor bottom area serves dock/fleeting uses and 50% serves as navigation use." In addition to these shared costs, the report also describes 100% Federal costs for dredging an access channel to the "L" dike area, and 100% non-Federal costs for lands, easements, rights-of-way, disposal areas and associated retention dikes, relocations, roads and railways, a public warehouse, and public docks.

The Division Engineer's Notice of Report issued on 29 November 1982 notes that the September 1982 Feasibility Report was made by the District and Division Commanders and describes the recommended plan. The Board of Engineers for Rivers and Harbors Report dated 6 April 1983 and the Chief of Engineers Report dated 30 April 1984 concur in the views and recommendations of the reporting officers.

In Fiscal Year 1985 St. Louis District initiated Preconstruction, Engineering and Design (PED) for the St. Louis Harbor project. St. Louis District received additional funds in Fiscal Year 1986. The District accomplished extensive geotechnical work and other engineering and planning efforts for the Tri-City harbor project in Illinois.

In March 1986 a Reevaluation Report was completed that describes the results of extensive model testing of the "L" dike concept by the Waterways Experiment Station. A physical model of the St. Louis Harbor was used to analyze the "L" dike and several other sediment control concepts. The "L" dike was not found to be effective in controlling sediment at the St. Louis Municipal Dock. However, the modeling showed that a vertical wall adjacent to the Municipal Dock would solve the sedimentation problem. Part of the wall would form a rounded upstream end for the Municipal Dock, and a second part would extend at a slight angle out into the river, and then tie back into the south end of the dock. This would result in flow velocities that would keep sediment moving past the dock. This wall concept was named the Prototype River Access Improvement Structure (PRAIS). The area between the wall and the existing Municipal Dock would be filled by local interests and used as part of the dock facility. The end result would be a larger reshaped Municipal Dock area with the PRAIS wall serving as part of the outer wall of the dock. The Reevaluation Report did not include a design, a cost estimate, nor a benefit-cost analysis for the PRAIS. However, based on its physical shape, one realistic design for the PRAIS would be an anchored steel sheet pile wall with fill material between the wall and the existing dock.

In May 1986 the Lower Mississippi Valley Division (LMV) approved the March 1986 Reevaluation Report but directed that the design effort on the St. Louis Harbor project be terminated "because Federal accomplishment of this project is not in accord with the Administration's policies (see Engineering Circular [EC] 1165-2-139 dated 23 May 1986)." The following are quotes from the EC:

> "Background. A number of feasibility studies have resulted in proposals for new inland channels and harbors in lands adjacent to existing navigation channels. Often, excavated material is to be placed next to the new channels to create flood-

free land for use by industries able to take advantage of water transportation via the new channels and existing river navigation systems. In such cases, the cost of the improvement should be recoverable by the project sponsors from the sale or lease of the land made usable by the placement of excavated material. Furthermore, in cases involving the acquisition of fast land for the proposed improvement the local sponsor usually obtains control over access to the project. For these cases, it should be possible for the local proponent to finance the project cost from charges for access to the improvement. Where the above circumstances exist it is appropriate for non-Federal interests to implement the proposed improvements in response to local market conditions."

"Guidance. Federal participation in inland waterway harbor improvements under the Army Civil Works Program is not warranted and shall not be recommended when (1) resale or lease of lands used for disposal of excavated channel material can recover the cost of the improvements or (2) the acquisition of land outside the navigation servitude is necessary for construction of the improvements and would permit local interests to control access to the project. The latter case shall be assumed to exist where the proposed improvement consists of a new channel cut into fast land. This opens additional waterfront area for industrial development and usually the excavated material provides fill to develop lands for industrial development."

In August 1986, the District notified local interests that the design effort on the St. Louis Harbor project was being terminated per the direction of the Lower Mississippi Valley Division.

In November 1986, the Water Resources Development Act of 1986 (WRDA 86) authorized "the project for navigation, St. Louis Harbor, Missouri and Illinois: Report of the Chief of Engineers, dated April 30, 1984, at a total cost of $31,000,000, with an estimated first Federal cost of $10,400,000 and an estimated first non-Federal cost of $20,600,00." WRDA 86 also changed the cost-sharing requirements for the general navigation portion of harbor projects. For harbors that have a depth not in excess of 20 feet, non-Federal interests now pay 10% of the cost of construction, in addition to costs of lands, easements, rights-of-way, relocations, and disposal areas. Also, the non-Federal interests must pay an additional 10% of the cost of the general navigation features of the project in cash over a period not to exceed 30 years, but the value of lands, easements, rights-of-way, relocations, and dredged material disposal areas are credited against this required payment.

A St. Louis District value engineering study dated January 1987 examined alternative designs for the PRAIS (the plan for the St. Louis Municipal Dock that was described in the March 1986 Reevaluation Report). Two preliminary designs and cost estimates were presented, one for an anchored steel sheet pile wall and the other for a cellular wall using the steel sheet pile from the third stage cofferdam at Melvin Price Locks and Dam. The cost estimate for an anchored sheet pile wall was based on an Architect/Engineer firm's design for a wall that had recently been constructed at the

Municipal Dock. The value engineering study estimated that the cost of a cellular PRAIS wall with the used sheet pile would be much less than an anchored sheet pile wall with new sheet pile. The anchored wall would require a "Z" type pile, while the cellular wall uses straight section pile. The cost estimate for the cellular wall included a cost to deliver and drive the government-owned used sheet pile, but did not include a basic material cost or value for the sheet pile. The Melvin Price Lock and Dam project sheet pile became the property of the government at the end of the third stage contract. However, because the St. Louis Harbor project has been delayed requiring more study, the sheet pile was used for other purposes and is no longer available.

A March 1987 letter from the Assistant Secretary of the Army (Civil Works) to Senator Christopher Bond of Missouri said that the Assistant Secretary has conducted an extensive review of the Executive Branch policy and was not able to find a rationale for proceeding on the St. Louis Harbor Project (and eight other slackwater ports) "because of the shortage of funds to address priority missions that Congress has given us: flood control and navigation."

On 22 May 1987 the Assistant Secretary of the Army (Civil Works) transmitted the report of the Chief of Engineers to the Senate and the House of Representatives. The letter states: "I recommend, and the Office of Management and Budget (OMB) concurs, that further Federal participation in development of the proposed harbor improvements is not warranted. To the extent that this project is a sound investment, local interests can finance the project and secure their costs from users who would benefit from the availability of additional flood-free lands and land with navigation access to waterfront development."

In June 1991, Tri-City Regional Port District officials asked the St. Louis District to look into the idea of changing the size and location of Phase 1 of the harbor project, and to consider the advisability of the change in view of such issues as economic justification, Federal/non-Federal cost-sharing, effect on project authorization, and effect on construction timing. The tentative revised configuration of the new harbor would be an 1,800 foot-long Phase 1 harbor shifted in location so that it is a northward extension of the existing Tri-City harbor just north of Locks 27 on the Chain of Rocks Canal. Phase 2 would be a physically separate 5,100 foot-long harbor in the northern portion of the authorized harbor project location.

The St. Louis District used the Fiscal Year 1991 funds as follows: to develop preliminary designs and cost estimates for the PRAIS and the tentative revised configuration of the Tri-City harbor; to update the cost of the authorized configuration of the Tri-City harbor; to complete preliminary economic analyses of two projects, the PRAIS in combination with the authorized configuration of the Tri-City harbor and the PRAIS in combination with the tentative revised configuration of the Tri-City harbor; to consider the environmental effects of these changes; to address the issue of Federal interest, and to begin preparation of the 1992 Letter Report.

A draft Letter Report was distributed to the local sponsors and to St. Louis District management on 26 December 1991, and a meeting was held with the local sponsors on 10 January 1992. The sponsors had some comments on the cost estimates. However, because (1) the possible changes to the cost estimates were somewhat offsetting and they were minor compared to total project costs, and because (2) the cost revisions would not change the conclusions reached in the economic analysis of the letter report, and because (3) the District did not have funds for any additional analysis effort, no changes were made to the cost estimates and economic studies presented in the Letter Report.

Headquarters reviewed the Letter Report and, in May 1992, issued guidance requiring a General Reevaluation Report with Engineering Appendix to include: current economic studies, incremental economic justification for each area, evaluation of the area designated as "environmental enhancement," demonstration of compliance with the National Historic Preservation Act of 1966, allocation of costs between general navigation and associated costs, a draft PCA, and a Project Study Plan.

Headquarters' guidance on the limited reevaluation report is as follows: A Project Study Plan (PSP) has been drafted for the ongoing PED for the authorized St. Louis Harbor Project. Prepare an amendment to the PSP to prepare a General Reevaluation Report (GRR) on the Federal interest in interior flood control inside the Chain of Rocks Levee. Inasmuch as this is a continuing PED effort, up-front cost-sharing is not required. The District must inform potential non-Federal project sponsors that the general reevaluation may find no Federal interest in the conversion of ponding areas to industrial development and conclude that the Federal interest is best served by preserving and restoring the ponding areas for their originally intended use. Moreover, the non-Federal cost sharing partner should be advised that if any conversion of existing ponding areas is recommended as a locally preferred plan, it likely would be subject to 100% non-Federal special cost sharing.

4. Plan Formulation

4.1 Problems and Opportunities

4.1.1 Existing Conditions

Port Conditions

The existing Mississippi River navigation channel provides a minimum channel depth of not less than nine feet and a minimum width of not less than 300 feet at low water, which is achieved through regulating works such as dikes and weirs, and dredging. Total tonnage handled on the docks of the Port of Metropolitan St. Louis has grown steadily from an average of about 22.75 million tons per year in the 1970's to an average of 31.8 million tons per year from 1996 to 2000. This represents approximately 40% growth in tonnage handled. The port handled 32.6 million tons in 2002. Through traffic in the port has increased from about 48,400,000 tons in 1972, to 53,200,000 tons in 1977, 65,680,000 tons in 1990, and 72,950,000 tons in 1995. This represents an increase of 50.7% from 1972 to 1995, and 11% from 1990 to 1995 alone.

Waterfront Sites

Many studies conducted by and for local interests have concluded that waterway-related development has been impeded by the lack of suitable waterfront sites. Tonnage handled at the port has not kept pace with the growth in through tonnage. Participant in public meetings have indicated that firms needing waterfront sites have bypassed St. Louis because there were few suitable sites available that did not require considerable modification. Some potential sites have become unavailable for development because the Corps has turned them into ecosystem restoration sites.

Port Management Structure

St. Louis District and the U.S. Coast Guard have primary authority over activities occurring in the channel and along the banks of the Mississippi River. St. Louis District is responsible for operating locks and dams, maintaining the navigation channels and all construction relating to flood control and navigation. The U.S. Coast Guard provides basic navigational aids. The Office of Water Resources at the Illinois Department of Natural Resources (IDNR-OWR) and the Missouri Department of Natural Resources (MDNR) are the primary permitting agencies at the state level.

The seven port authorities or districts within the Port of Metropolitan St. Louis are: the Tri-City Regional Port District (TCRPD), the Southwest Regional Port District (SRPD), the Kaskaskia Regional Port District(KRPD), the Jefferson County Port Authority, the St. Louis County Port Authority, the City of St. Louis port Authority, and the St. Charles County Port Authority. These districts have a variety of powers, such as the issuance of tax-free industrial and port bonds, the power of eminent domain and the authority to construct buildings and make site improvements. Illinois port districts are allowed to issue general obligation bonds. The Bi-State Development Agency (Bi-State) serves as the regional port coordinator. The agency is empowered to issue bonds and perform other duties associated with its role of encouraging regional port development. The City of St. Louis Community Development Agency is empowered to stimulate

industrial development in the City of St. Louis by means of eminent domain, industrial revenue bonds, and city tax abatement.

4.1.2. Future Without Project Condition, Port of Metropolitan St. Louis.

Nine of the 14 most desirable sites identified in the 1982 feasibility report are no longer available. The future without project condition now estimates 14 sites will be developed that are even more marginal (meaning even higher development costs of individual site modifications at various Harbor locations over the next 50 years (i.e.; the 50 year project period of evaluation)) than what was available in 1982.

Economic analysis, consisting of extensive field interviews and surveys, indicated that nine (9) of the first fourteen (14) sites from the 1982 Report are no longer available for future private industry development. For example, of the top two (2) sites from the 1982 Report, the first is in a recently developed area just south of the MacArthur Bridge at Mississippi River Mile 178 to 179, Illinois side. The second site is currently being developed into a casino at Mississippi River Mile 171-172, on the Missouri side. The first fourteen sites from the 1982 Report, as listed in Table 10, are defined as the fourteen sites requiring the least costly modification and, in accordance with Assumption (f), would be the first fourteen sites selected and modified by private industry as future site demand arose. Of the first fourteen sites, those seven sites that have already been developed since the 1982 Report have most likely been developed due to the very nature of their favorable parameters (reliable water access, adequate flood protection, etc.) and associated low modification costs.

Projected future tonnage is shown in Appendix A, the economics appendix.

4.1.3. Problems and Opportunities

The principal problem addressed in this reevaluation report is the shortage of waterfront sites suitable for industrial development. The study addresses potential harbor improvements on two topics: availability of land for waterway-dependent industrial developments and sedimentation problems of the existing St. Louis Municipal Dock. The authorized project is therefore two separable elements consisting of: 1) addressing the sedimentation problems of the St. Louis Municipal Dock in Missouri, and 2) an additional site for a new harbor within the Tri-City Regional Port District's geographic boundary in Illinois. This reevaluation report will separate the costs and benefits of those two elements.

Although WRDA 96 specifically mentioned that this reevaluation should address the evacuation of waters collecting on the landside of the Chain of Rocks Canal East Levee, a separate project is addressing this issue. The Corps of Engineers constructed, operates and maintains the Chain of Rocks Canal and Levee. In 1996 existing authorities were used to conduct remedial and emergency measures to control underseepage along the canal levee. These measures include new relief wells, the rehabilitation and replacement of relief wells, ditch and utility relocations, landside berms and fills, and the

construction of a new Federal pump station to supplement an existing pump station that is operated by the Choteau, Nameoki, and Venice Drainage and Levee District. Construction of these emergency and remedial measures began in 1997 and is on-going. The new pump station is authorized to handle the interior ponding from the existing, rehabilitated and new relief wells. The two pump stations combined should have the capability to manage conditions of large inflow due to the relief wells and interior rainfall.

Also briefly addressed in this reevaluation report is the Environmental Enhancement area from the 1992 Letter Report.

4.1.3.1. Opportunities in Illinois

As will be shown in the economics section of this report, of the possible sites for development in the Port of St. Louis, the sites recommended in the 1982 feasibility report as most suitable for harbor development are the same today. The initial scope of the project was to consider individual sites from the 1982 feasibility report and 1992 letter report, plus possible combinations of them. Both previous reports recommended phasing the new harbor development into two parts. Once land adjacent to the first phase of the new harbor was occupied by industry, the second phase would be constructed. All options along the Chain of Rocks Canal would involve setting back the 500-year levee immediately parallel to the east side of the canal. Option H would not require a levee setback as its location is where the levee bends away from the upstream mouth of the canal.

Table 1. First Iteration Options Considered for St. Louis Harbor GRR.

Option	Size	Location*	Description
A	1,800 x 210 feet	138+00 to 156+00	1992 Letter Report Phase I
B	1,800 x 400 feet	138+00 to 156+00	Widen Option A to match existing harbor.
C	5,100 x 210 feet	211+00 to 262+00	1992 Letter Report Phase II
D	3,450 x 210 feet	193+00 to 227+00	1982 Feasibility Report Phase I
E	3,450 x 210 feet	227+00 to 262+00	1982 Feasibility Report Phase II
F	3,600 x 210 feet	164+00 to 200+00	New Option between A and E
G	3,600 x 400 feet	164+00 to 200 +00	Wider version of Option F
H	3,300 x 400 feet	400+00 to 433+00	New Option north end of Chain of Rocks Canal – angle cut

*Location data refers to stationing along Chain of Rocks East Levee.

This reevaluation assumed that the original 1982 feasibility report calculations of harbor dimensions were correct. The calculation of a 210-foot-wide harbor was based upon the typical 1500-ton jumbo hopper barge used for shipping grain with a 35-foot width and 195-foot length. A typical 3-barge-wide tow is therefore 105 feet wide, the maximum tow width available on the upper Mississippi River down to St. Louis. The 210-foot harbor width assumed that half of the width would be for berthing and unloading, and the other half would be for a safe access channel to the docking facilities

away from the navigation channel. The existing harbor immediately upstream of Locks 27 is 400 feet wide, so it was considered an alternative width to consider for some of the options in the Chain of Rocks Canal. This width provides an additional measure of safety for maneuvering into the existing harbor so as not to interfere with tows entering and leaving the locks.

Figure 4-1. Possible Site Development Locations (Options A thru H).

Figure 4-2. Option C.

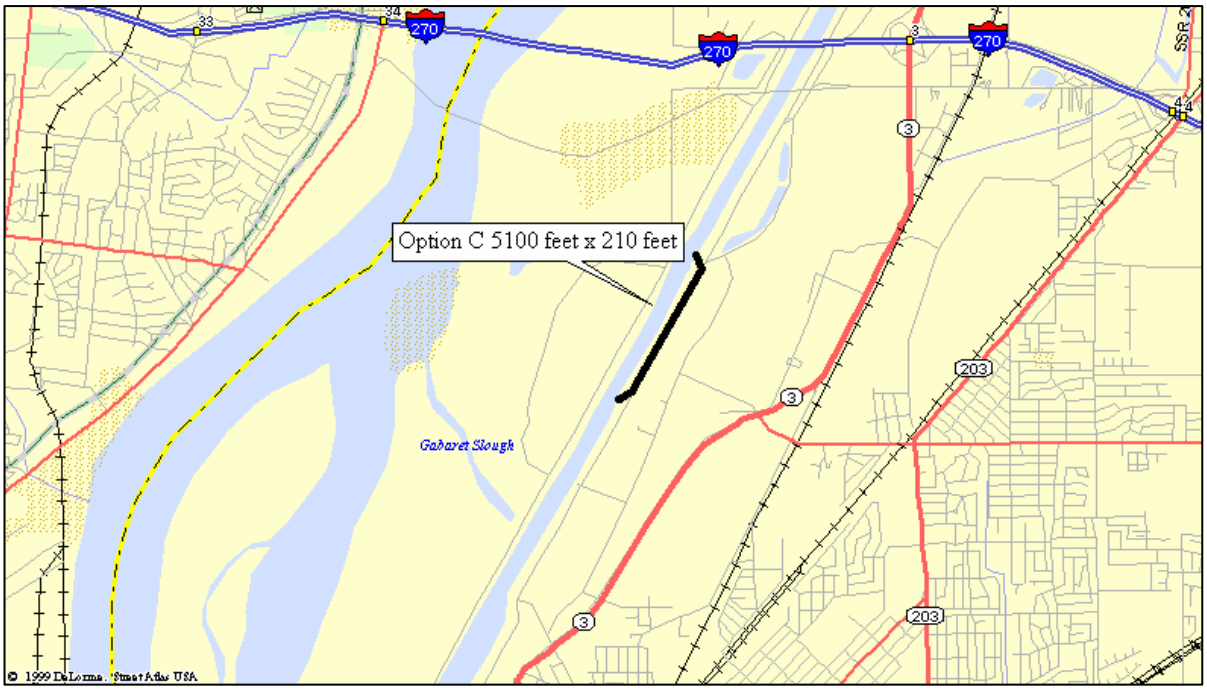


Figure 4-3. Options D & E.

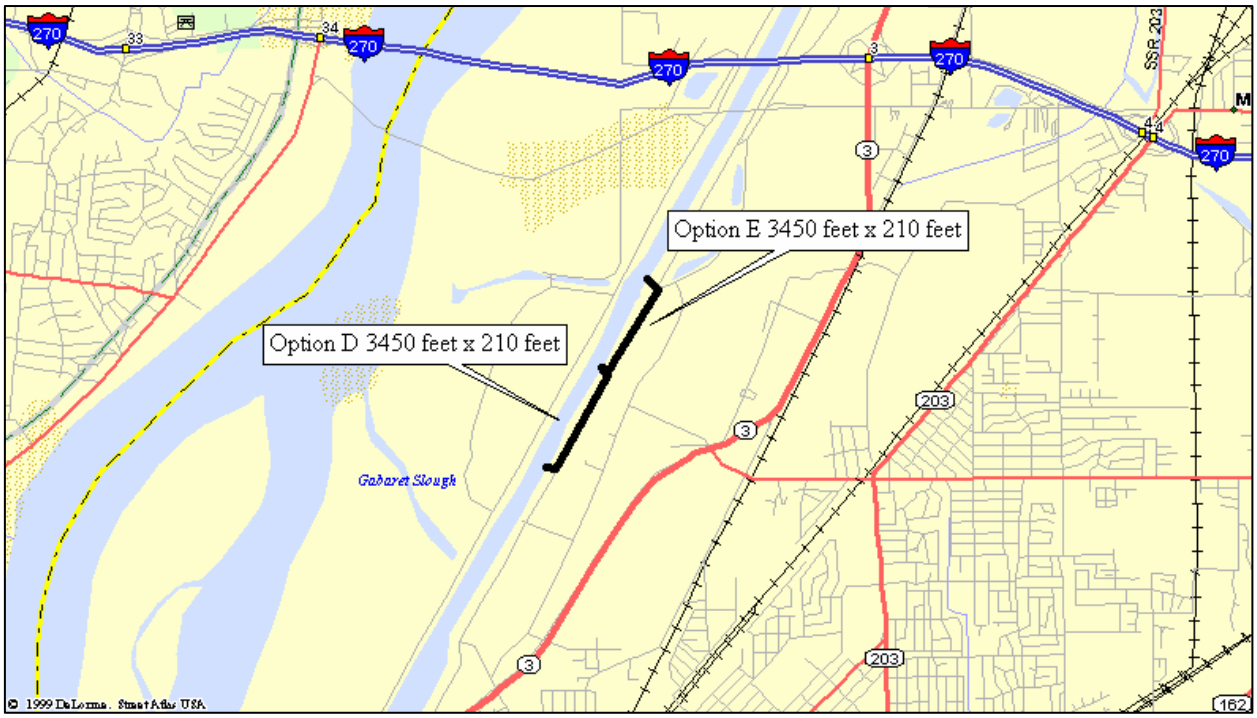
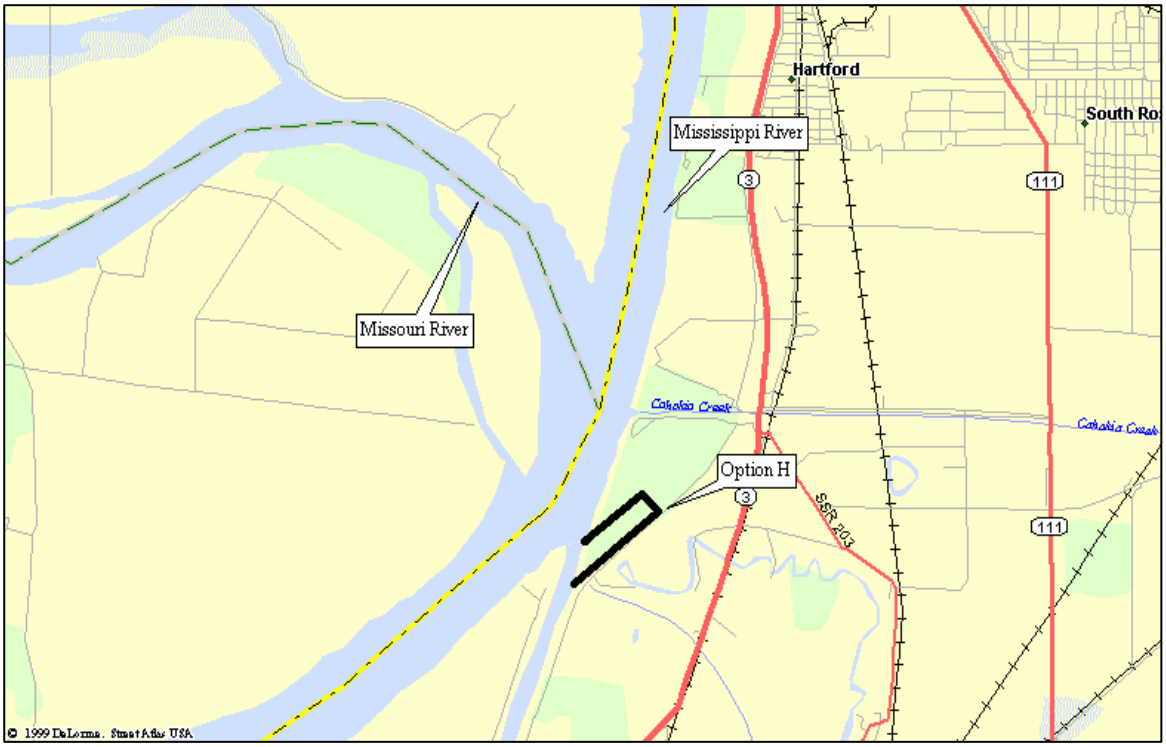


Figure 4-4. Option H.

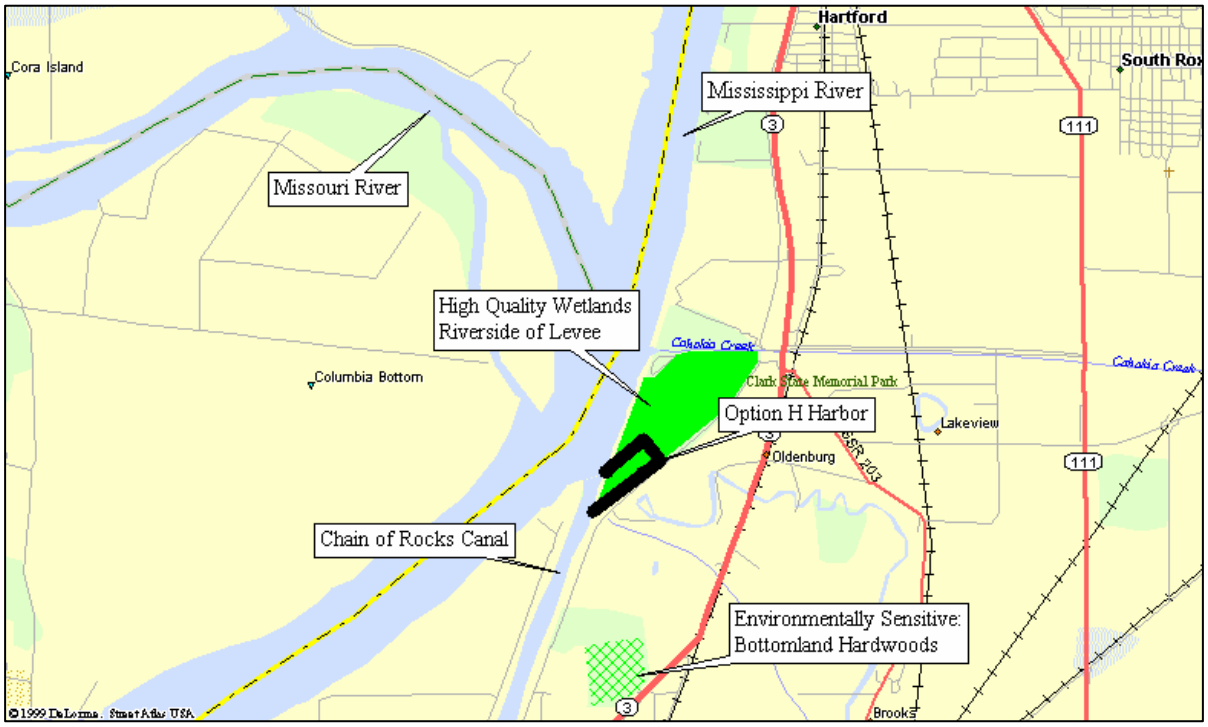


Part of refining the scale or magnitude of the project was to first update the authorized project costs and benefits. The results of the cost update showed that the Illinois elements of the authorized project would cost $37,500,000 in October 1997 dollars. This was for a Phase I 3,450-foot harbor (Option E) and a Phase II 3,450-foot extension of that harbor (Option D). Other Illinois alternatives from the 1982 feasibility report cost more. The Missouri element (PRAIS) cost an additional $18.5 million in October 1997 dollars. Benefits from the 1982 feasibility report were based on tonnage projections for the Port of St. Louis that have not been met. Updated tonnage projections show more modest growth in tonnage. The initial benefit recalculation showed project benefits for all elements to be $19,600,000, indicating that the authorized project was infeasible. Phasing the authorized project reduced project costs to $30,600,000, which is still infeasible.

For the second iteration, the study team chose to review what project alternatives would be feasible given the expected benefits. This included reviewing both the cost of each option and the likely elimination of constructing two phases. Assuming that the authorized project had each phase cost roughly the same, either Option D or Option E at 3,450 feet long by 210 feet wide would cost about $18,750,000, just under the available benefits. The study team therefore chose to eliminate Option C as infeasible because its size of 5,100 feet long by 210 feet wide was almost 50% larger and the expected cost would therefore be significantly higher. Additionally, National Robinson LLC began construction of a steel fabricating plant in 1998 at approximately the location where the Chain of Rocks East levee would be set back to create an extension of the existing harbor. This eliminated the possibility of constructing Option A and Option B.

The remaining or surviving Options were therefore D, E, F, G, and H. The next step was to compare these similarly sized options with respect to environmental concerns, policy issues, and utility relocation costs. Option H, at the north end of the Chain of Rocks Canal, is in a location with very high quality wetlands. Expected adjacent industrial development appeared likely to negatively impact the last remaining virgin bottomland hardwood forest in the American Bottoms, a wide floodplain region over 25 miles long. If any other option was economically feasible, Option H was considered to be infeasible because it had by far the highest environmental impacts.

Figure 4-5. Wetland and Hardwood Areas Near Study Area.



4.1.3.2. Option I: The former Charles Melvin Price Support Center

In 1999, the Tri-City Regional Port District (Tri-City) requested that the Corps add the Charles Melvin Price Support Center (CMPSC, also once called the Granite City Army Depot) as an alternative location to be considered for a harbor facility. The Support Center had a dock facility in the past. Although it had once been a significant Army depot, the National Defense Authorization Act for Fiscal Year 2001 conveyed the property to the Tri-City Regional Port District. This site has since been renamed River's Edge. Several factors make this a rational site for a harbor facility. It has urban flood protection for about 752 acres. Roads, electricity, and stormwater sewers are in place, and a railroad line is connected to the Support Center. There are no wetlands on the Support Center except for two small slivers along the eastern edge of the facility near Illinois Route 3.

Figure 4-6. Location of the former Charles Melvin Price Support Center, Chain of Rocks Canal, St. Louis Municipal Dock, and the Merchants Bridge.

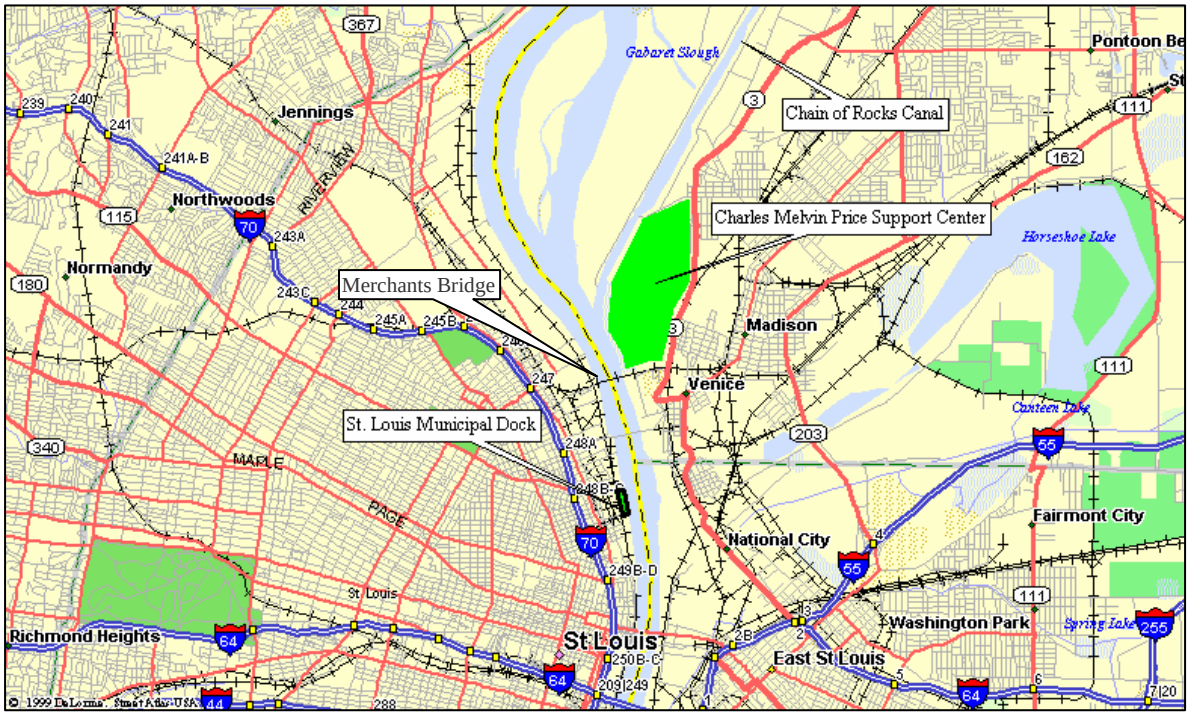


Figure 4-7. Existing Tri-City Regional Port District facility on the Chain of Rocks Canal, just up from Locks 27, looking south. Charles Melvin Price Support Center is in the center of the photograph, and the St. Louis skyline is at the top of the photo.

From the mouth of the Chain of Rocks Canal to the Merchants Bridge at the southern edge of the Support Center there is about 3,600 feet of shoreline on the left descending bank of the Mississippi River from which to create a harbor. The distance from the levee toe to the ordinary high water mark shoreline is at least 800 feet. This allows for a new harbor to be cut into the land without setting the levee back. By comparison, the harbor options along the Chain of Rocks Canal do require levee setbacks. This land riverside of the levee is owned by the Department of the Army and managed by the St. Louis District. The land is inundated frequently enough by the Mississippi River during the growing season to qualify technically as wetlands, although not of the quality of the area where Option H was considered.

Various alternatives were developed for a harbor at this location adjacent to the CMPSC, and are roughly centered on an old T-shaped cobblestone dock. Variations in the alternatives included the elevation of the work platform, the backset from the river, and the length or size of the dock or platform area used to load the barges. A larger platform uses more of the material that is excavated to create the harbor, thus reducing a landside disposal need. A smaller platform requires more landside disposal, but is less costly to construct. Both options would use disposal material to provide landside

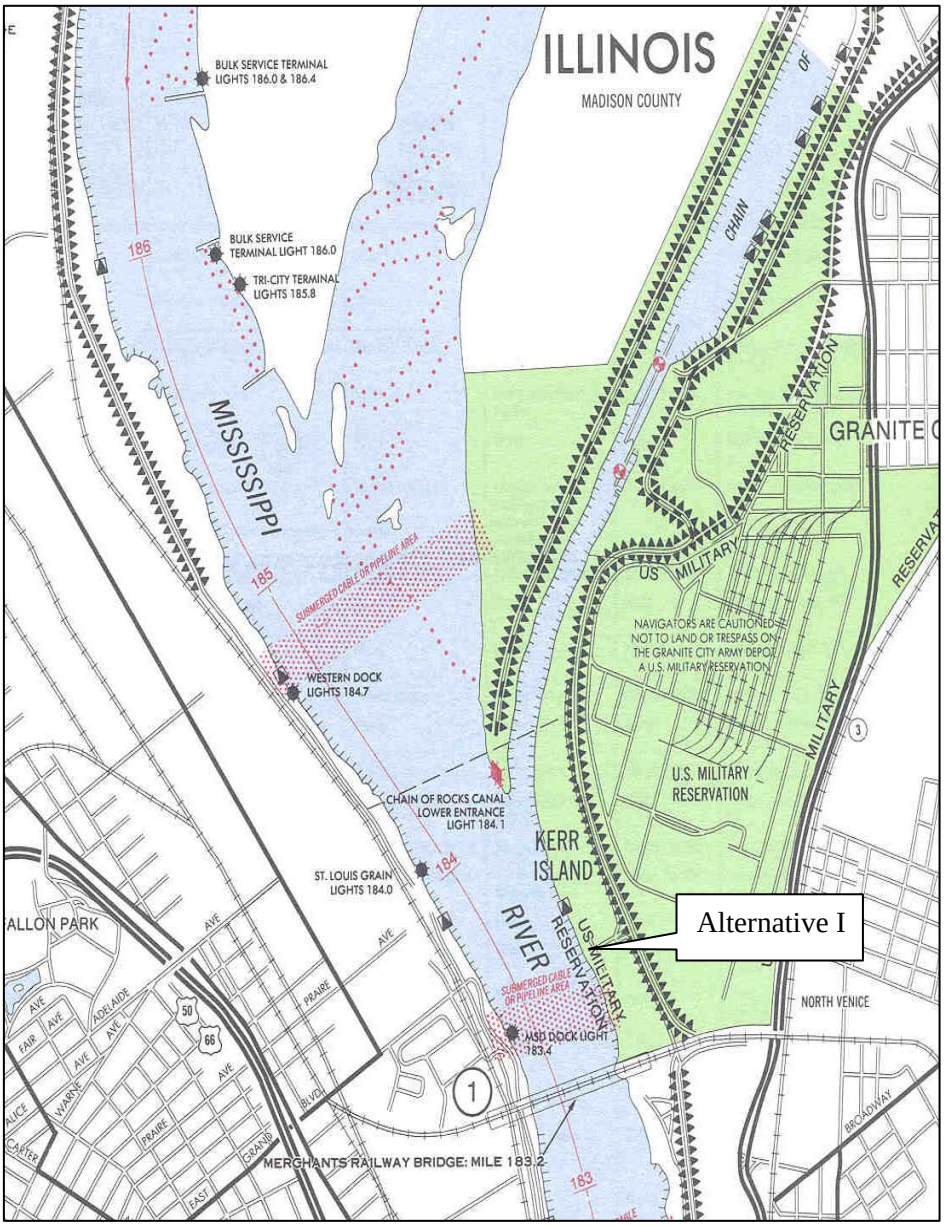
embankment for railroads to get up to the height of the closure structures cut through the existing levee and for roads to go over the levee. Decreasing the elevation of the work platform makes it more frequently flooded, and causes the railroad closure structures to have to cut more deeply into the levee, but has less impact on the floodway.

Some disadvantages of the Option I alternatives are that the available land for development is only 752 acres (which is less than the total demand for 840 acres over the next 50 years), whereas the alternatives along the Chain of Rocks Canal have well more than 840 acres of flood-protected land available for development. Other disadvantages of the Alternative I location it that it is on the main stem of the Mississippi River and therefore susceptible to higher flow velocities, and it is immediately upstream of the Merchants Bridge over the Mississippi River.

To provide the required public access to the harbor, the project would have a rail loop pass through railroad closure structures in the existing levee, and a road going over the levee to a working platform at elevation 430 NGVD next to the harbor cut. Adjacent to the working platform would be a bulk loading facility for commodities that can be loaded and unloaded via conveyor or pipeline.

In the U.S. 106th session of Congress, House Resolution 5408 (Section 2833) was introduced that conveyed the entire CMPSC to the Tri-City Regional Port District. Per the resolution, the Corps still operates and maintains the Federal levee protecting the CMPSC, and still "owns" the navigational servitude land where the harbor Alternative I is located.

Figure 4-8. Alternative I at the former Price Support Center.



4.1.3.3. Opportunities in Illinois: the Environmental Enhancement Area.

The 1992 Letter Report described environmental enhancement land on the land side of the Chain of Rocks Canal East Levee in the vicinity of Chouteau Slough. This opportunity for enhancement has not been pursued in the current General Reevaluation Report because the St. Louis District owns the land. The description that follows is taken from the Rivers Project Master Plan for the Chouteau Slough Area: The area is managed

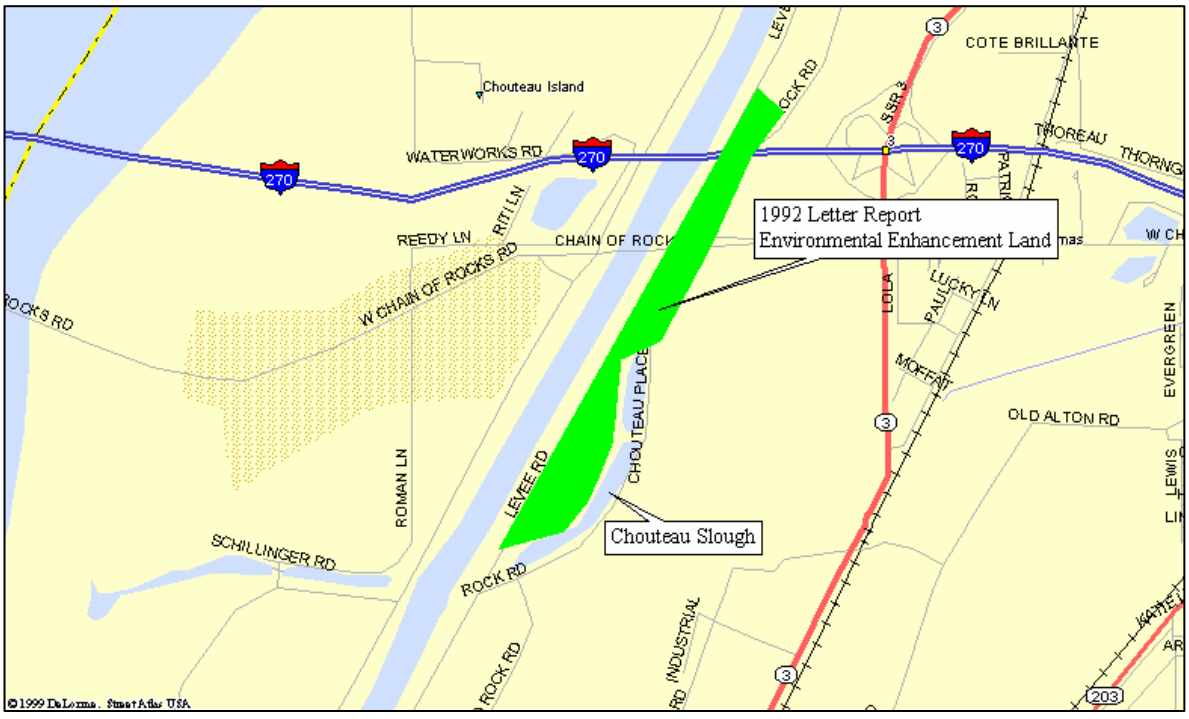
to restore permanent vegetative cover for native plant community restoration and wildlife habitat. This area consists of old fields, riparian bottomland forest remnants, and disturbed areas that provide resident, migratory, and endangered and threatened species habitats. The majority of the old fields has been replanted with bottomland forest species or has undergone natural succession. Other old fields have been kept clear by mowing and burning for future conversion to prairie habitats. The area offers excellent educational opportunities to the public as a riparian habitats restoration demonstration area.

The natural hydrology has been altered by the Alton to Gale Levee System with groundwater levels near 405.0 NGVD. The natural resources have been altered by agricultural clearing, and levee, ditch and road construction. The natural ridge and swale topography and soils have not been altered. Natural succession during seepage inundation of the flood of 1993 has naturally restored native wetland plant communities in the lower swale elevations.

The area is primarily managed to sustain and restore natural riparian forest, prairie and wetland communities through natural succession and restoration plantings, silviculture techniques, succession control and native plant introduction for old fields. The area is open to regulated hunting and trapping in coordination with the IDNR. No proposed development is planned. No future development is planned.

The area is expected to change land use as repairs are made to the Chain of Rocks Canal East Levee. Some of the vegetative management area will be converted to a landside berm adjacent to the levee to control underseepage, and some will be lost to the construction site of a new pump station.

Figure 4-9. Environmental Enhancement Land as Recommended in the 1992 Letter Report.



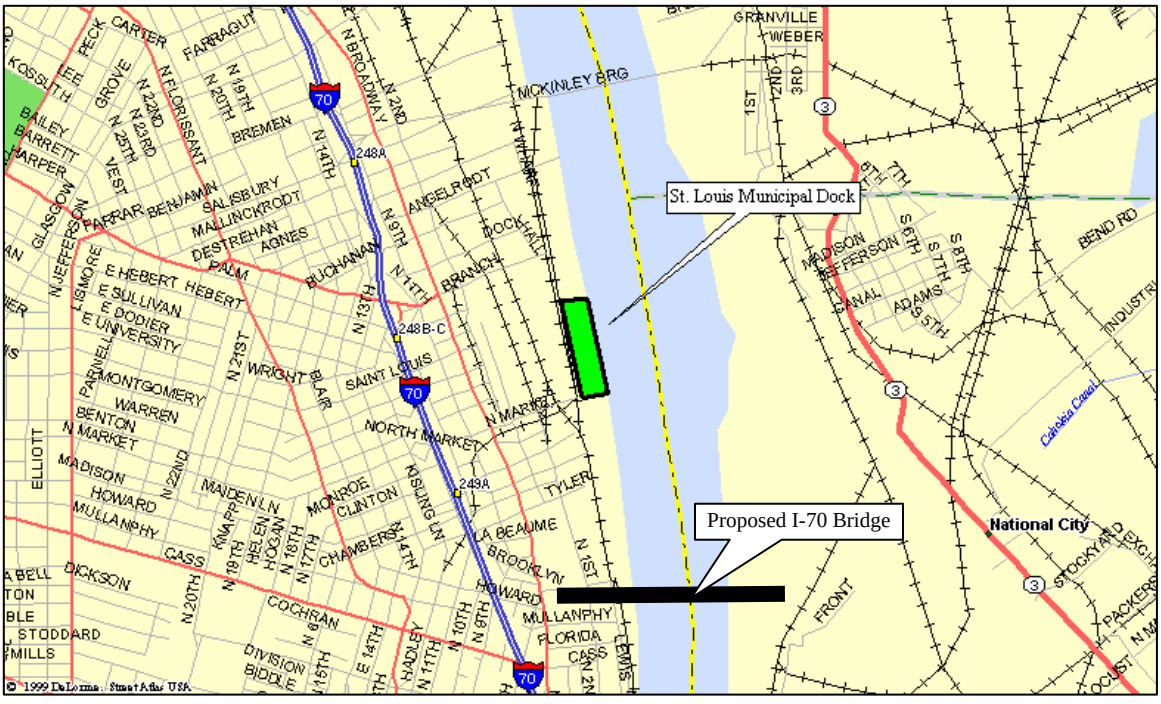
4.1.3.4. Opportunities in Missouri: St. Louis Municipal Dock Sedimentation Issue

The St. Louis Municipal Dock suffers from a lack of access during low water periods and has suffered from sedimentation buildup in the past. Because of the gentle curve in the bend of the Mississippi River at this location, the deposition of sediments is not always on the inside of the bend. Rather, deposition areas shift back and forth across the channel and are not static. While there currently are few sedimentation problems at the Municipal Dock, river shifts and droughts will cause problems in the future. However, the "Sedimentation and Navigation Study of the Middle Mississippi River in the St. Louis Harbor", completed by the St. Louis District's Applied River Engineering Center in 2004, recommends modifications to river training structures through the regulating works program that will reduce the chance of problems in the future.

The Prototype River Access Improvement Structure, or PRAIS, proposed in the 1986 reevaluation report would guide the river currents to prevent sediment buildup at the Municipal Dock. However, the economic justification for the PRAIS came with the increased availability of industrial land in the vicinity of the Municipal Dock.

The Municipal Dock is within the north riverfront industrial corridor, which contains many small parcels of land and many buildings. While most of the buildings in this area are decades old, the majority of buildings are still occupied. The City of St. Louis is not preparing the large-scale land clearing in this area necessary to create the 30 to 90-acre tracts needed by the bulk commodity users that depend upon river transportation. As such, there is little economic benefit to be derived from creating the PRAIS at the Municipal Dock.

Figure 4-10. Location of the St. Louis Municipal Dock



4.1.3.5. Key Assumptions.

The City of St. Louis will continue to have difficulty assembling large tracts of land near the Municipal Dock that are required to attract large industrial harbor users.

The proposed new Interstate 70 bridge over the Mississippi River does not necessarily have any impact on considering the expansion of the St. Louis Municipal Dock or on the use of land adjacent or associated to the Municipal Dock. In July 2001 the design for the bridge was selected (a large cable-stayed bridge with a main span crossing the width of the Mississippi River). The approach to the bridge will tie in to I-70 near 9th and Howard Street--about one mile north of Eads Bridge and about 1.3 miles south of the McKinley Bridge, and about 7 city-blocks southwest of the Municipal Dock.

A 1994 report on the possibility of unexploded ordnance at the former Granite City Army Depot reported a location of an Explosive Ordnance Disposal demolition range site riverside of the levee, north of the abandoned wharf. The report concluded that it was “extremely unlikely” that ordnance and explosive waste or unexploded ordnance hazards still remain at the disposal site. Although this location has not been given any conclusive final site clearance for safety, it is assumed that after a planned future site inspection the area will be deemed safe for development.

4.2. Review of Alternative Plans

4.2.1. Planning and Project Objectives

The planning objective for this GRR is to:

- determine "the advisability of providing improved commercial harbor facilities at and in the vicinity of St. Louis, Missouri."

- to examine the "evacuation of waters collecting on the land side of the Chain of Rocks Canal East Levee.”

- identify the plan that maximizes net National Economic Development (NED) benefits while minimizing adverse environmental impacts and avoiding other undesirable consequences. Additionally, the planning objective is to formulate plans that meet valid social, environmental, economic, and engineering objectives.

4.2.2. Planning Constraints

General planning constraints for this study are defined by applicable Federal laws and regulations that include, but are not limited to:

- the "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies." These guidelines direct that Federal projects should only seek to be economically justified.

- Executive Order 11988, Floodplain Management. Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impacts of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

- the National Environmental Policy Act (NEPA). This act requires that an Environmental Assessment shall be conducted and coordinated with other agencies and the public, from which a Finding of No Significant Impact (FONSI) is signed, or from which a determination may be found to prepare an Environmental Impact Statement (EIS).

- the Farmland Protection Policy Act. This act requires that the Corps contact the Natural Resources Conservation Service for identification of prime or unique farmland which might be impacted by proposed Corps actions.

- the Clean Water Act. This act requires that a determination be made as to whether a permit is required for the placement of fill in waters of the United States, and provides for the regulation of water quality.

- Executive Order 11990, Protection of Wetlands. Agencies are directed to provide leadership and take action to minimize the destruction or modification of wetlands and to avoid direct or indirect support of construction in wetlands wherever there is a practical alternative.

- the Fish and Wildlife Coordination Act. The U.S. Fish and Wildlife Service will receive funds to prepare a report that assesses the recommended plan's impacts on fish and wildlife objectives.

4.2.3. Evaluation of Alternatives

4.2.3.1 Plan Formulation and Evaluation Criteria

1. **Completeness**. The extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects.

2. **Effectiveness**. The extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities.

3. **Efficiency**. The extent to which an alternative plan is the most cost effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment.

4. **Acceptability**. The workability and viability of the alternative plan with respect to acceptance by State and local entities and the public (and the Corps and the local sponsor) and the plan's compatibility with existing laws, regulations, and public policies.

4.2.3.2. Environmental Criteria

(1) Design the harbor or harbor appurtenances so as to minimize adverse environmental effects.

(2) Avoid or minimize the environmental impact on adjacent areas from construction activities.

4.2.3.3. Economic Criteria.

(1) Planning for National Economic Development. During this investigation, various alternative plans were developed and compared in terms of their economic viability by determining net benefits. Net benefits for an alternative plan are derived as follows:

a. the first costs of construction are estimated. This estimate includes a contingency, engineering and design costs for preparing plans and specifications, and costs for construction management;

b. the first costs (e.g., construction and construction management) are annualized over the life of the project (50 years), and added to an estimate of annual operation, maintenance, and rehabilitation costs. The interest rate used to determine average annualized costs was 6.375 percent for the alternatives initially considered starting in 1997. Projects recommended for further comparison in October 2004 dollars would use an updated 5.375% interest rate. A project life of 50 years is considered appropriate for this project.

c. the average annual benefits are calculated by finding the difference between average annual damages occurring with versus without the plan; and,

d. net benefits are then calculated by subtracting the average annual costs from the average annual benefits.

The National Economic Development (NED) plan is the plan that maximizes the difference between average annual benefits and average annual costs. This difference is also known as average annual net benefits. The Federal objective is achieved in water resources planning by identifying and recommending the NED plan that is also consistent with protecting the nation's environment. In addition, the NED plan must have a BCR

over 1.0 to be considered economically justified. The Corps normally must recommend the NED plan unless the Assistant Secretary of the Army for Civil Works grants an exception. There are guidelines for determining the compelling reasons for granting such an exception.

The economic evaluation procedures used to determine the efficiency of a plan are Corps-wide and established in the Water Resources Council's (WRC) "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies," Chapter II - "National Economic Development (NED) Benefit Evaluation Procedures."

(2) Tangible and intangible benefits must exceed costs when analyzed on the basis of current prices. For this report a 5.375 percent discount rate was used and an economic life of 50 years using October 2004 price levels.

(3) Computations of benefits for land enhancement must be based upon current market appraisals compared to with-project conditions.

Details of the economics analysis are in Appendix A. The economic analysis indicates future tonnage growth in food and kindred products, such as grain, as the majority of increased tonnage to be handled in the Port of Metropolitan St. Louis. Initial benefit calculations were derived from a 2000 forecast of tonnage in the Port of Metropolitan St. Louis for 2000 through 2050. This growth in the tonnage handled is expected to require additional landside facilities for processing. These facilities require an average of about 60 acres each time one is developed. The economic benefit for the project is based on lower site development costs at one location than developing multiple smaller locations with varying degrees of suitability for harbor sites. This analysis has generated an estimated average annual economic benefit of $2,525,490 in 2004 dollars. This is based on lower site development costs for 840 acres over a 50-year period. A harbor site with all necessary landside facilities that can be constructed for under about $21,900,000 (in 2004 dollars) plus interest during construction and operation and maintenance costs will have a positive benefit to cost ratio.

The most recent forecasts available are from the Draft Upper Mississippi River - Illinois Waterway System Navigation Feasibility Study printed in April 2004. Unfortunately the data presented in that study focuses on tonnage going through locks, and the commodity types and groupings are not the same as used in either the 1982 feasibility report or the projections made in 2000. For example, in the 2000 Report, both commodity types Grain and Food & Kindred have separate commodity tonnage projection streams, while in the 2004 Study both Grain and Food & Kindred are combined with other commodity types under Agriculture and Forestry to generate only one commodity tonnage projection stream. Data showing actual tonnage in the Port of Metropolitan St. Louis from 1999 to 2002 show discrepancies from the long-term projections of certain commodities made in 2000. For example, coal tonnage shipments of over 12 million tons in both 2001 and 2002 exceed those projected though 2050 of about 10.3 million tons. However grain tonnage has for some reason decreased from 5.96 million tons in 1999 to 5.35 million tons in 2000, 5.16 million tons in 2001, and

5.125 million tons in 2002. Although this short-term data does not negate the long-term projections, it does provide a reason to be cautious about the economic benefits of a new harbor based on expected future shipments of grain.

An alternative consideration for checking the approximate economic benefits of a project is the increased lease value of land with an adjacent harbor. The estimated increase in land value for lands in the Port of Metropolitan St. Louis is $1,070 per acre in 2004 dollars, as land without adjacent harbor access is leased at an average of about $2,140 per acre, while land with adjacent harbor access is leased at about $3,210 an acre. For the River's Edge, the former Charles Melvin Price Support Center, the maximum average annual benefit for lease value over 50 years is $1,336,420. That level of economic benefit would support a project that costs up to about $18,700,000 for initial construction, plus interest during construction and long term operation and maintenance costs, in 2004 dollars. Project costs would include all items necessary for the harbor to function, including local service facilities such as a crane, conveyor belt, working platform, and berthing area. Having cranes transfer grain from barges to conveyor belts is the typical operation for unloading grain at a harbor.

4.3. Alternatives Considered

This list of alternatives does not include the 12 or 14 "sample" sites discussed in Chapters 4 through 8 of the Economic Appendix. The Economic Appendix discusses a methodology by which those sample or possible sites could be developed by private industry within the study area to meet the need of projected tonnages shipped in or out of the port of St. Louis. Examination of the costs of private industry developing these possible sites is used to calculate benefits. These "sample" sites were among the 36 sites identified for the 1982 Feasibility Report.

Alternative 0. No Federal Action. This plan would result in no Federal project leading to the development of plans and specifications proceeding to neither construction of a new harbor nor the improvement of an existing harbor. Private or non-Federal interests could--without Federal participation- improve or develop harbors as they deemed necessary.

Alternatives A through H are on the Chain of Rocks Canal, left descending bank, on Corps-owned property. Stationing is along the Chain of Rocks East Levee.

Alternative A. 138+00 to 156+00. This harbor alternative is located immediately upstream of the existing Tri-City port facilities, and would be 1,800 ft. long by 210 ft. wide. It was formulated in 1991 at the request of Tri-City, and was recommended as the Phase 1 harbor portion in the 1992 Letter Report (Phase 2 is Alternative C, below). The site is now occupied by new National Robinson factory.

The 1982 Feasibility Report recommended a harbor portion along the Chain of Rocks Canal, upstream of and separated from the existing Tri-City facilities. That plan had two

equal 3,450 ft.-long phases. In 1991 at the request of Tri-City Phase 1 was decreased to 1,800 ft. and shifted downstream to be contiguous with the existing Tri-City facilities. The 1982-recommended Phase 2 portion was lengthened from 3,450 to 5,100 ft. and then recommended as the Phase 2 harbor portion in the 1992 Letter Report, and is now called Alternative A.
to make Phase 1 contiguous with the existing Tri-City facilities.

Alternative B. 138+00 to 156+00. This harbor alternative is in the same location as Alternative A, but this alternative is 400 ft. wide rather than 210 ft. in order to match the width of the existing Tri-City port facility. This site is now occupied by new National Robinson factory.

Alternative C. 211+00 to 262+00. This alternative was formulated in 1991 at the request of Tri-City and was recommended as the Phase 2 harbor portion in the 1992 Letter Report. It is 5,100 ft. long by 210 ft. wide. It is 5,500 ft. upstream of, and not contiguous with the Phase 1 portion of the 1992 Letter Report recommendation (now termed Alternative A). This location of this alternative (as compared to the 1982 Phase 2 portion) was moved upstream, the overall length increased, and the separated from Alternative A (what had been Phase 1 of the 1982 Feasibility Report) by 5,500 ft.

Alternative D. 193+00 to 227+00. This alternative is Phase 1 of the harbor portion as recommended in the 1982 Feasibility Report. This is a 3,450 ft. long by 210 ft. wide harbor. The 1982 Feasibility Report evaluated four structural plans (1 through 4) and one non-structural plan (Plan 5), and recommended Plan 4, which was Plan 1 (the PRAIS) plus the phased construction of Plan 2 (the harbor). Plan 2 was composed of two equal and contiguous portions: Phase 1 and Phase 2, and are shown in the 1992 Letter Report in Plate 2.

Alternative E. 227+00 to 262+00. This alternative is Phase 2 of the harbor portion as recommended in the 1982 Feasibility Report, and is a 3,450 ft. long by 210 ft. wide harbor. This alternative is upstream of and contiguous to Alternative D, above.

Alternative F. 164+00 to 200+00. This harbor alternative would be 3,600 ft. long by 210 ft. wide. It would begin 800 ft. upstream of where Alternative A ends, and would extend 3,600 ft. upstream and end 1,100 ft. downstream of the location of Alternative C. This alternative was formulated after the 1992 Letter Report.

Alternative G. 164+00 to 200 +00. This harbor alternative is the same location and length as Alternative F, but has a width of 400 ft. rather than 210 ft.

Alternative H. 400+00 to 433+00. This alternative was formulated after the 1992 Letter Report, and is located at the upstream end of the Chain of Rocks Canal. This site is relatively undeveloped and considered environmentally sensitive.

Alternatives I-1, I-2, and I-3. Alternatives designated "I" at the former Charles Melvin Price Support Center (CMPSC). The location of these harbor alternatives is on the left

descending bank of the Mississippi River immediately downstream of the confluence of the Chain of Rocks Canal and the Mississippi River, and is adjacent to the former CPMSC.

Some of the things that could vary at this location include the length or size of the platform area used to load the barges, the width of the harbor or the distance the loading platform area would be backset from the river, and the elevation of the work platform.

A higher working platform slightly increases backwater impacts, but it also increases the duration that the platform would be out of the water and usable during higher water elevations on the Mississippi River. A low elevation for the working platform decreases backwater impacts, but decreases the days that the platform is usable (not inundated) and it increases handling problems of moving cargo from the platform up and through the levee. Alternative I-3 was developed when addressing impacts due to backwater.

Alternative I-1. CMPSC. This alternative has a public access terminal platform composed of 3 sheetpile cells. The platform is at an elevation of 430 feet NGVD, approximately the height of a 100-year flood. The rest of the project is a bulk loading area with a riprap-protected bank.

Alternative I-2. CMPSC. This alternative is a public access terminal platform composed of 7 sheetpile cells, also at an elevation of 430 feet NGVD. The rest of the project is a bulk loading area with a riprap-protected bank.

Alternative I-3. CMPSC. This alternative is a public access terminal platform composed of 3 sheetpile cells. The platform is at an elevation of 422 feet NGVD. This is approximately the elevation at which navigation stops. The rest of the project is a bulk loading area with a riprap-protected bank.

Alternative J. Prototype River Access Improvement Structure (PRAIS). This was a structure to be built adjacent to the St. Louis Municipal Dock to reduce or eliminate sedimentation at that site. The PRAIS was based on a 1987 Value Engineering Report following the 1986 Reevaluation Report that found that the 1982 Feasibility Report-recommended "L" dike concept by WES not to be effective. The PRAIS design was revised for the 1992 Letter Report.

Alternative S. The potential sponsor, Tri-City Regional Port District, prefers a harbor located just downstream of the Chain of Rocks Canal at their River's Edge complex at the former Charles Melvin Price Support Center. Their preferred configuration, or Alternative S, would require somewhat less excavation than Plan I-1, 519,000 cubic yards of material compared to 690,000 cubic yards of material. Plan I-1 was estimated to cost $16,700,000, including General Navigation Features that are cost-shared 80% Federal and 20% non-Federal, and Local Service Facilities that are 100% non-Federal. The majority of costs would be for items that are 100% non-Federal Local Service Facilities. In comparison, alternative S is estimated to require only 112,000 cubic yards of this material for landside fill adjacent to the harbor, leaving approximately

407,000 cubic yards of material to dispose of landside of the levee. That disposal would cost an estimated $900,000 if there were a large area of land where the material could be easily disposed. Spreading material to a uniform thickness of one foot would require approximately 253 acres. Given that the majority of the 752-acre River's Edge (former Charles Melvin Price Support Center) is open space, this might be possible, but it is a concern regarding the viability of this alternative. Disposing of the material farther away than the River's Edge complex would increase costs with distance, and would likely require land acquisition or easements that would further increase costs. Mitigation requirements for Alternative I-1 were approximately 52 acres of created wetland to mitigate for 26 acres of impacts at a net 2:1 ratio. The exact Section 404 Clean Water Act requirements for the sponsors preferred plan are not known and have not been included in a cost estimate for Alternative S. The area is forested and is subject to frequent inundation from the Mississippi River. Figure 14 on the following page shows an artists rendering of the sponsors preferred plan.

Figure 4-11. Artists Rendering of Sponsors Preferred Alternative

4.3.1. Navigation Safety Concerns

In October 2000 several members of the planning team met with members of the River Industry Action Committee (RIAC). RIAC voiced several concerns about navigation safety if a harbor is constructed near the former Charles Melvin Price Support Center just below the mouth of the Chain of Rocks Canal. The principal concern was that this reach of the Mississippi River below the Canal is somewhat difficult to navigate in its existing condition because the direction of the navigation channel is along the left descending (Illinois) bank, while the main stem Mississippi River current flows from the right descending (Missouri) bank to the left descending (Illinois) bank.

The close proximity of the sponsors preferred plan to Locks 27 causes many concerns for the lock operators. The through traffic of barge tows entering and leaving the canal and locks causes safety concerns if barges are loading and unloading at the harbor and need to back into the main channel for maneuvering and configuring tows. Other proposed fleeting activities just downstream from this location met with considerable river industry opposition because of the traffic congestion in an area that is relatively narrow, has many bridges, and often has tows waiting in this area when there is a backlog for entry into Locks 27. The Tri-City Regional Port District has offered to address these safety concerns if their preferred plan is constructed, and is willing to construct tow hold points such as mooring cells or other features as needed to ensure navigation safety. Their views are shown in Appendix B.

4.3.2. Policy Considerations

Paragraphs 3-2.d.(2) and E-13 of Engineering Regulation 1105-2-100 state a policy that Federal participation in inland waterway harbor improvements is not warranted when: (1) resale of lease of the lands used for disposal of excavated material can recover the cost of the improvements; or (2) the acquisition of land outside the navigation servitude is necessary for construction of the improvements, or would permit local interest to control access to the project. This policy was developed, at least in part, from Administration review of the St Louis Harbor project report in the late 1980's. The Office of the Assistant Secretary of the Army for Civil Works (OASA(CW))and the Office of Management and Budget (OMB) did not support Federal participation in development of the proposed and authorized project at that time. In a 22 May 1987 letter to the House of Representatives, OASA(CW), with the support of OMB (letter dated 9April 1987), stated that, "…local interests can finance the project and secure their costs from users who would benefit from the availability of additional flood-free lands and land with navigation access for waterfront development."

4.4 Selection of the Recommended Plan

Since all of the alternatives considered provide river access to flood-free lands, thereby enhancing land values, they are not in accord with Corps budget policy. The selected plan is therefore Alternative 0, the no Federal action plan.

5. Summary of Coordination, Public Views, and Comments

The potential cost-sharing sponsor, Tri-City Regional Port District, prefers the construction of a new harbor facility adjacent to their River's Edge campus, the former Charles Melvin Price Support Center. Their current preferred configuration was not analyzed in detail since the configuration was envisioned after initial policy review. If implemented under typical cost-sharing requirements as described in Public Law 99-662, the Water Resources Development Act of 1986, as amended, the vast majority of first construction costs would be 100% non-Federal Local Service Facilities. Any non-Federal interests wishing to implement this alternative will be required to obtain state and local permits, as well as a Section 10 Rivers and Harbors Act permit and a Section 404 Clean Water Act permit. The River Industry Action Committee expressed many concerns about navigation safety when they reviewed a proposed harbor at the former Charles Melvin Price Support Center, now called the River's Edge. Since that time several issues about navigation safety and Locks 27 access have been addressed by the Tri-City Regional Port District in their letter in Appendix B. Construction should not proceed until the former Explosive Ordnance Disposal Demolition Range is cleared as safe for development.

6. Recommendations

I recommend that Federal participation in a plan of improvement is not warranted at this time and that this investigation be terminated. To the extent that a new harbor facility is economically justified in the Port of Metropolitan St. Louis, local interests may invest in such a facility and recover the costs of their investments through sale or lease of adjacent lands and through user fees.

LEWIS F. SETLIFF III
COL, EN
Commanding

APPENDIX A

ECONOMICS APPENDIX

ECONOMICS APPENDIX

I. Introduction

This Appendix addresses the National Economic Development (NED) contributions of potential alternatives involving the construction and operation of a multiple site harbor facility within St. Louis Harbor (Mississippi River Mile (RM) 150-220). Project alternatives consist of various harbor facility designs at (RM) 183-186 and an additional harbor facility design at approximately (because it is located in the Chain of Rocks Canal) RM 187, both on the Illinois side of the Mississippi River. The NED contributions are defined as "increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the nation. Contributions to NED include increases in the net value of those goods and services that are marketed, and also of those that may not be marketed." (*Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, p. 1, March 1983.) In accordance with Engineering Regulation (ER) 1105-2-100, dated January 2000, a NED benefit-cost analysis is undertaken to assure that the value of the outputs (the NED benefits) produced via the characteristics of the St. Louis Harbor facility exceeds the value of the inputs used (the NED costs) to construct and operate the facility.

Important assumptions used in the NED evaluation of potential alternatives for the St. Louis Harbor Project are (a) all benefits and costs are expressed in October 2004 price levels unless noted; (b) The project discount rate for the evaluation of NED benefits and costs is 5.375 percent; (c) The project base year is 2002; (d) The project period of evaluation is estimated at 50 years with appropriate operation, maintenance and replacement; (e) Resources have alternative uses and consequently, opportunity costs; (f) Individuals are risk neutral and rational economic agents; and (g) All elevations are expressed in feet and are understood to represent "Ft. NGVD" (Feet. National Geodetic Vertical Datum).

2. Background

The National Economic Development benefits expected to be realized with the construction of the St. Louis Harbor Project are dependent upon commodity tonnage projections and the need for future site development to handle such tonnage. St. Louis is an important node in the waterway transportation network for a spectrum of commodities. The transshipment patterns as well as the actual and projected tonnage for the following commodities – grain, cement, chemical, food and kindred, and coal – are analyzed in this Report. Grain tonnage is primarily transshipped from the St. Louis Harbor (hereto: Harbor) area to Gulf Coast ports for export. Grain tonnage is comprised mainly of corn, wheat, soybeans, and oats and is produced in areas surrounding the Harbor. These commodities constitute 99 percent of the total growth in tonnage projected for the Harbor. The transshipment of chemical tonnage contributes significantly to commodity movement within the Harbor. Specific

chemicals handled within the Harbor include alcohol, benzene, toluene, crude tars, sulfuric acid, sodium hydroxide and a variety of chemical fertilizers. The transshipment of food and kindred tonnage is comprised mainly of grain mill products, most of which are shipped to gulf Coast ports for export. Wheat flour, sugar and molasses also represent significant portions of food and kindred tonnage, and are transported to and from all major nodes of the inland waterway transportation network. Cement produced in the Harbor is shipped to several points on the waterway in relatively high annual volume. Cement tonnage is generally delivered on short hauls via mixer truck, while rail and barge supply transshipment for longer hauls. However, analysis indicates the bulk of these longer haul transshipments are made via waterway. Therefore, this Report concentrates on industries covering multi-state market areas, thus requiring significant barge transport for their operation to remain competitive. Analysis of present coal transshipment patterns indicates much of the coal being shipped is bound for nodes on the Upper Mississippi River, namely Minnesota and Wisconsin. Utilities are the major receivers of coal, though the transshipment tonnage for coal will not be of the magnitude it was in the 1980s.

Observation of projections used in the 1982 St. Louis Harbor Report (hereto: 1982 Report), compared with actual tonnage handled within the Harbor for the period 1980 through 1995, are presented in Table 1. As illustrated, the projected tonnage did not materialize. The error in the projections as a percent of the actual tonnage observed ranged from 10 percent in 1980 to almost 100 percent in 1995.

Table 2 through Table 6 compares actual and projected tonnage for individual commodities within St. Louis Harbor for the period 1990 through 1995. The commodities shown represent approximately 80 percent of all commodity tonnage handled in the Harbor for that period. Grain and cement are the only commodities that met or exceeded projections. Actual chemical as well as actual food and kindred tonnage were well below the projected tonnage in the 1982 Report. Also, projected coal tonnage exceeded actual coal tonnage by 200 percent to 300 percent for the period 1990 through 1995. However, since actual grain and cement tonnage often exceeded projections by significant percentages, the overall annual projected error for Harbor commodity tonnage in the 1982 Report remained below 100 percent.

Table 1
ST. LOUIS HARBOR TONNAGE
ACTUAL AND PROJECTED (1982 Report)
(Millions of Tons)

Year	Actual	Projected
1980	24.5	27.0
1981	24.9	28.8
1982	25.3	30.7
1983	25.7	33.7
1984	26.2	34.8
1985	26.6	37.1
1986	26.7	39.3
1987	26.8	41.6
1988	26.9	44.1
1989	27.0	46.7
1990	27.1	49.5
1991	27.7	51.0
1992	28.3	52.6
1993	28.9	54.2
1994	29.5	55.8
1995	30.1	57.5

Table 2
GRAIN TONNAGE
ACTUAL AND PROJECTED (1982 Report)
(Millions of Tons)

Year	Actual	Projected
1990	6.4	4.0
1991	6.9	4.1
1992	9.0	4.3
1993	7.4	4.4
1994	5.2	4.6
1995	5.5	4.7

Table 3
CEMENT TONNAGE
ACTUAL AND PROJECTED (1982 Report)
(Millions of Tons)

Year	Actual	Projected
1990	1.7	1.3
1991	1.4	1.3
1992	1.6	1.3
1993	1.3	1.3
1994	1.6	1.3
1995	1.8	1.3

Table 4
CHEMICAL TONNAGE
ACTUAL AND PROJECTED (1982 Report)
(Millions of Tons)

Year	Actual	Projected
1990	1.5	2.0
1991	1.6	2.1
1992	1.7	2.1
1993	1.5	2.2
1994	1.6	2.2
1995	1.5	2.3

Table 5
FOOD AND KINDRED TONNAGE
ACTUAL AND PROJECTED (1982 Report)
(Millions of Tons)

Year	Actual	Projected
1990	1.9	3.5
1991	2.1	3.6
1992	2.1	3.6
1993	1.9	3.7
1994	2.3	3.7
1995	2.4	3.8

Table 6
COAL TONNAGE
ACTUAL AND PROJECTED (1982 Report)
(Millions of Tons)

Year	Actual	Projected
1990	6.5	28.2
1991	7.8	29.4
1992	8.4	30.6
1993	8.9	31.9
1994	9.9	33.2
1995	10.7	34.6

3. Other Commodity Tonnage Forecasts

Considering the above-demonstrated inaccuracy of the 1982 Report in projecting commodity tonnage, more pragmatic projections of percentage changes in commodity tonnage, namely those calculated for the Upper Mississippi River-Illinois Waterway System Navigation Study (UMR-IWWS), were used in this Report. Jack Faucett and Associates through the Institute of Water Resources (IWR) created the UMR-IWWS Commodity Projection Report. Table 7 is constructed from the UMR-IWWS Commodity Projection Report's projection of percentage changes in commodity tonnage. These projections are applied to the actual commodity tonnage observed in the Harbor during the year 2000. Tonnage observed in the Harbor consists of: 1. Tonnage originating outside the Harbor and reaching its final destination within the Harbor; 2. Tonnage originating inside the Harbor and its final destination is located outside the Harbor; 3. Tonnage both originating and reaching its final destination within the Harbor. Tonnage that passes through the Harbor (i.e., is neither loaded nor unloaded within the Harbor, and thus does not require loading or unloading facilities) is not included in Table 7. Commodity tonnage is forecast by five-year increments through 2050 (i.e., through the project period of evaluation).

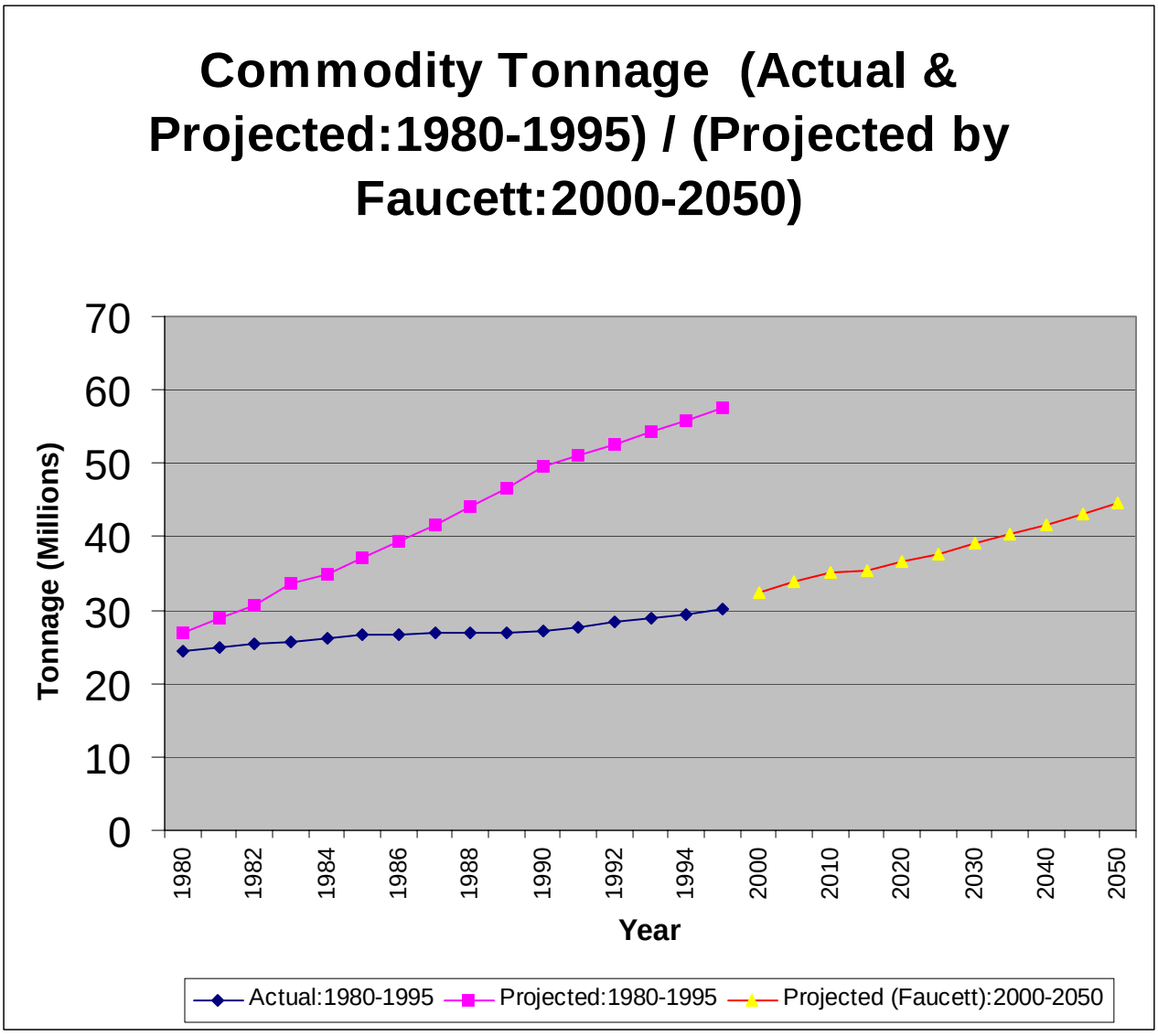
Table 7
PROJECTED ST. LOUIS HARBOR COMMODITY TONNAGE
(In Tons)

Year	Grain	Chemicals Agricultural / Industrial	Metallic Ores / Primary / Metals	Coal	Non-Metallic Minerals / Building Cement	Food & Kindred Products	Petroleum & Coal Products	Waste & Scrap / Other / Lumber & Wood Prod. / Crude	Total Forecast
2000	8,464,466	1,543,291	1,520,391	8,798,561	2,678,450	3,119,296	6,257,280	117,642	32,499,377
2005	9,350,036	1,616,401	1,587,689	8,980,416	2,802,558	3,280,035	6,269,804	126,796	34,013,736
2010	10,018,182	1,686,276	1,664,551	8,980,416	2,923,709	3,404,895	6,263,537	133,595	35,075,160
2015	10,633,873	1,752,205	1,752,927	8,709,835	2,828,492	3,259,337	6,238,523	139,439	35,314,630
2020	11,231,745	1,813,496	1,844,169	8,983,209	2,908,581	3,391,813	6,210,500	145,827	36,529,341
2025	11,851,503	1,873,206	1,938,240	9,164,316	2,992,426	3,519,181	6,185,698	152,358	37,676,928
2030	12,530,221	1,960,002	2,013,021	9,344,419	3,162,234	3,644,089	6,160,994	159,734	38,974,715
2035	13,254,360	2,044,730	2,089,650	9,618,569	3,343,331	3,765,942	6,105,745	167,632	40,389,960
2040	13,999,565	2,126,783	2,168,120	9,797,834	3,538,295	3,884,143	6,020,742	175,661	41,711,143
2045	14,757,439	2,206,648	2,248,420	10,070,255	3,746,481	3,998,097	5,907,214	183,891	43,118,445
2050	15,502,540	2,283,835	2,328,224	10,339,961	3,968,877	4,109,261	5,763,898	192,889	44,489,486

A graphical representation of the Actual and Projected St. Louis Harbor Tonnage for the period 1980 through 1995 (please reference Table 1) along with the Projected St. Louis Harbor Tonnage (Total Forecast) for the period 2000 through 2050 (please reference Table 7) is presented below in Graph 1.

As mentioned above, the Projected St. Louis Harbor Tonnage for the period 2000-2050 was created by Jack Faucett and Associates through the Institute of Water Resources (IWR). A review of Graph 1 reveals a definitive similarity/continuation from the Actual St. Louis Harbor Tonnage line for the period 1980 through 1995 and the Projected St. Louis Harbor Tonnage line for the period 2000 through 2050. Thus the 2000-2050 Projected St. Louis Harbor Tonnage well reflects future commodity tonnage growth for the project evaluation period.

Graph 1
ACTUAL & PROJECTED ST. LOUIS HARBOR COMMODITY TONNAGE
(In Tons)



4. Project Conditions

a. Existing Conditions, Port of Metropolitan St. Louis.

Port Conditions

The existing Mississippi River navigation channel provides a minimum channel depth of not less than nine feet and a minimum width of not less than 300 feet at low water, which is achieved through regulating works such as dikes and weirs, and dredging. Total tonnage handled on the docks of the Port of Metropolitan St. Louis has grown steadily from an average of about 22.75 million tons per year in the 1970's to an average of 31.8 million tons per year from 1996 to 2000. This represents approximately 40% growth in tonnage handled. Through traffic in the port has increased from about 48,400,000 tons in 1972, to 53,200,000 tons in 1977, 65,680,000 tons in 1990, and 72,950,000 tons in 1995. This represents an increase of 50.7% from 1972 to 1995, and 11% from 1990 to 1995 alone.

Waterfront Sites

Many studies conducted by and for local interests have concluded that waterway-related development has been impeded by the lack of suitable waterfront sites. Tonnage handled at the port has not kept pace with the growth in through tonnage. Participant in public meetings have indicated that firms needing waterfront sites have bypassed St. Louis because there were few suitable sites available that did not require considerable modification. Some potential sites have become unavailable for development because the Corps has turned them into ecosystem restoration sites.

Port Management Structure

St. Louis District and the U.S. Coast Guard have primary authority over activities occurring in the channel and along the banks of the Mississippi River. St. Louis District is responsible for operating locks and dams, maintaining the navigation channels and all construction relating to flood control and navigation. The U.S. Coast Guard provides basic navigational aids. The Office of Water Resources at the Illinois Department of Natural Resources (IDNR-OWR) and the Missouri Department of Natural Resources (MDNR) are the primary permitting agencies at the state level.

The seven port authorities or districts within the Port of Metropolitan St. Louis are: the Tri-City Regional Port District (TCRPD), the Southwest Regional Port District (SRPD), the Kaskaskia Regional Port District(KRPD), the Jefferson County Port Authority, the St. Louis County Port Authority, the City of St. Louis port Authority, and the St. Charles County Port Authority. These districts have a variety of powers, such as the issuance of tax-free industrial and port bonds, the power of eminent domain and the authority to construct buildings and make site improvements. Illinois port districts are allowed to issue general obligation bonds. The Bi-State Development Agency (Bi-State) serves as the regional port coordinator. The agency is empowered to issue bonds and perform other duties associated with its role of encouraging regional port development. The City of St. Louis Community Development Agency is empowered to stimulate industrial

development in the City of St. Louis by means of eminent domain, industrial revenue bonds, and city tax abatement.

b. Future Without Project Condition, Port of Metropolitan St. Louis.

Nine of the 14 most economically desirable sites from 1982 are no longer available. The future without project condition now estimates 14 sites will be developed that are even more marginal (meaning even higher development costs of individual site modifications at various Harbor locations over the next 50 years (i.e.; the 50 year project period of evaluation)) than what was available in 1982.

Economic analysis, consisting of extensive field interviews and surveys, indicated that nine (9) of the first fourteen (14) sites from the 1982 Report are no longer available for future private industry development. For example, of the top two (2) sites from the 1982 Report, the first is in a recently developed area just south of the MacArthur Bridge at Mississippi River Mile 178 to 179, Illinois side. The second site is currently being developed into an RV (recreational vehicle) park and wetland area at Mississippi River Mile 171-172, Missouri side. The first fourteen sites from the 1982 Report, as listed in Table 10, are defined as the fourteen sites requiring the least costly modification and, in accordance with Assumption (f), would be the first fourteen sites selected and modified by private industry as future site demand arose. Of the first fourteen sites, those seven sites that have already been developed since the 1982 Report have most likely been developed due to the very nature of their favorable parameters (reliable water access, adequate flood protection, etc.) and associated low modification costs.

5. Economic Methodology

The accrued NED benefits of the Harbor Project consist of: (1) Reduced site modification costs associated with grain, cement, food and kindred tonnage movements; and (2) Reduced chemical transshipment costs associated with chemical tonnage movements. Reduced chemical transshipment costs are discussed in **Section 8. Chemical Transshipment Costs.**

These commodity types, namely grain, cement, and food and kindred, have economic incentive to develop sites within the Harbor area in lieu of the Harbor Project.

Analysis has determined that grain facilities would select the least cost transportation option including an alternative port location. Accordingly, this report considers a range of alternative ports north and south of St. Louis, from Mississippi River Mile 140 northward to Mississippi River Mile 200. Food and kindred facilities as well as cement facilities have been determined to derive a significant benefit from a central metropolitan location; i.e.; St. Louis Harbor. Without available suitable sites, it is determined that these industries would still locate within the Harbor. However, the industries would use either an alternative mode of transshipment, locate off the river and

transship to barge via a public terminal (i.e.; indirect barge), or incur the cost to develop a waterfront site and transship directly via barge.

Consequently, the NED benefits to these commodity types are the reduced site modification costs afforded by the economies of scale in constructing the Harbor Project provided sites adjacent to each other and all at one time, as compared with the higher development costs of individual site modifications at various Harbor locations over the next 50 years (i.e.; the 50 year project period of evaluation). In other words, reduced site development costs would be realized by industries locating on the Harbor Project acreage as future demand dictates. Such benefits are expected to accrue over the life of the project for these commodity types utilizing the project acreage until all available project acreage is completely developed. Subsequently, facilities in need of future commodity transshipment sites are assumed to return to private sites requiring modification, thereby incurring increasing site modification costs. Costs were derived through Spring of 2000 detailed field interviews and analysis of historical data, and reflect October 2000 price levels via the appropriate cost indices from the ENR-CCI.

The economic methodology used in the 1982 Report is also employed in this Report; i.e., estimating the required modification costs associated with private industry modifying individual available sites necessary for the development of facilities to process the projected increased tonnage. All potential sites are evaluated and ranked under numerous site selection criteria. The associated costs of private industry modifying the individual sites are compared with those same associated costs of constructing the Harbor Project site. Thus the Harbor Project would provide twelve (12) adjacent sites and preclude private industry from having to modify twelve individual sites as the demand for such sites arise. The difference in associated costs between private industry modifying the individual sites and the associated costs of constructing the proposed Harbor Project, when translated into average annual dollars, provides an estimate of the average annual benefits for the project.

Again, the economic methodology consists of estimating all associated costs for any minor or major site modifications needed to make twelve individual sites identically suitable for development as the twelve sites provided by the Harbor Project. Potentially necessary site modifications (i.e., potential associated costs) are: reliable water access; adequate urban flood protection; short (500 feet or less) conveyor runs; rail, road and utilities available adjacent to site; relocation and permitting; limited costs for foundation problems; bank setback with and without levee relocation; dredging and mitigation. Environmental losses and impacts on governmental service costs are not quantified, but nevertheless are important considerations.

5. Acreage Needs for Projected Increases in Tonnage

The required site acreage necessary to accommodate the projected increase in commodity tonnage is calculated utilizing the tonnage handled per acre, by commodity type. These tons per acre ratios are derived from extensive field interviews and

surveys in Spring of 2000 as well as historical record analysis. The acreage needs are as follows:

Site	Tons per Acre
Grain	16,667
Cement	8,333
Food and Kindred	10,791
Chemicals	3,219

As shown in Table 6, coal tonnage in the Harbor has clearly not kept pace with the tonnage projected in the 1982 Report. However, coal is not a commodity expected to utilize or benefit from the Harbor Project sites for two reasons. First, the Harbor Project sites would not be well suited to the unique requirements of a high volume coal transshipment facility. Second, because of the large tonnage and small acreage involved in coal transshipment as well as the decreased actualization of projected coal tonnage, future development needs of new coal facilities will not impact the determination of necessary site acreage or the computation of Harbor Project benefits.

Chemical tonnage is also excluded from the determination of future sites needed by private industry, yet is included in the calculation of NED benefits as discussed in **Section 8. Chemical Transshipment Costs.**

These tons per acre ratios, in conjunction with Table 7, generate the acreage needs by commodity and by decade for the Harbor. Results are presented in Table 8. In order to place all sites on an equivalent basis, a representative site size was determined. Site sizes reviewed ranged from approximately a 30-acre site for a grain facility to approximately a 90-acre site for a food and kindred facility. (St. Louis Harbor: Missouri and Illinois Study; Feasibility Report FINAL, Appendix E, p. E-83, September 1982.) Therefore, for estimation purposes, an average facility acreage required of 60 acres per site is employed. The number of future sites necessary for each commodity type is calculated by first dividing the difference in per decade commodity tonnage by the appropriate commodity type acreage needs per tonnage, and subsequently dividing by 60 acres (i.e., the average site size in acres required per facility). Also, the St. Louis Harbor: Missouri and Illinois Study; Feasibility Report FINAL, Appendix E, p. E-83, September 1982, "…discussions with cement manufacturers indicated that a standard modern facility requires approximately 60 acres…" However, it is noted that a constant acreage per tonnage of commodity shipped would require further investigation prior to any possible future construction.

For example, in Table 8, under Grain and Decade 2010/2020, 73 acres are projected to be necessary. This figure is derived from Table 7. In Table 7, under Grain, Year 2010, projected commodity tonnage is 10,018,182. Under Grain, Year 2020, projected commodity tonnage is 11,231,745. The difference / increase in grain tonnage from 2010 to 2020 is 1,213,563. This difference in grain tonnage, divided by 16,667 tons per acre for grain (see ratio above), yields 73 acres (rounded). The same computation methodology is used to calculate future acreage needs in Table 8 for all facility types

and decades. Acreage needs are totaled per decade and divided by 60 acres per site (see above paragraph) to determine future sites needed per decade. The total number of future sites needed by private industry over the 50-year project period of evaluation is fourteen (14) sites.

Table 8
ACREAGE AND SITE NEEDS
BY COMMODITY AND DECADE
(In Acres)

Type of Facility	Decade 2000/2010	Decade 2010/2020	Decade 2020/2030	Decade 2030/2040	Decade 2040/2050
Grain	93	73	78	88	90
Food & Kindred	26	0	23	22	21
Chemicals*	44	40	46	52	49
Cement	29	0	30	45	52
Total Acres*	149	73	132	156	163
Sites Needed	3	2	3	3	3
Total Sites Needed					14

* Chemical tonnage is not included in determining private industry site needs and is therefore excluded from calculations of total acres and future sites in Table 8. Chemical tonnage is addressed in **Section 8. Chemical Transshipment Costs.**

6. Cost of Acreage Needs and Site Needs

Thirty-six (36) available sites within the St. Louis Harbor were previously identified in the 1982 Report as potentially developable in the future by private industry, and stratified into groups by particular constraints or difficulties that would require various degrees of modification, albeit either minor or major. Each of the thirty-six sites are evaluated based upon criteria detailing the type and degree of modification necessary to render each site equal to and as readily available for future development as any of the sites provided by the Harbor Project. These group constraints are presented in Table 9. The site modification constraints range from relatively minor modification to major modification, such as complete flood protection or major maintenance dredging.

Table 9
SITE MODIFICATION CONSTRAINT CATEGORIES

CATEGORIES	SITE MODIFICATION CONSTRAINT
I	*Relocation / Permitting* It is recognized that private development of these sites could entail costs such as relocation, permitting, mitigation, higher dock costs in a fast-water location and / or delay costs than might be incurred in a planned port complex or an off-waterway industrial park. In urban areas, relocation could be significant while permitting and mitigation might be relatively minor. The opposite would likely be true for more pristine waterfront locations. **Modification**: *Relocation / Permitting*
II	*Site Foundation* Sites in urban areas which have been vacant for some time can be repositories for a wide range of debris, including building rubble and discarded equipment. Such unfavorable material in the soil typically increases the cost of constructing a building foundation. **Modification**: *Site Foundation*
III-a	*Docking Area: Existing Levee Unaffected* Sites with this constraint are located in areas where the low water navigation channel is close enough to the bank such that docks and/or moored barges would be unsafe. If water access were to be provided, the docking area may need to be set back into the existing bank line to avoid conflict with traffic in the channel. The cost of providing this bank offset would be dependent upon certain factors, including the proximity of the levee and the amount of waterfront footage needed. **Modification**: *Bank Setback*
III-b	*Docking Area: Existing Levee Affected* Same constraints as described in Site Group III-a, yet existing levee would also need to be relocated. **Modification**: *Bank Setback with Levee Relocation*
IV	*Extended Cargo Handling Facilities*

Some sites have urban flood protection yet are located in areas where the levee is set back 1,500 and 3,000 feet from the bank. In such cases, all that may be required is longer bulk cargo handling facilities.

Modification: *Extended Cargo Handling Facilities*

V — *Inadequate Flood Protection*

Some sites lack adequate flood protection (e.g., agricultural levee). In such cases, it may be practical to improve and possibly upgrade the levee in the immediate area. However, in most cases, the only practical alternative is to isolate the site with an additional levee. The cost would be dependent upon the existing level of flood protection.

Modification: *Improved Flood Protection*

VI — *No Flood Protection*

Sites near the river and within the floodplain would require a complete new levee, assuming development was not prohibited by either backwater effects or Executive Order 11988 (Floodplain Management Directive).

Modification: *Complete Flood Protection*

VII-a — *Dredging: Minor*

Prior to some sites handling commodities via waterway transport, dredging is required to provide reliable water depth at dock fronts.

Modification: *Minor Dredging*

VII-b — *Dredging: Major*

Same constraint as described in Site Group VII-a. However, more intense dredging may be required. Also, if some sites are sediment prone areas, maintenance dredging would likely be required on a frequent basis.

Modification: *Major Dredging*

Using the projected number of sites required (Table 8), and referencing Assumption (f) which states, "Individuals are risk neutral and rational economic agents", as future site demand arose, private industry would select and modify the present available site that required the least costly modification necessary to render that site equal to and as readily available for future development as any of the twelve sites provided by the Harbor Project. The estimated site modification cost per acre of implementing the modification constraints are calculated, stratified into groups, and presented in Table 11.

Table 10 also presents the estimated site modification cost per acre of implementing the modification constraints. However, it is based on the *1982 Report analysis.* Table 10

is included to illustrate the change in the available sites per group rank as well as the change in the associated site modification costs between the 1982 Report and this Report (Table 11).

Table 10
ESTIMATED SITE MODIFICATION COSTS PER ACRE

1982 Report

Site Group Rank	**Required Modifications of Site Development Constraints**	**Number of Available Sites Per Group Rank**	**Estimated Site Modification Costs Per Acre**
1	Relocation / Permitting	1	$20,000
2	Relocation / Permitting Extended Cargo Handling Facilities	2	$72,000
3	Relocation / Permitting Site Foundation	4	$110,000
4	Relocation / Permitting Improved Flood Protection	7	$111,000
5	Relocation / Permitting Extended Cargo Handling Facilities Minor Dredging	2	$125,000
6	Relocation / Permitting Bank Setback with Levee Relocation	8	$125,000
7	Relocation / Permitting Major Dredging	3	$152,000
8	Relocation / Permitting Extended Cargo Handling Facilities Site Foundation	5	$152,000
9	Relocation / Permitting Extended Cargo Handling Facilities Improved Flood Protection	3	$152,000
10	Relocation / Permitting Complete Flood Protection	27	$157,000
11	Relocation / Permitting Site Foundation Bank Setback	6	$206,000
12	Relocation / Permitting Extended Cargo Handling Facilities Major Dredging	3	$194,000
13	Relocation / Permitting Extended Cargo Handling Facilities Improved Flood Protection Minor Dredging	20	$204,000
14	Relocation / Permitting Complete Flood Protection Minor Dredging	6	$208,000

As noted above, economic analysis, consisting of extensive field interviews and surveys, indicated that nine (9) of the first fourteen (14) sites from the 1982 Report are no longer available for future private industry development (Table 10). For example, of the top two (2) sites from the 1982 Report, the first site is in a recently developed area just south of the MacArthur Bridge at Mississippi River Mile 178 to 179, Illinois side. The second site is currently being developed into an RV (recreational vehicle) park and wetland area at Mississippi River Mile 171-172, Missouri side. The *first fourteen sites* from the 1982 Report, as listed in Table 10, are defined as the fourteen sites requiring the least costly modification and, in accordance with Assumption (f), would be the first fourteen sites selected and modified by private industry as future site demand arose. Of the first fourteen sites, those seven sites that have already been developed since the 1982 Report have most likely been developed due to the very nature of their favorable parameters (reliable water access, adequate flood protection, etc.) and associated low modification costs. In lieu of those seven sites listed in the 1982 Report that are no longer available, meeting future site demands would require sites with higher site modification costs per acre being modified (Table 11) in order to accrue and render the sites equal to and as readily available for future development as any of the sites provided by the Harbor Project. Also, please note Table 11 presents site modification costs only through Site Group Rank #9, since Site Group #1 through Site Group #9 provides 17 sites, which is sufficient to calculate all site modification costs for all plans in accordance with future demand for private industry site development as well as site demand sensitivity analysis, as detailed in **Section 11.1. Sensitivity Analysis**.

Table 11
ESTIMATED SITE MODIFICATION COSTS PER ACRE

Site Group Rank	Required Modifications of Site Development Constraints	Number of Available Sites Per Group Rank	Estimated Site Modification Costs Per Acre
1	Relocation / Permitting	0	$33,145
2	Relocation / Permitting Extended Cargo Handling Facilities	0	$79,382
3	Relocation / Permitting Site Foundation	1	$124,294
4	Relocation / Permitting Improved Flood Protection	4	$127,111
5	Relocation / Permitting Extended Cargo Handling Facilities Minor Dredging	2	$136,060
6	Relocation / Permitting Bank Setback with Levee	4	$137,221
7	Relocation / Permitting Major Dredging	1	$168,543
8	Relocation / Permitting Extended Cargo Handling Facilities Site Foundation	2	$170,531
9	Relocation / Permitting Extended Cargo Handling Facilities Improved Flood Protection	3	$173,349

Please note for Table 11, as well as all relevant calculations and tables within this analysis, benefit and cost methodology has been verified and costs recalculated to reflect October 2004 price levels via the appropriate cost indices from the CWCCIS (Civil Works Construction Cost Index Series).

7. Cost of Private Industry Site Development

The rate at which private industry develops sites in the future is based on the projected number of sites needed per decade. Given the projection of fourteen sites needed over the project period of evaluation, all Harbor Project site acreage would eventually be developed. The rate of the projected number of sites needed per decade (Table 8), in conjunction with the estimated per site modification costs necessary to render the sites

equal to and readily available for future development (Table 11), are incorporated into cost stream analysis and discounted over the 50-year project period of evaluation in calculating average annual costs.

Any of the three (3) proposed Harbor Project alternatives at RM 183–186, Illinois side, would provide twelve (12) sites suitable for future private industry development. In Table 12, three sites are estimated to be needed / modified for the decade 2000-2010 (reference Table 8). This averages to one-third (0.30) of a site being modified each year. For Year 2001, the $2,237,292 cost of modifying the first one-third (0.30) of the first site is comprised of: 60 (acres per site), $124,294 (site modification cost per acre for first available site; reference Table 11, Site Group Rank #3) and 0.30 (first one-third of the first site modified in Year 2001). It is computed as: 60 x $124,294 x 0.30 = $2,237,292. For Year 2004, the $2,271,100 cost of modifying the last one-tenth (0.10) of the first site and the first two-tenths (0.20) of the second site (totaling one-third of site modification for Year 2004) is comprised of: 60 (acres per site), $124,294 (site modification cost per acre for first available site; reference Table 11, Site Group Rank #3) and 0.10 (last one-tenth of the first site modified in Year 2004) PLUS 60 (acres per site), $127,111 site modification cost per acre for second available site, reference Table 11, Site Group Rank #4) and 0.20 (first two-tenths of the second site modified in Year 2004). It is computed as: [60 x $124,294 x 0.10] + {60 x $127,111 x 0.20] = $2,271,100. The net present value of implementing all required site modifications to render twelve sites suitable for future private industry development, over the 50-year project period of evaluation at the project discount rate of 5.375%, is calculated via cost stream analysis and estimated at $35,423,100. The average annual cost of implementing required site modifications to all twelve sites is estimated at $2,053,850 (Table 12).

Table 12
PRIVATE INDUSTRY SITE MODIFICATION COSTS
(Modification of Twelve Sites)

Year	Numbered Site(s) Being Modified Annually	Percentage of Site(s) Being Modified Annually	Cost of Site(s) Being Modified Annually
2001	1	0.3	2,237,292
2002	1	0.3	2,237,292
2003	1	0.3	2,237,292
2004	1 & 2	.1 & .2	2,271,100
2005	2	0.3	2,288,003
2006	2	0.3	2,288,003
2007	2 & 3	.2 & .1	2,288,003
2008	3	0.3	2,288,003
2009	3	0.3	2,288,003
2010	3	0.3	2,288,003
2011	4	0.2	1,525,335
2012	4	0.2	1,525,335
2013	4	0.2	1,525,335
2014	4	0.2	1,525,335
2015	4	0.2	1,525,335
2016	5	0.2	1,525,335
2017	5	0.2	1,525,335
2018	5	0.2	1,525,335
2019	5	0.2	1,525,335
2020	5	0.2	1,525,335
2021	6	0.3	2,449,088
2022	6	0.3	2,449,088
2023	6	0.3	2,449,088
2024	6 & 7	.1 & .2	2,449,088
2025	7	0.3	2,449,088
2026	7	0.3	2,449,088
2027	7 & 8	.2 & .1	2,456,048
2028	8	0.3	2,469,969
2029	8	0.3	2,469,969
2030	8	0.3	2,469,969
2031	9	0.3	2,469,969
2032	9	0.3	2,469,969

2033	9	0.3	2,469,969
2034	9 & 10	.1 & .2	2,469,969
2035	10	0.3	2,469,969
2036	10	0.3	2,469,969
2037	10 & 11	.2 & .1	2,469,969
2038	11	0.3	2,469,969
2039	11	0.3	2,469,969
2040	11	0.3	2,469,969
2041	12	0.1	1,011,256
2042	12	0.1	1,011,256
2043	12	0.1	1,011,256
2044	12	0.1	1,011,256
2045	12	0.1	1,011,256
2046	12	0.1	1,011,256
2047	12	0.1	1,011,256
2048	12	0.1	1,011,256
2049	12	0.1	1,011,256
2050	12	0.1	1,011,256
Total Cost of Twelve Sites Being Modified by Private Industry			$97,337,080
Net Present Value			$35,423,100
Average Annual Cost of Twelve Sites Being Modified by Private Industry			$2,053,850

The proposed Harbor Project alternative at approximately RM 187, Illinois side, would provide two (2) additional sites, thus providing a total of fourteen (14) sites suitable for future private industry development. The methodology used in Table 11 to calculate *Cost of Site(s) Being Modified Annually* is also employed below in Table 13. The net present value of implementing all required site modifications to render fourteen sites suitable for future private industry development, over the 50-year project period of evaluation at the project discount rate of 5.375%, is calculated via cost stream analysis and estimated at $37,332,410. The average annual cost of implementing required site modifications to all fourteen sites is estimated at $2,164,560.

The average annual cost for this proposed alternative is higher than the other proposed alternatives not only because two additional sites must be modified but also because those two additional sites requiring modification are from Site Group Rank #8. As indicated in Table 11, Site Group Rank #8 has estimated site modification costs of $170,531 per acre.

Table 13
PRIVATE INDUSTRY SITE MODIFICATION COSTS
(Modification of Fourteen Sites)

Year	Numbered Site(s) Being Modified Annually	Percentage of Site(s) Being Modified Annually	Cost of Site(s) Being Modified Annually
2001	1	0.3	2,237,291
2002	1	0.3	2,237,291
2003	1	0.3	2,237,291
2004	1 & 2	.1 & .2	2,271,099
2005	2	0.3	2,288,003
2006	2	0.3	2,288,003
2007	2 & 3	.2 & .1	2,288,003
2008	3	0.3	2,288,003
2009	3	0.3	2,288,003
2010	3	0.3	2,288,003
2011	4	0.2	1,525,335
2012	4	0.2	1,525,335
2013	4	0.2	1,525,335
2014	4	0.2	1,525,335
2015	4	0.2	1,525,335
2016	5	0.2	1,525,335
2017	5	0.2	1,525,335
2018	5	0.2	1,525,335
2019	5	0.2	1,525,335
2020	5	0.2	1,525,335
2021	6	0.3	2,449,088
2022	6	0.3	2,449,088
2023	6	0.3	2,449,088
2024	6 & 7	.1 & .2	2,449,088
2025	7	0.3	2,449,088
2026	7	0.3	2,449,088
2027	7 & 8	.2 & .1	2,456,048
2028	8	0.3	2,469,969
2029	8	0.3	2,469,969
2030	8	0.3	2,469,969
2031	9	0.3	2,469,969

2032	9	0.3	2,469,969
2033	9	0.3	2,469,969
2034	9 & 10	.1 & .2	2,469,969
2035	10	0.3	2,469,969
2036	10	0.3	2,469,969
2037	10 & 11	.2 & .1	2,469,969
2038	11	0.3	2,469,969
2039	11	0.3	2,469,969
2040	11	0.3	2,469,969
2041	12	0.3	3,033,767
2042	12	0.3	3,033,767
2043	12	0.3	3,033,767
2044	12 & 13	.1 & .2	3,057,631
2045	13	0.3	3,069,563
2046	13	0.3	3,069,563
2047	13 & 14	.2 & .1	3,069,563
2048	14	0.3	3,069,563
2049	14	0.3	3,069,563
2050	14	0.3	3,069,563
Total Cost of Fourteen Sites Being Modified by Private Industry			$117,800,830
Net Present Value			$37,332,410
Average Annual Cost of Fourteen Sites Being Modified by Private Industry			$2,164,560

8. Chemical Transshipment Costs

Waterway shipments and receipts of intermediate chemicals, which generate chemical transshipment costs, are major activities in the St. Louis Harbor area and constitute a significant portion of the Harbor-related industrial land use. The specific chemicals currently being handled within the St. Louis Harbor area are alcohol, benzene, toluene, crude tars, sulfuric acid, sodium hydroxide and a variety of chemical fertilizers.

Presently, chemical businesses do not have an economic incentive to develop waterfront sites on the river with or without the Harbor Project. Pipelines are used for transporting liquid chemicals to and from the river whereas trucks are used for transporting dry chemicals to and from the river. Given site modification costs, the savings of developing a river site over pipeline transshipment and truck shipment are slight. Therefore, chemical companies are rationally unlikely to incur the cost of developing a waterfront chemical site without the project.

These chemical shipments and receipts can be transshipped via four transshipment modes. *Trucks* are usually used for short-distance hauls or low volume per shipment. *Rail lines* are usually used for long-distance hauls, also of low volume per shipment. *Pipelines* are used when a high-volume movement, from one specific point to another, is planned over a long period of time. *Barge lines* fill the remaining needs for hauls of varied length and high volumes, though the time period of the movement need not be extended. The rail lines are the only mode that could possibly substitute for the barge industry: the ton-mile cost of truck transport is too high and the volumes of individual and frequently incompatible products are not sufficient to justify the construction of a pipeline system.

For industries located on or near the waterway, there are essentially three transshipment modes: direct rail, direct barge and indirect barge. The method of transshipment from waterfront to inland industry is primarily dependent on commodity type, distance hauled, tonnage levels, and land use constraints. Since grain elevators could likely make use of the limited acreage on the Harbor waterfront, the consideration of indirect barge movements is limited to food and kindred products, cement and chemicals commodity groups.

There are essentially three alternative transshipment modes: direct rail, direct barge and indirect barge. Direct Rail would move commodities from origin to destination completely on rail line-haul transport with only loading/offloading costs realized as additional charges. Direct Barge would move commodities completely on the waterway between shipping and receiving industries with barge loading/offloading costs included as additional expenses. Indirect Barge is similar to the direct barge transshipment mode except that the ultimate shipping / receiving industrial location in the Harbor is away from the waterway due to constrained waterfront land availability. The Indirect Barge mode also incurs an additional truck or pipeline line haul and handling cost in moving the commodity inland from the waterfront.

Pipeline transport of liquid bulk commodities is considered for short-haul transshipment from waterfront areas to receiving industries and vice-versa. Since the liquid bulk commodities of relevance in the St. Louis future are chemicals of various types and tonnage levels, long-haul pipeline to many different locations having variable tonnage and frequent cleaning charges are not deemed feasible for costs reasons. A chemical industry located off-waterway within St. Louis that realizes constant shipments and receipts of a limited number of liquid products between a waterfront dock and a liquid bulk storage area would likely make economical use of pipeline transport. Typically, liquid chemicals are transshipped via pipeline movement and dry bulk chemicals are transshipped via short-haul trucking.

The distance of transshipment is estimated at five (5) miles, on average, for future development sites throughout St. Louis Harbor. Given this distance, the limited dry commodity tonnage involved as well as urban land use constraints, a long distance

conveyor belt system is determined to be infeasible. Only short-haul trucking of dry commodities and pipelining of liquid bulk commodities are considered feasible given the inland shipping constraints of the St. Louis Harbor area. Liquid chemical tonnage is sufficient to justify small pipelines, and any disruption of urban land would only be minimal and short-term.

In order to determine if commodity transportation (i.e., pipeline) cost savings exist for the future handling of chemicals from the waterway, origin and destination costs that may be realized from various alternative shipment means are analyzed. The overall origin-destination routes are divided into three general groups: (1) routes involving chemical transshipment from industries located on or near the waterway; (2) routes involving chemical transshipment between industries shipping / receiving within the St. Louis locality; (3) routes involving chemical transshipment between St. Louis and Harbor Project area locations off the waterway.

Given the numerous different origin-destination routes for chemical shipments, the wide variety of liquid and dry bulk chemicals, and the inability to accurately forecast the growth of liquid vs. dry bulk chemical tonnage on a route-by-route basis, chemicals are considered a single commodity classification in rate calculations. Two conservative assumptions are made in the rate calculations that would tend to favor rail shipment over that of direct or intermodal barge shipments. First, all rail or barge line haul charges would be for liquid bulk chemical shipments. Reviews of rail line haul rates for liquid and dry chemicals reveal no significant difference in costs per ton between the covered hopper and tank car shipments. The use of tanker barges does result in a noticeable increase in cost per ton over that calculated for covered hopper barges on the waterway routes examined. Since the use of liquid bulk chemical shipments tends to reduce the rail-barge line haul cost differential, liquid bulk rates are used for all line haul charges on chemical movements. Second, transshipment costs for dry bulk chemicals tend to be larger than comparable transshipment costs for liquid chemicals. Again, taking a conservative estimate of transshipment costs (derived from historical record analysis and extensive field interviews), the distribution of liquid chemicals and dry bulk chemicals are estimated at 71 percent and 29 percent, respectively. Applying this liquid / dry bulk distribution to the estimated costs of $0.77 per ton for pipeline movement (liquid chemicals) and $3.06 per ton for short-haul trucking (dry bulk chemicals) yields a weighted average transshipment cost of $1.43 per ton (computed as: [0.71 x $0.77] + [0.29 x $3.06] = $1.43 per ton). Thus, the weighted average transshipment cost for liquid and dry bulk chemicals via Indirect Barge transshipment (i.e., truck / pipeline) is estimated at $1.43 per ton. (This estimate is presented in Table 14 and Table 15).

A compilation of recorded waterway routes for chemical shipments and receipts was recorded in Spring of 2000 via detailed field interviews and analysis of historical records. The routes represent various city origin and city destination combinations along the Mississippi River, Missouri River, Ohio River and Illinois River. Costs for alternative modes of transshipment (namely Direct Rail, Direct Barge and Indirect Barge) of both chemical shipments and chemical receipts are included for all recorded waterway routes.

Average chemical shipment costs (representing all observed chemical shipment costs) are calculated for all alternative transshipment modes. The total costs for chemical shipments via Direct Barge and Indirect Barge are $25.89 per ton and $28.08 per ton, respectively. The cost differential for chemical shipments (i.e., the difference between the total costs for chemical shipments via Direct Barge and Indirect Barge) is calculated as $2.19 per ton. These estimates are presented in Table 14.

Table 14
CHEMICAL SHIPMENT COSTS BY ALTERNATIVE MODES
(Per Ton)

Chemical Shipments

Origin : St. Louis, MO
Destination : A River Location via Mississippi
Commodity : Chemicals

	Direct Rail	Direct Barge	Indirect Barge
Rail	$38.35[a]	$0.00	$0.00
Barge	0.00	21.20	21.20
Truck / Pipeline	0.00	0.00	1.43[b]
Handling	5.28	4.68	5.44
Total	$43.63	*$25.89*	*$28.08*
Difference in Total Shipment Costs Between Direct Barge & Indirect Barge			*$2.19*

a. Constructed volume rate from SLD (St. Louis District)
b. Assumes five (5) mile transshipment via truck (dry) or pipeline (liquid)

Average chemical receipt costs (representing all observed chemical receipt costs) are calculated for all alternative transshipment modes. The total costs for chemical receipts via Direct Barge and Indirect Barge are $20.40 per ton and $22.92 per ton, respectively. The cost differential for chemical receipts (i.e., the difference between the total costs for chemical receipts via Direct Barge and Indirect Barge) is calculated as $2.52 per ton. These estimates are presented in Table 15.

Table 15
CHEMICAL RECEIPT COSTS BY ALTERNATIVE MODES
(Per Ton)

Chemical Receipts			
Origin : A River Location via Mississippi **Destination : St. Louis, MO** **Commodity : Chemicals**			
	Direct Rail	**Direct Barge**	**Indirect Barge**
Rail	$38.35[a]	$0.00	$0.00
Barge	0.00	15.71	15.71
Truck / Pipeline	0.00	0.00	1.43[b]
Handling	5.28	4.69	5.77
Total	$43.63	*$20.40*	*$22.92*
Difference in Total Receipt Costs Between Direct Barge & Indirect Barge			*$2.52*

a. Constructed volume rate from SLD (St. Louis District)
b. Assumes five (5) mile transshipment via truck (dry) or pipeline (liquid)

Under the future with project condition, NED benefits (i.e., transshipment cost savings) are generated through reduced transshipment costs for chemical tonnage movements. A chemical facility located at or near the project site would not need to invest in as long of a pipeline for liquid chemicals or incur the higher truck shipment costs for dry bulk chemicals to access the waterway. Thus transshipment cost savings are accrued because of the reduced need for pipelines for moving liquid chemicals to and from the river and reduced trucking costs for moving dry chemicals to and from the river. Consequently, the Harbor Project would provide chemical shippers with less costly access to river transportation, thereby reducing transshipment costs of moving chemical tonnage to and from the waterway for transport.

Extensive field interviews and analysis of historical as well as projected St. Louis Harbor area chemical shipments and receipts indicates the distribution of chemical shipments and chemical receipts to be estimated at 30 percent and 70 percent, respectively. Applying

this shipments / receipts distribution to the Table 14 and Table 15 cost differentials of $2.19 per ton for chemical shipments and $2.52 per ton for chemical receipts, respectively, yields a weighted average transshipment cost of $2.42 per ton (computed as: [0.30 x 2.19] + [0.70 x 2.52] = $2.42 per ton). Thus, the weighted average transshipment cost *savings* for chemical tonnage movements (both shipments and receipts) is estimated at $2.42 per ton.

A compilation of recorded waterway routes for chemical shipments and receipts was recorded in Spring of 2000 via detailed field interviews and analysis of historical records. The routes represent various city origin and city destination combinations along the Mississippi River, Missouri River, Ohio River and Illinois River.

Projected St. Louis Harbor area annual chemical tonnage movements are derived from St. Louis Harbor area chemical shipments and receipts and supported via field interviews and analysis of historical records. Applying the transshipment cost *savings* of $2.42 per ton to these projected annual chemical tonnage movements yields a 50-year cost stream (2001 to 2050) of chemical transshipment cost savings. The cost stream generates *average annual* chemical transshipment cost savings (i.e., benefits) of $360,930. The results are presented in Table 16.

Table 16
CHEMICAL RECEIPT COSTS BY ALTERNATIVE MODES

Year	Chemical Transshipment Tonnage	Chemical Transshipment Costs at $2.42 per ton
2001	$0	$0
2002	$0	$0
2003	$0	$0
2004	$0	$0
2005	$0	$0
2006	$0	$0
2007	$0	$0
2008	$0	$0
2009	$0	$0
2010	$0	$0
2011	$87,000	$210,540
2012	$99,000	$239,580
2013	$112,000	$271,040
2014	$125,000	$302,500
2015	$138,000	$333,960
2016	$151,000	$365,420

2017	$164,000	$396,880
2018	$179,000	$433,180
2019	$190,000	$459,800
2020	$201,000	$486,420
2021	$213,000	$515,460
2022	$228,000	$551,760
2023	$243,000	$588,060
2024	$258,000	$624,360
2025	$273,000	$660,660
2026	$288,000	$696,960
2027	$303,000	$733,260
2028	$318,000	$769,560
2029	$333,000	$805,860
2030	$340,000	$822,800
2031	$348,000	$842,160
2032	$366,000	$885,720
2033	$385,000	$931,700
2034	$403,000	$975,260
2035	$422,000	$1,021,240
2036	$441,000	$1,067,220
2037	$459,000	$1,110,780
2038	$478,000	$1,156,760
2039	$496,000	$1,200,320
2040	$505,000	$1,222,100
2041	$515,000	$1,246,300
2042	$535,000	$1,294,700
2043	$555,000	$1,343,100
2044	$575,000	$1,391,500
2045	$595,000	$1,439,900
2046	$615,000	$1,488,300
2047	$635,000	$1,536,700
2048	$650,000	$1,573,000
2049	$660,000	$1,597,200
2050	$673,000	$1,628,660
Total Chemical Transshipment Costs		$35,220,680
Net Present Value		$6,225,080
Average Annual Chemical Transshipment Costs		$360,930

9. Future-With-Project Condition

Three potential future-with-project condition alternatives are evaluated as follows.

Plan I-1

This alternative is located at the Melvin Price Support Center, RM 183-186, Illinois side, and consists of a 430-foot working platform with a 3 cell wall platform approach, thus handling 1 barge. The total acreage provided by this alternative is 752 acres. 752 acres divided by 60 acres per site yields twelve (12) sites (reference Table 8). Thus this alternative would provide twelve adjacent sites ready for the future development of commodity facilities by private industry as the demand for such sites arose. The average annual cost of implementing required site modifications to all *twelve* sites is estimated at $2,053,850 (reference Table 12). This alternative is referred to as Plan I-1 throughout the Report.

Plan I-2

This alternative is located at the Melvin Price Support Center, RM 183-186, Illinois side, and consists of a 430-foot working platform with a 7 cell wall platform approach, thus handling 3 barges. The total acreage provided by this alternative is 752 acres. 752 acres divided by 60 acres per site yields twelve (12) sites (reference Table 8). Thus this alternative would provide twelve adjacent sites ready for the future development of commodity facilities by private industry as the demand for such sites arose. The average annual cost of implementing required site modifications to all *twelve* sites is estimated at $2,053,850 (reference Table 12). This alternative is referred to as Plan I-2 throughout the Report.

Plan E

This alternative is located 2 miles north of the Melvin Price Support Center at approximately RM 187, Illinois side, within the Chain of Rocks Canal below Chouteau Slough, and consists of a riprap-lined embankment, thus handling 1 barge. The total acreage provided by this alternative is over 850 acres. 850 acres divided by 60 acres per site yields fourteen (14) sites (reference Table 8), two (2) additional sites over the aforementioned alternatives. Thus this alternative would provide fourteen adjacent sites ready for the future development of commodity facilities by private industry as the demand for such sites arose. Again, the average annual cost of implementing required site modifications to all *fourteen* sites is estimated at $2,164,560 (reference Table 13). This alternative is referred to as Plan E throughout the Report.

9.1 General Accounts

According to ER 1102-2-100, there are four accounts established to facilitate evaluation and display of the effects of alternative plans (1) national economic development (NED); (2) environmental quality (EQ); (3) regional economic development (RED); and (4) other social effects (OSE). These four accounts

encompass all significant effects of a plan on the human environment as required by the National Environmental Policy Act (NEPA). They also encompass social well-being as required by Section 122 of the Flood Control Act of 1970. The EQ account shows effects on ecological, cultural, and aesthetic attributes of significant natural and cultural resources that cannot be measured in monetary terms. The OSE account shows urban and community impacts and effects on life, health, and safety. The NED account shows effects on the national economy and is the only required account. The RED account shows the regional incidence of NED effects, income transfers, and employment effects.

9.2 National Economic Development Analysis

The National Economic Development (NED) account describes that part of the NEPA human environment that identifies beneficial and adverse effects on the economy. Beneficial effects in the NED account are increases in the economic value of the national output of goods and services from a plan, the value of output resulting from external economies caused by a plan, and the value associated with the use of otherwise unemployed or under-employed labor resources. Adverse effects in the NED account are the opportunity costs of resources used in implementing a plan. These adverse effects include implementation outlays, associated costs, and other direct costs (ER 1105-2-100).

The NED plan reasonably maximizes net national economic development benefits, consistent with the federal objective. Alternative plans, including the NED plan, should be formulated in consideration of the following four criteria (1) completeness; (2) effectiveness; (3) efficiency; and (4) acceptability.

1. **Completeness**. The extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects.

2. **Effectiveness**. The extent to which an alternative Plan I-1 alleviates the specified problems and achieves the specified opportunities.

3. **Efficiency**. The extent to which an alternative plan is the most cost effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment.

4. **Acceptability**. The workability and viability of the alternative plan with respect to acceptance by State and local entities and the public (and the Corps and the local sponsor) and the plan's compatibility with existing laws, regulations, and public policies.

While there is only one benefit standard, there are three benefit categories that reflect three different responses to a flood hazard reduction plan. During the economic analysis, all of which is contained within this Appendix, all three of the following benefit categories are considered:

Inundation Reduction Benefit. If floodplain use is the same with and without the plan, the benefit is the increased net income generated by that use. If an activity is removed from the flood plain, this benefit is realized only to the extent that removal of the activity increases the net income of other activities in the economy.

Intensification Benefit. If the type of floodplain use is unchanged but the method of operation is modified because of the plan, the benefit is the increased net income generated by the floodplain activity.

Location Benefit. If an activity is added to the floodplain because of a plan, the benefit is the difference between aggregate net incomes, including economic rent, in the economically affected area with and without the plan.

As mentioned, all three of the benefit categories are considered in the determination of net NED average annual benefits. The following tables display the alternative plans, average annual benefits for each category of benefit, average annual costs, and final net NED average annual benefits.

The NED benefits are determined by subtracting a potential plan's total average annual costs to the total average annual costs associated with the future-without-project scenario. The average annual implementation costs for each potential Plan I-1re then subtracted in order to determine net NED benefits for each potential plan.

9.3 Environmental Quality, Regional Economic Development and Other Social Effects

Environmental Quality (EQ) Regional Economic Development (RED), and Other Social Effects (OSE) issues are addressed in the Environmental Impacts section of the Environmental Impacts Study (EIS).

Other social effects that are addressed by these flood damage reduction plans include (1) the reduction in human suffering associated with being flooded and being surrounded by family, friends and neighbors that are flooded; (2) the reduction in shock and personal disruptions created by being flooded; (3) an increased sense of personal security; and (4) the reduction in potentially dangerous situations resulting from increased emergency (including police, fire and medical) service response time.

9.4 Site Modification Costs and Chemical Transshipment Costs

The accrued NED benefits of the Harbor Project consist of: (1) Reduced site modification costs associated with grain, cement, food and kindred tonnage movements;

and (2) Reduced chemical transshipment costs associated with chemical tonnage movements.

(1) NED benefits (i.e.; private industry reduced site modification costs) are the reduced private industry site modification costs afforded by the economies of scale in constructing the Harbor Project provided sites adjacent to each other and all at one time, as compared with the higher development costs of individual site modifications at various Harbor locations over the next 50 years (i.e.; the 50 year project period of evaluation). In other words, reduced site development costs would be realized by industries locating on the Harbor Project acreage as future demand dictates. Such benefits are expected to accrue over the life of the project for these commodity types utilizing the project acreage until all available project acreage is completely developed. Subsequently, facilities in need of future commodity transshipment sites are assumed to return to private sites requiring modification, thereby incurring increasing site modification costs.

(2) NED benefits (i.e., chemical transshipment cost savings) are generated through reduced transshipment costs for chemical tonnage movements. A chemical facility located at or near the project site would not need to invest in as long of a pipeline for liquid chemicals or incur the higher truck shipment costs for dry bulk chemicals to access the waterway. Thus transshipment cost savings are accrued because of the reduced need for pipelines for moving liquid chemicals to and from the river and reduced trucking costs for moving dry chemicals to and from the river. Consequently, the Harbor Project would provide chemical shippers with less costly access to river transportation, thereby reducing transshipment costs of moving chemical tonnage to and from the waterway for transport.

10. Benefit and Cost Analysis

10.1 Benefits

Private Industry Reduced Site Modification Costs (Benefits and Chemical Transshipment Cost Savings). The NED plan reasonably maximizes average annual net national economic development benefits, consistent with a federal objective for maximizing economic benefits. Alternative plans, including the NED plan, should be formulated using four criteria; (1) completeness; (2) effectiveness; (3) efficiency; and (4) acceptability. All the proposed plans, namely Plan I-1, Plan I-2 and Plan E, are evaluated to properly define the NED curve and identify the NED plan. Total Average Annual Benefits are calculated as: Average Annual Private Industry Reduced Site Modification Costs plus Average Annual Chemical Transshipment Cost Savings.

The Total Average Annual Benefits for Plan I-1, Plan I-2 and Plan E are presented in Table 17. Total Average Annual Benefits is estimated at $2,414,780 for Plan I-1; $2,414,780 for Plan I-2; and $2,525,490 for Plan E.

Table 17
SUMMARY OF TOTAL AVERAGE ANNUAL BENEFITS,
FUTURE-WITH-PROJECT CONDITION

Project Alternative	Private Industry Reduced Site Modification Costs	Chemical Transshipment Cost Savings	Total Average Annual Benefits
Plan I-1	$2,053,850	$360,930	$2,414,780
Plan I-2	$2,053,850	$360,930	$2,414,780
Plan E	$2,164,560	$360,930	$2,525,490

10.2 Costs

Average annual costs are subtracted from NED average annual benefits generated by the project alternative to determine net NED average annual benefits for the project alternative. The total average annual construction cost estimate includes construction costs, annual operation, maintenance and replacement costs, real estate costs and all applicable contingency costs. All costs are annualized utilizing the estimated project evaluation period of 50 years and a project discount rate of 5.375 percent.

Construction First Costs and Interest During Construction. Construction first costs and interest during construction are determined for all project alternatives. In calculating interest during construction, interest is charged for each year funds are expended during the construction period because of the time value of money and project construction preventing alternative uses of the funds. A three-year construction period is assumed and the mid-year convention is employed. Average annual costs are subsequently calculated for construction first costs as well as operations, maintenance and replacement costs. Construction first costs, interest during construction, average annual operation, maintenance, and repair costs, and total average annual construction related costs for all project alternatives are presented in Table 18.

Table 18
CONSTRUCTION COSTS

Costs	Plan I-1	Plan I-2	Plan E
Construction First Costs	$19,053,012	$26,871,552	$31,522,001
Interest During Construction	$1,877,301	$2,647,665	$3,105,875
Total First Costs	$20,930,313	$29,519,217	$34,627,877
Average Annual First Costs	$1,397,914	$1,971,557	$2,312,760
Average Annual Operation, Maintenance, and Repair Costs	$51,987	$52,236	$47,899
Total Average Annual Construction Related Costs	$1,449,901	$2,023,793	$2,360,659

Other Direct Costs. Other direct costs are defined as the cost of resources directly required for a project or plan, but for which no implementation outlays are made. Consequently, they are included in the economic costs of a plan, but not in the financial costs. Other direct costs also include uncompensated NED losses caused by the installation, operation, maintenance or replacement of project or plan measures. All uncompensated net losses in economic outputs (*not* transfers) that can be quantified shall be considered project NED costs. The evaluation of such costs requires an analysis of project effects both within and outside the project area (ER 1105-2-100, Section 6-148, December 1990).

11. Summary

As presented in **Section 10.1. Benefits**, average annual private industry reduced site modification costs (i.e., the costs of private industry modifying individual sites as

needed) comprise the majority of the accrued average annual benefits. Also, as stated above, Total Average Annual Benefits are calculated as: Average Annual Private Industry Reduced Site Modification Costs plus Average Annual Chemical Transshipment Cost Savings. The Total Average Annual Benefits for Plan I-1, Plan I-2 and Plan E are presented in Table 19.

Table 19
TOTAL AVERAGE ANNUAL BENEFITS

Project Alternative	Private Industry Reduced Site Modification Costs	Chemical Transshipment Cost Savings	Total Average Annual Benefits
Plan I-1	$2,053,850	$360,930	$2,414,780
Plan I-2	$2,053,850	$360,930	$2,414,780
Plan E	$2,164,560	$360,930	$2,525,490

Average annual construction first costs, operation, maintenance, and repair costs and total average annual construction related costs for all project alternatives are presented in Table 20.

Table 20
TOTAL AVERAGE ANNUAL COSTS

Costs	Plan I-1	Plan I-2	Plan E
Average Annual First Costs	$1,397,914	$1,971,557	$2,312,760
Average Annual Operation, Maintenance, and Repair Costs	$51,987	$52,236	$47,899
Total Average Annual Construction Related Costs	$1,449,901	$2,023,793	$2,360,659

The *Expected Value and Probabilistic Values of Net Benefits* for all project alternatives are presented (Table 21). The expected average annual net benefits for Plan I-1 are estimated to be $964,879 and the benefit-cost ratio is 1.67. The expected average annual net benefits for Plan I-2 are estimated to be $390,987, and the benefit-cost ratio is 1.19. The expected average annual net benefits for Plan E are estimated to be $164,831, and the benefit-cost ratio is 1.07. Plan I-1 generates the highest expected annual net benefits, at $964,879, and is therefore recommended as the NED plan. The Probability Net Benefit Exceeds Indicated Amount is also presented. For example, for Plan I-1, the probability of the Net Benefits, at $964,879, exceeding $739,239 is 75 percent.

Table 21
EXPECTED VALUE AND PROBABILISTIC VALUES OF NET BENEFITS

Project Alternative	Expected Annual National Economic Benefit and National Economic Benefit				Probability Net Benefit Exceeds Indicated Amount		
	Benefits	Costs	Net Benefits	Benefit-Cost Ratio	0.75	0.50	0.25
Plan I-1	$2,414,780	$1,449,901	$964,879	1.67	$739,239	$948,239	$1,107,908
Plan I-2	$2,414,780	$2,023,793	$390,987	1.19	$291,978	$379,383	$492,965
Plan E	$2,525,490	$2,360,659	$1664,831	1.07	$179,376	$233,134	$302,059

11.1 Sensitivity Analysis

This section will evaluate the relative economic feasibility of all project alternatives after a change has been made to certain input parameters. Two input parameters will be examined – commodity tonnage projections and site size as developed by private industry.

Commodity Tonnage Projections. The most recent forecasts available are from the Draft Upper Mississippi River (UMR) - Illinois Waterway System Navigation Feasibility Study printed in April 2004. Forecasts used in the St. Louis Harbor Report are from projected percentage changes in commodity tonnage first applied to recorded commodity tonnage in St. Louis Harbor for the year 1982 as shown in the original Feasibility Report, and then to observed commodity tonnage in St. Louis Harbor for the year 2000 as shown in the 2000 Report. The projected percentage changes in commodity tonnage applied to the 1982 and 2000 Reports are from the UMR-IWWS Commodity Project Report, created by Jack Faucett and Associates through the Institute of Water Resources (IWR). However, the data presented in the 2004 Study is generated from recorded tonnage through locks, whereas the data presented in the 2000 Report is based on 1) tonnage originating outside the Harbor and reaching its final destination with the Harbor, 2) tonnage originating inside the Harbor and its final destination is located outside the Harbor, and 3) tonnage both originating and reaching its final destination with the Harbor. Also, commodity types and groupings between the 2004 Study and the 2000 Report differ enough to make comparisons problematical without expending significant time and budget resources. For example, in the 2000 Report, both commodity types Grain and Food & Kindred have separate commodity tonnage projection streams, while in the 2004 Study both Grain and

Food & Kindred are combined with other commodity types under Agriculture and Forestry to generate only one commodity tonnage projection stream. Data showing actual tonnage in the Port of Metropolitan St. Louis from 1999 to 2002 show discrepancies from the long-term projections of certain commodities made in the 2000 Report. For example, actual coal tonnage shipments of over 12 million tons in both 2001 and 2002 exceed those projected though 2050 of about 10.3 million tons. However, actual grain tonnage has decreased from 5.96 million tons in 1999 to 5.35 million tons in 2000, 5.16 million tons in 2001, and 5.125 million tons in 2002. Although this short-term decrease in data does not negate the long-term projections, it does provide a reason to be cautious about the economic benefits of a new harbor based on projected future commodity shipments of grain.

Therefore, the first input parameter evaluated for sensitivity is commodity tonnage projections to evaluate the effect on project benefits given substantial increases and decreases in commodity projections. As detailed in Section 3. Other Commodity Tonnage Forecasts, the UMR-IWWS Commodity Projection Report was created by Jack Faucett and Associates through the Institute of Water Resources (IWR), the tonnage projections (see Table 7) are constructed from the UMR-IWWS Commodity Projection Report's projection of percentage changes in commodity tonnage. These projections are applied to the actual commodity tonnage observed in the Harbor during the year 2000. For sensitivity analysis, commodity tonnage projections which are 50 percent lower, 25 percent lower and 25 percent higher than actual commodity tonnage projections are calculated and presented in Tables 22 through 24, respectively.

Table 22
SENSITIVITY ANALYSIS OF ACREAGE AND SITE NEEDS
BY COMMODITY AND DECADE
(50 Percent *Lower* than Actual)
(In Acres)

Type of Facility	Decade **2000/2010** (50 Percent Lower than Actual)	Decade **2010/2020** (50 Percent Lower than Actual)	Decade **2020/2030** (50 Percent Lower than Actual)	Decade **2030/2040** (50 Percent Lower than Actual)	Decade **2040/2050** (50 Percent Lower than Actual)
Grain	47	36	39	44	45
Food & Kindred	13	0	12	11	10
Chemicals*	22	20	23	26	24
Cement	15	0	15	23	26
Total Acres*	**75**	**38**	**66**	**78**	**81**
Sites Needed	**2**	**1**	**2**	**2**	**2**
Total Sites Needed					**9**

* Chemical tonnage is not included in determining private industry site needs and is therefore excluded from calculations of total acres and future sites in Table 22. Chemical tonnage is addressed in **Section 8. Chemical Transshipment Costs**.

Table 23
SENSITIVITY ANALYSIS OF ACREAGE AND SITE NEEDS
BY COMMODITY AND DECADE
(25 Percent *Lower* than Actual)
(In Acres)

Type of Facility	Decade 2000/2010 (25 Percent Lower than Actual)	Decade 2010/2020 (25 Percent Lower than Actual)	Decade 2020/2030 (25 Percent Lower than Actual)	Decade 2030/2040 (25 Percent Lower than Actual)	Decade 2040/2050 (25 Percent Lower than Actual)
Grain	70	55	58	66	68
Food & Kindred	20	0	18	17	16
Chemicals*	33	30	34	39	37
Cement	22	0	23	34	39
Total Acres*	**112**	**55**	**99**	**117**	**122**
Sites Needed	**2**	**1**	**2**	**2**	**3**
Total Sites Needed					**10**

* Chemical tonnage is not included in determining private industry site needs and is therefore excluded from calculations of total acres and future sites in Table 23. Chemical tonnage is addressed in **Section 8. Chemical Transshipment Costs.**

Table 24
SENSITIVITY ANALYSIS OF ACREAGE AND SITE NEEDS
BY COMMODITY AND DECADE
(25 Percent *Higher* than Actual)
(In Acres)

Type of Facility	Decade 2000/2010 (25 Percent Higher than Actual)	Decade 2010/2020 (25 Percent Higher than Actual)	Decade 2020/2030 (25 Percent Higher than Actual)	Decade 2030/2040 (25 Percent Higher than Actual)	Decade 2040/2050 (25 Percent Higher than Actual)
Grain	117	91	97	110	113
Food & Kindred	33	0	29	28	26
Chemicals*	56	49	57	65	61
Cement	37	0	38	56	65
Total Acres*	**186**	**90**	**165**	**194**	**203**
Sites Needed	**4**	**2**	**3**	**4**	**4**
Total Sites Needed					**17**

* Chemical tonnage is not included in determining private industry site needs and is therefore excluded from calculations of total acres and future sites in Table 24. Chemical tonnage is addressed in **Section 8. Chemical Transshipment Costs.**

As calculated via the methodology in Table 12 and Table 13, Private Industry Reduced Modification Costs reflecting the percentage sensitivity changes noted in Tables 22 through 24 above are presented in Table 25.

Table 25
SENSITIVITY ANALYSIS OF COMMODITY TONNAGE PROJECTIONS

Sensitivity Change (in Percent) in Commodity Tonnage Projections	Sensitivity Change of Private Industry Reduced Site Modification Costs		
	Plan I-1	Plan I-2	Plan E
50 Percent of Actual	$1,272,123	$1,272,123	$1,340,695
75 Percent of Actual	$1,304,217	$1,304,217	$1,374,519
100 Percent (Actual)	$2,053,850	$2,053,850	$2,164,560
125 Percent of Actual	$2,543,546	$2,543,546	$2,680,653

The Average Annual Net Benefits and Benefit-Cost Ratio for reflecting the percentage sensitivity change in commodity tonnage projections for all project alternatives are presented in Table 26. *For 50 percent of actual commodity tonnage projections*, the average annual net benefits for Plan I-1 are estimated to be $183,152, and the benefit-cost ratio is 1.13; the average annual net benefits for Plan I-2 are estimated to be *negative* $390,740, and the benefit-cost ratio is 0.81; and the average annual net benefits for Plan E are estimated to be *negative* $659,034, and the benefit-cost ratio is 0.72. *For 75 percent of actual commodity tonnage projections*, the average annual net benefits for Plan I-1 are estimated to be $215,246, and the benefit-cost ratio is 1.15; the average annual net benefits for Plan I-2 are estimated to be *negative* $358,646, and the benefit-cost ratio is 0.82; and the average annual net benefits for Plan E are estimated to be *negative* $625,210, and the benefit-cost ratio is 0.74. *For 125 percent of actual commodity tonnage projections*, the average annual net benefits for Plan I-1 are estimated to be

$1,454,575, and the benefit-cost ratio is 2.00; the average annual net benefits for Plan I-2 are estimated to be $880,683, and the benefit-cost ratio is 1.44; and the average annual net benefits for Plan E are estimated to be $680,924, and the benefit-cost ratio is 1.29. As shown in Table 26, Plan I-1 (the recommended NED Plan) continues to generate the highest expected annual net benefits regardless of the sensitivity change in commodity tonnage projections.

Table 26
SENSITIVITY ANALYSIS OF AVERAGE ANNUAL NET BENEFITS AND BENEFIT-COST RATIO

Sensitivity Change (in Percent) in Commodity Tonnage Projections		Sensitivity Change of Average Annual Net Benefits and Benefit-Cost Ratio		
		Plan I-1	Plan I-2	Plan E
50 Percent of Actual	Net Benefits	$183,152	-$390,740	-$659,034
	Benefit-Cost Ratio	1.13	0.81	0.72
75 Percent of Actual	Net Benefits	$215,246	-$358,646	-$625,210
	Benefit-Cost Ratio	1.15	0.82	0.74
100 Percent (Actual)	*Net Benefits*	*$964,879*	*$390,987*	*$164,831*
	Benefit-Cost Ratio	*1.67*	*1.19*	*1.07*
125 Percent of Actual	Net Benefits	$1,454,575	$880,683	$680,924
	Benefit-Cost Ratio	2.00	1.44	1.29

Site Size. The second input parameter evaluated for sensitivity is the size of each site as developed by private industry. As detailed in **Section 5. Acreage Needs for Projected Increases in Tonnage,** in order to place all sites on an equivalent basis, a representative site size was determined. Site sizes reviewed ranged from approximately a 30-acre site for a grain facility to approximately a 90-acre site for a food and kindred

facility. Therefore, for estimation purposes, an average facility acreage required (i.e., site size) of 60 acres per site is employed. The number of future sites necessary for each commodity type is calculated by first dividing the difference in per decade commodity tonnage by the appropriate commodity type acreage needs per tonnage, and subsequently dividing by 60 acres (i.e., the average site size in acres required per facility). Consequently, the number of future sites necessary for each commodity type can change depending upon the site size in acres required per facility.

For sensitivity analysis, the number of future sites necessary for each commodity type is calculated based on an average site size of 45 acres (i.e., 25 percent lower than the average facility acreage of 60 acres per site employed in this report) as well as an average site size of 75 acres (i.e., 25 percent higher than the average facility acreage of 60 acres per site employed in this report). As calculated via the methodology in Table 8, Acreage and Site Needs by Commodity and Decade reflecting the percentage sensitivity changes based on an average site size of 75 acres are presented in Table 27.

Table 27
SENSITIVITY ANALYSIS OF ACREAGE AND SITE NEEDS
BY COMMODITY AND DECADE
(Average Site Size of 75 Acres)
(In Acres)

Type of Facility	Decade 2000/2010	Decade 2010/2020	Decade 2020/2030	Decade 2030/2040	Decade 2040/2050
Grain	93	73	78	88	90
Food & Kindred	26	0	23	22	21
Chemicals*	44	40	46	52	49
Cement	29	0	30	45	52
Total Acres*	**149**	**73**	**132**	**156**	**163**
Sites Needed (75 Acre Site)	**2**	**1**	**2**	**3**	**3**
Total Sites Needed					**11**

* Chemical tonnage is not included in determining private industry site needs and is therefore excluded from calculations of total acres and future sites in Table 27. Chemical tonnage is addressed in **Section 8. Chemical Transshipment Costs.**

Again, as calculated via the methodology in Table 8, Acreage and Site Needs by Commodity and Decade reflecting the percentage sensitivity changes based on an average site size of 45 acres are presented in Table 28.

Table 28
SENSITIVITY ANALYSIS OF ACREAGE AND SITE NEEDS
BY COMMODITY AND DECADE
(Average Site Size of 45 Acres)
(In Acres)

Type of Facility	Decade 2000/2010	Decade 2010/2020	Decade 2020/2030	Decade 2030/2040	Decade 2040/2050
Grain	93	73	78	88	90
Food & Kindred	26	0	23	22	21
Chemicals*	44	40	46	52	49
Cement	29	0	30	45	52
Total Acres*	**149**	**73**	**132**	**156**	**163**
Sites Needed (45 Acre Site)	**4**	**2**	**3**	**4**	**4**
Total Sites Needed					**17**

* Chemical tonnage is not included in determining private industry site needs and is therefore excluded from calculations of total acres and future sites in Table 28. Chemical tonnage is addressed in **Section 8. Chemical Transshipment Costs.**

Again, as detailed in **Section 5. Acreage Needs for Projected Increases in Tonnage**, site sizes reviewed ranged from approximately a 30-acre site for a grain facility to approximately a 90-acre site for a food and kindred facility. Yet, for estimation purposes an average facility acreage required (i.e., site size) of 60 acres per site is employed.

For sensitivity analysis, the acreage and site needs by commodity and decade are not totaled per facility and subsequently dividing by 60 acres (per Table 8). Instead the acreage and site needs per decade by grain facility are divided by 30 acres, and the acreage and site needs per decade by food and kindred facility are divided by 90 acres, as noted above. (Cement acreage and site needs per decade will continue to be divided by 60 acres.) As calculated via the methodology in Table 8, Acreage and Site Needs by Commodity and Decade reflecting the percentage sensitivity changes based on acreage and site needs per decade by grain facility being divided by 30 acres, and acreage and site needs per decade by food and kindred facility being divided by 90 acres, are presented in Table 28. Table 8 is repeated below for comparison purposes.

Table 29
SENSITIVITY ANALYSIS OF ACREAGE AND SITE NEEDS
BY COMMODITY AND DECADE
(Site Sizes of 30-, 60- & 90-Acres)
(In Acres)

Type of Facility	Decade **2000/2010**	Decade **2010/2020**	Decade **2020/2030**	Decade **2030/2040**	Decade **2040/2050**
Grain	93	73	78	88	90
Food & Kindred	26	0	23	22	21
Chemicals*	44	40	46	52	49
Cement	29	0	30	45	52
Grain Sites Needed (30 Acre Site)	3.11	2.43	2.60	2.94	3.01
Food & Kindred Sites Needed (90 Acre Site)	0.29	0	0.26	0.25	0.23
Cement Sites Needed (60 Acre Site)	0.49	0	0.51	0.75	0.86
Total Sites Needed (and Rounded)	**4**	**3**	**4**	**4**	**5**
Total Sites Needed					**20**

* Chemical tonnage is not included in determining private industry site needs and is therefore excluded from calculations of total acres and future sites in Table 29. Chemical tonnage is addressed in **Section 8. Chemical Transshipment Costs.**

Table 8 (Repeated)
ACREAGE AND SITE NEEDS
BY COMMODITY AND DECADE
(In Acres)

Type of Facility	Decade 2000/2010	Decade 2010/2020	Decade 2020/2030	Decade 2030/2040	Decade 2040/2050
Grain	93	73	78	88	90
Food & Kindred	26	0	23	22	21
Chemicals*	44	40	46	52	49
Cement	29	0	30	45	52
Total Acres*	149	73	132	156	163
Sites Needed	**3**	**2**	**3**	**3**	**3**
Total Sites Needed					**14**

* Chemical tonnage is not included in determining private industry site needs and is therefore excluded from calculations of total acres and future sites in Table 8. Chemical tonnage is addressed in **Section 8. Chemical Transshipment Costs.**

As noted above in Table 29, even though the sensitivity analysis divides the food and kindred acreage by 90 acres to determine site needs, and the grain acreage by 30 acres to determine site needs (where both are divided by 60 acres in the Report), since grain comprises over 50 percent of the total acreage needs for every decade throughout the project period of evaluation, the Total Sites Needed of 20 in the sensitivity analysis Table 29 is significantly higher than the Total Sites Needed of 14 in Table 8. Obviously computing Total Sites Needed via different site sizes per facility would substantially increase the Private Industry Reduced Site Modification Costs as well as the Average Annual Net Benefits and Benefit-Cost Ratio.

Again, as calculated via the methodology in Table 12 and Table 13, Private Industry Reduced Modification Costs reflecting the percentage sensitivity changes noted in Tables 27 through 29 above are presented in Table 30.

Table 30
SENSITIVITY ANALYSIS OF SITE SIZE AS DEVELOPED BY PRIVATE INDUSTRY

Sensitivity Change in Site Size as Developed by Private Industry	Sensitivity Change of Private Industry Reduced Site Modification Costs		
	Plan I-1	Plan I-2	Plan E
Average Site Size of 75 Acres	$1,584,814	$1,584,814	$1,670,241
Average Site Size of 45 Acres	$2,522,886	$2,522,886	$2,658,879
Average Site Size of 60 Acres (Actual)	$2,053,850	$2,053,850	$2,164,560
Site Sizes of 30-, 60- & 90-Acres	$2,991,922	$2,991,922	$3,153,198

The Average Annual Net Benefits and Benefit-Cost Ratio for reflecting the percentage sensitivity change in site size as developed by private industry for all project alternatives are presented in Table 31. *For average site size of 75 acres*, the average annual net benefits for Plan I-1 are estimated to be $495,843, and the benefit-cost ratio is 1.34; the average annual net benefits for Plan I-2 are estimated to be *negative* $78,049 and the benefit-cost ratio is 0.96; and the average annual net benefits for Plan E are estimated to be *negative* $329,488, and the benefit-cost ratio is 0.86. *For average site size of 45 acres*, the average annual net benefits for Plan I-1 are estimated to be $1,433,915 and the benefit-cost ratio is 1.99; the average annual net benefits for Plan I-2 are estimated to be $860,023, and the benefit-cost ratio is 1.42; and the average annual net benefits for Plan E are estimated to be $650,150, and the benefit-cost ratio is 1.28. *For site sizes of 30-, 60- & 90-acres*, the average annual net benefits for Plan I-1 are estimated to be

$1,902,951, and the benefit-cost ratio is 2.31; the average annual net benefits for Plan I-2 are estimated to be $1,329,059, and the benefit-cost ratio is 1.66; and the average annual net benefits for Plan E are estimated to be $1,153,469, and the benefit-cost ratio is 1.49. As shown in Table 31, Plan I-1 (the recommended NED Plan) continues to generate the highest expected annual net benefits regardless of the sensitivity change in site size as developed by private industry.

Table 31
SENSITIVITY ANALYSIS OF AVERAGE ANNUAL NET BENEFITS AND BENEFIT-COST RATIO

Sensitivity Change in Site Size as Developed by Private Industry		Sensitivity Change of Average Annual Net Benefits and Benefit-Cost Ratio		
		Plan I-1	Plan I-2	Plan E
Average Site Size of 75 Acres	Net Benefits	$495,843	-$78,049	-$329,488
	Benefit-Cost Ratio	1.34	0.96	0.86
Average Site Size of 45 Acres	Net Benefits	$1,433,915	$860,023	$659,150
	Benefit-Cost Ratio	1.99	1.42	1.28
Average Site Size of 60 Acres (Actual)	*Net Benefits*	*$964,879*	*$390,987*	*$164,831*
	Benefit-Cost Ratio	*1.67*	*1.19*	*1.07*
Site Sizes of 30-, 60-, 90-Acres	Net Benefits	$1,902,951	$1,329,059	$1,153,469
	Benefit-Cost Ratio	2.31	1.66	1.49

11.2 Market Value Sensitivity Analysis

Analysis as to whether the increased market value of the land with riverfront access under the without project and with project conditions would be a reasonable estimate of benefits is performed as a sensitivity check of the validity of the project benefit estimates already completed.

Real Estate branch compiled current market land sales and lease data representing the with project condition (flood free, harbor access utilizing crane, conveyor, rail, truck, etc…) and without project condition (flood free, NO harbor access), detailed as follows in Table 32.

Table 32
PER ACRE MARKET VALUE
WITH AND WITHOUT HARBOR FACILITIES

Comparable No. *	Date of Sale or Execution	Location	Size	Unit Price or Lease Price Per Acre	2003 Time Adjustment (2% per year)	Estimated Lease Price Per Acre
L-1	2000	Harbor Side Industrial Park, Granite City, IL	20.00 ac	$1,946	$2,065	$2,065
L-2	2000	Harbor Side Industrial Park, Granite City, IL	7.01	$2,875	$3,051	$3,051
L-3	1990	Harbor Side Industrial Park, Granite City, IL	2.0	$2,000	$2,587	$2,587
L-4	1981	Harbor Side Industrial Park, Granite City, IL	7.87	$1,980	$3,061	$3,061
L-5	1977	Harbor Side Industrial Park, Granite City, IL	5.0	$2,000	$3,347	$3,347
S-1	2000	Madison, Illinois	8.13	$18,450	$19,579	$1,958
S-2	2000	Hartford, Illinois	18.41	$16,295	$17,292	$1,729
S-3	1999	Madison, Illinois	8.41	$20,214	$21,880	$2,188
S-4	2000	Granite City, Illinois	6.3	$23,810	$25,267	$2,527
S-5	2000	Roxana, Illinois	31.08	$11,583	$12,292	$1,229

* L = Lease, S = Sale

A total of five leases and five sales of vacant industrial land with the project area are identified. All of the ten (10) comparables are currently zoned or have been determined to have highest and best uses as industrial. Each of the leases identified are located in the Harbor Side Industrial Park, which is presently operated by TCRPD, offering full service harbor facilities. The sales identified are located in the general market area surrounding the project area. Comparable No. S-1 is situated in Access Industrial Park, which adjoins the CMPSC. It is considered to be the best indicator of a "flood free, NO harbor access" market.

More recent comparables for the data criteria outlined is not currently available. Each of the comparables is therefore adjusted for time. A 2 percent per year adjustment, compounded annually, is considered reasonable for the industrial market in the project area. The "Estimated Lease Price Per Acre" for the comparable sales data has been calculated using a 10% income capitalization rate, which is also considered reasonable for land leases in the area. The mean and median prices per acre for the Lease comparables are $2,822 and $3,051, respectively. The mean and median prices per acre for the Sale comparables are $1,926 and $1,958, respectively.

Conclusion: Based on the data presented above, a value conclusion of $3,210 representing "with project condition" and $2,140 representing "without project condition" appears reasonable and fair. Therefore, the net land market value difference in "with project condition" and "without project condition" is approximately $1,070 in 2004 dollars (the year the Real Estate analysis was completed). Noting Table 8 above, which indicates site needs each decade from 2000 to 2050 are 3, 2, 3, 4 and 1, respectively. Computing the net land market value difference for all sites over the project period (through 2050) results in an estimate of $1,249,930 for Plan I-1 and $1,418,200 for Plan E, the 14 site plan, respectively.

11.3 Benefit-Cost Ratio

The Expected Value and Probabilistic Values of Benefit-Cost Ratio for Plan I-1, the recommended NED plan, are presented in Table 33. The Expected Benefit-Cost Ratio for Plan I-1 is 1.67.

Table 33
EXPECTED VALUE AND PROBABILISTIC VALUES OF BENEFIT-COST RATIO, NATIONAL ECONOMIC DEVELOPMENT, PLAN I-1

Project Alternative	Expected Benefit-Cost Ratio	Probability Benefit-Cost Ratio > 1	Probability Benefit-Cost Ratio Exceeds Indicated Amount		
			0.75	0.50	0.25
Plan I-1	1.673	0.94	1.331	1.672	1.944

APPENDIX B

TRI-CITY REGIONAL PORT DISTRICT
VIEWS AND PREFERRED PLAN

FOREIGN TRADE ZONE #31

TCRPD

RIVER'S EDGE

Tri-City Regional Port District

July 29, 2005

Colonel Lewis F. Setliff III
District Engineer
U.S. Army Corps of Engineers
1222 Spruce St.
St. Louis, Missouri 63103

RE: St. Louis Harbor Study

Dear Colonel Setliff:

Tri-City Regional Port District believes the best plan is to create a new harbor facility at the River's Edge complex. This facility can be designed to be safe for navigation, to have minimal environmental impacts, and to greatly benefit the local economy. The Port District also believes it is in a position of being a leader in the inland waterway industry in developing container on barge capabilities through this new harbor and the only such facility in the Port of St. Louis. Container traffic handling was not analyzed in the economics justification analysis of the General Evaluation Report.

Tri-City Regional Port District (Tri-City Port) is the local sponsor for the St. Louis Harbor Project. Tri-City Port, a municipal corporation of the State of Illinois for the past 46 years, has extensive experience in developing inland river harbor and terminal infrastructure. Existing terminal facilities are capable of handling in excess of five million tons of various commodities annually.

In 2002 the U.S. Congress mandated that the Charles Melvin Price Support Center (Army Depot) in Granite City, Illinois be deeded over to Tri-City Port through the U.S. Maritime Port Conveyance Program for the specific purpose of utilizing this strategic location for development of an intermodal freight complex. This site now called "Rivers Edge is strategically significant because it is the only site in the U.S which "combines" lock free navigation below Lock 27 on the inland waterway system to the Gulf of Mexico, access from six Class I rail carriers (BN, UP, KCS, CN, NS, CSX) through the Granite City rail corridor, and is served by 4 Interstate Highways.

1635 W. First Street, Granite City Illinois 62040-1838
(618) 877-8444 - (618) 452-3337 FAX (618) 452-3402
http://www.tricityport.com

The Tri-City Port site, comprising 1,300 acres of prime industrial property adjacent to the Mississippi River, is fully developed in terms of primary infrastructure, including rail, roads, utilities, security, warehousing, distribution facilities, and other supporting structures. In place infrastructure at this site is valued in excess of $200,000,000.

Beginning in 2003 the Port undertook an objective evaluation of this site in terms of the current intermodal market to be served, the interrelationship of the as built landside support infrastructure with the marine environment, and optimal harbor design to minimize maritime and environmental impacts.

Analysis of the St. Louis Harbor/Tri-City Port area terminal marketplace found several compelling river terminal opportunities:

a) A state of art General Cargo Dock and associated storage and distribution facilities. This facility must be capable of handling in excess of 3,000,000 tons of sheet steel in coil form annually without damage by rail, truck, barge. This facility must also be capable of routinely handling container on barge shipments. This facility must also be capable of handling other general cargo merchandize working 24 hours/day-7 days/wk.
b) A high speed/high capacity bulk terminal for rail to barge transfers of both dry bulk and liquid bulk product shipments. The location south of Lock 27 with access to multiple Class I Railroads is key.

The existing as built infrastructure including rail, roads, buildings, utilities, etc. within Rivers Edge is oriented north and south. It then only makes sense that the harbor complex be built on the same axis to avoid overly complex cargo handling situations. The state of art method of handling general cargo in a damage free setting is by utilizing an overhead electric crane and craneway, which runs in a straight line from warehouse to river terminal. For instance a coil of steel can be picked from any point in a barge and deposited directly to any point in the distribution warehouse or to rail or truck with one pick, with no forklifts or intermediate movements.

Reduction of impacts was a key component in designing of the Rivers Edge Harbor. The proposed slip harbor design minimizes maritime impact through numerous features: least disturbance of waterfront, minimizes barge backing or maneuvering in the channel, and situated in slack water conditions for majority of year, discussed in greater detail below.

The proposed harbor arrangement has minimal effect on flood levels by avoidance of heavy filling in the floodplain. The location, size, and orientation of the harbor minimizes wetland impacts. The landside development serves to further stabilize the 500 year flood frequency levee system and minimize underseepage.

The river navigation reaches from Lock 27 south into and through St. Louis Harbor is one of the most critical reaches in the inland river system. This reach handles 90,000,000 tons of freight per year on average. Factors compounding the complexity of this reach are the number of bridges and location and width of bridge spans, a river channel crossing from West to East approaching the McArthur Rail Bridge, dead water in Chain of Rocks Canal, siltation build up in the lower end of Chain of Rocks Canal, and lack of northbound tow hold points awaiting Lock 27 turns. High water and low water events compound these issues and add additional challenges.

Even with all these considerations and complexities Tri-City Port with the cooperation of the Corps of Engineers and the barge towing industry believes that without question it can build and operate a River's Edge Harbor which actually improves navigation safety, reduces Corps operations and maintenance costs and at the same time creates new river commerce opportunities for the industry.

Consider the following:

* Northbound Tow Hold Points- At times when traffic is especially heavy and/or Lock repairs are underway, etc., locking delays occur at Lock 27, which require tows to hold up awaiting lock turn. In these instances the tow radios ahead as it enter St. Louis Harbor and secures a Lock turn number. The tow then tries to find a safe anchorage or hold point awaiting its turn. As its lock turn approaches the tow moves up to the lower entrance to the Chain of Rocks Canal and into a hold position. Some tows choose to push into the left descending bank, while others to the right descending bank. We propose herein that the Corps of Engineers construct permanent fixed mooring points consisting ideally of stout river cells between the McArthur Rail Bridge and Lock 27. As the maximum tow size is 15 barges, the hold points can be of uniform length. The Lockmaster would have control of these hold points and use them as an aid in queuing of traffic awaiting lock turns. In addition to providing "safe harbor" to tows awaiting locking these hold points would provide "safe anchorage" thus allowing towboats to cut power, saving fuel. In terms of the Rivers Edge Harbor, having designated hold points eliminates potential conflicts with harbor frontage.

* Extension of Chain of Rocks Canal Traildike- The St. Louis Harbor Study (this report) commenced in the late 1970's prompted mainly by the problem of sediment build up on the Missouri side of the river from the area of Lange Stegman down through the City of St. Louis dock on North Market. An elaborate L shaped dike was proposed, but eventually discarded as impractical. In the meantime with the advance of modeling techniques the Corps has been better able to predict the effect of different actions. In the early 1980's dikes were placed on the west side of Mosenthein and Chouteau islands forcing the channel closer to the Missouri bank. The result has been an improvement, but not a cure for the siltation problem in the St. Louis Harbor in this reach.

More recent modeling indicates that by extending the Chain of Rocks Canal traildike to a point just above the McArthur Rail Bridge will further assist with two siltation problems. By pushing the channel crossing further south further improves the Missouri bank siltation problem by keeping the channel closer to the Missouri bank further to the south and also will help keep the lower entrance of the Chain of Rocks Canal more free of siltation. Currently this area must be dredged every year. In terms of navigational safety, moving this traildike south means that downbound tows do not get hit by the crossing current above the McArtrhur Bridge. Experienced towboat pilots indicate that many of the southbound allisions through this area are caused because of an incorrect tow set made by the pilot above the McArthur Bridge. After starting down the chute at the wrong set it is very difficult to correct. Extending slack water to the McArthur bridge abutments gives the pilot more time to get a correct tow set for the McKinley, Martin Luther King, Poplar Street Bridge spans. Northbound tows should not be adversely impacted.
For the Rivers Edge Harbor this means that for the majority of the year the entrance/exit from the harbor is in static water conditions, allowing safer entry/exit. It also means less harbor dredging.

As a part of the Rivers Edge Harbor development, Tri-City Port proposes to develop a landside dredge spoil site to accommodate Corps dredge spoils from Chain of Rocks Canal dredge operations. Instead of just moving sand from one point in the harbor to another, where it will be carried further down into the harbor this material will be put to beneficial use in the development of River's Edge

* Slip Harbor Design and Location- The downward sloping slip harbor design proposed by Tri-City Port safely accommodates both inbound and outbound harbor tug movements. Harbor operations will rely on spots and pulls from St. Louis Harbor fleets. Therefore, the harbor will not be landing line haul traffic. The harbor is set up to be able to receive a four barge spot in a 2 X 2 configuration. The harbor tug pushing north through the McArthur Bridge span can push directly into the harbor and spot directly into the general cargo dock or push into the temporary mooring area. The harbor tug can then reposition barges in the harbor without getting into the channel. For southbound moves the tow will be built within the harbor in a maximum 2X2 configuration. Rakes will be topped within the harbor confines. When traffic is clear the harbor tug pushes into the channel and gets its set for the push between the McArthur span. The general cargo dock will accommodate three barges under hook at one time. Barges can be worked without moving the barges. Therefore typically there will be only one spot/pull per 24 hour period.

The above recommendations are made in the spirit of addressing the reason that the St. Louis Harbor Study was authorized by Congress in the first place. Congress intended that the St. Louis Harbor Study find a solution to the north harbor siltation problem and to evaluate the feasibility of additional terminal facilities adjacent to the Chain of Rocks Canal.

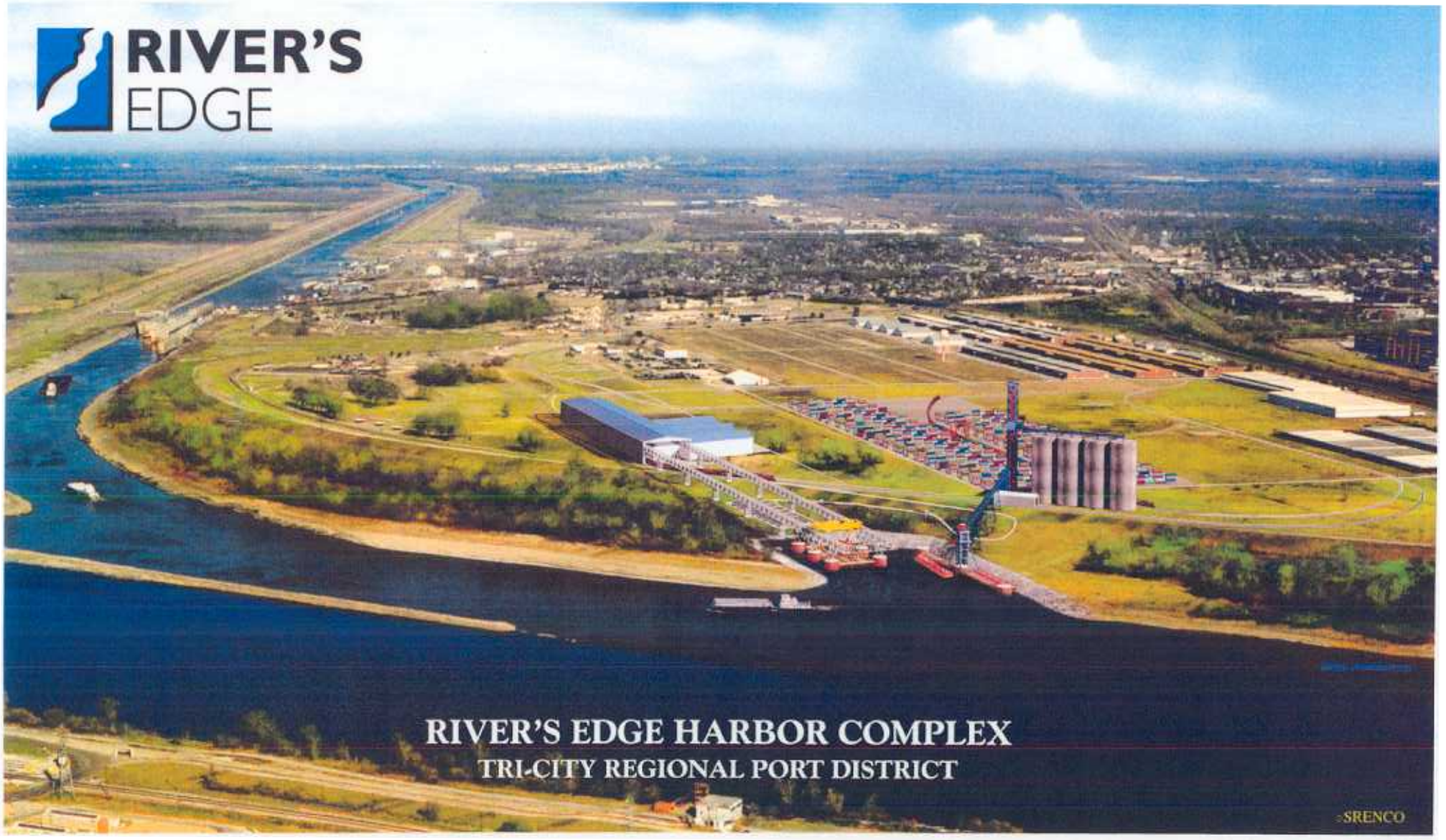
The recommendation to extend the Chain of Rocks Canal traildike is a low capital cost method to reduce sediment build up in the north harbor area. The recommendation to develop an off channel dredge disposal site funded by Tri-City Port further reduces the sedimentation impact in the north harbor.

The recommendations regarding development of the River's Edge Harbor complex addresses a capacity need that was recognized in the late 1970's. The proposed harbor development is projected to handle in excess of $2,000,000,000 worth of commodities per year, creating substantial local, regional, and national economic benefit. Unlike the Corps of Engineers generic national economic impact modeling to determine economic impact, Tri-City Port utilizes known commodity movements which are tributary to this site by virtue of specific strategic rail and highway interfaces and captive local markets. It is for this reason as well as the need to timely address the start of harbor development to meet market objectives that Tri-City Port has elected to proceed with this project without Federal financial participation.

Sincerely,

Robert Wydra
Executive Director

RW/ga


RIVER'S
EDGE
RIVER'S EDGE HARBOR COMPLEX
TRI-CITY REGIONAL PORT DISTRICT
SRENCO


Barge Sta
Trail Dike Extension
Slip Harbor

Tri-City Regional Port District

1635 West First Street
Granite City, Illinois 62040

Office: (618) 877-8444
Fax: (618) 452-3402

www.tricityport.com

RIVER'S EDGE

Tri-City Regional Port District
New Slip Harbor and Barge Staging

SCALE:
1" = 1000'

PAGE NUMBER:
001 out of 001

DATE:
Thursday, July 28, 2005

FILE NAME:
USACE Harbor.dwg

PROJECT:
GIS Mapping System

DRAWN BY:
William S. Stahlman III