

ANNEX F

SUPPLEMENTAL MAJOR REHABILITATION
EVALUATION REPORT
AND
COST ESTIMATES

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Herbert Hoover Dike - Reach 1 Supplemental Major Rehabilitation Evaluation Report

Introduction

For over 20 years, USACE reports have documented numerous cases of seepage, piping, boils, and stability problems along several sections of the Herbert Hoover Dike (HHD) surrounding Lake Okeechobee. These embankment distresses are exacerbated during high water events that correspond roughly to a 30-year recurrence interval, or when the lake elevation approaches 18.5 feet NGVD.

In November 2000, USACE published a Major Rehabilitation Evaluation Report (MRR) for Reach 1 of the HHD, as authorized by HQUSACE in accordance with ER 1130-2-417 (now superseded by 1130-2-500). In order to prioritize stability concerns, the HHD was divided into 8 Reaches as shown in Figure 1. Reach 1 was given the highest priority and Reach 8 the lowest. Due to concerns over being able to fully fund such a large repair project, construction schedule limitations, and variations in geology, Reach 1 was further subdivided into 4 subreaches; beginning with A in the northernmost stretch and ending with D in the southernmost stretch.

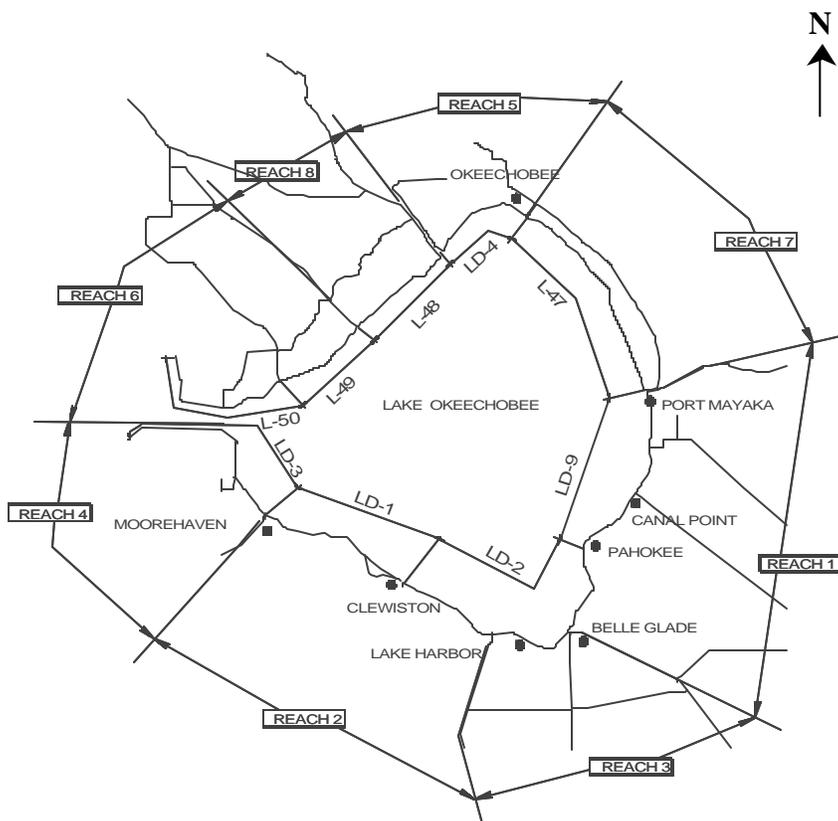


Figure 1: Reach Designations for HHD and Lake Okeechobee

Herbert Hoover Dike – Reach One

Specifically, Reach 1 subreach A (R1A) extends from the south side of the St. Lucie Canal at Port Mayaca (S-308) southwards to culvert structure C-10A, a distance of 4.6 miles. R1B&C continues from C-10A southwards to culvert structure C-10, a distance of about 10.5 miles. R1D continues southward from C-10 to structure S-351 in Belle Glade, a distance of about 7.3 miles.

The recommended plan for the entire Reach 1, as contained within the MRR, is shown in Figure 2. It recommends constructing a gravel-filled trench and placing a 48-inch diameter pipe within the existing toe ditch landward of the HDD. This culvert and trench would then be covered with a gravel berm. A drainage swale would be needed further landward to capture stormwater and agricultural runoff. This plan called for a substantial amount of real estate acquisition as the berm and drainage swale would extend beyond the current right-of-way limits of the HDD. Additional alternatives considered during the MRR analyses were toe ditch weirs (Alternative A) and a cutoff wall (Alternative C).

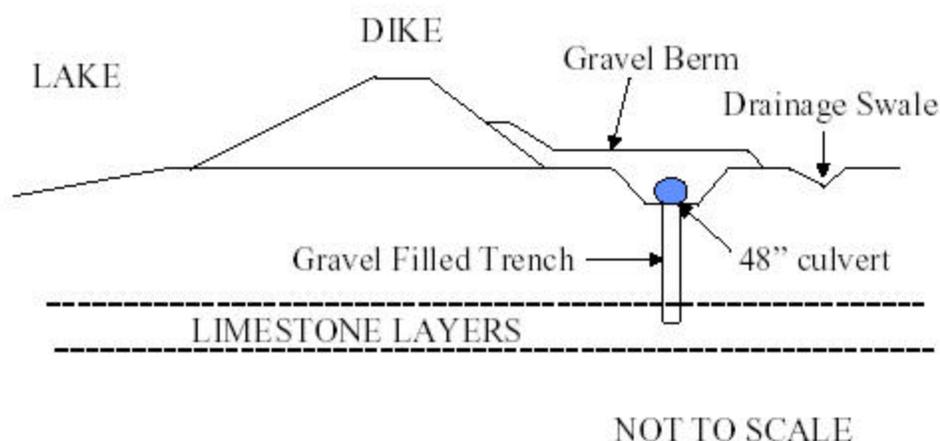


Figure 2: MRR Recommended Plan

An Independent Technical Review (ITR) involving an expert panel review and a deterministic technical review of the MRR was performed by the URS Group. Results further confirmed the need for remediation of HDD due to serious stability concerns. Although the possibility of a breach solely due to slope failure or sinkhole activities was ruled out, it was determined that these factors could be contributory to a breach of HDD. Seepage gradients were found to increase non-linearly as the lake elevation exceeds +20 feet. It is URS' opinion that given the existing geometry and condition of HDD and in absence of maintenance activity, seepage and piping-related dike breach would be likely as the lake elevation rises above +20 feet. In many cases, the factors of safety for the existing conditions for slope stability and piping are currently below minimum standards as set forth in guidance contained within EM 1110-2-1902 (Slope Stability) and EM 1110-2-1901 (Seepage Analysis and Control for Dams)

URS also performed the Value Engineering Study (VE) of the recommended MRR plan, along with active participation from USACE and the South Florida Water Management District (SFWMD). The VE study recommended an inverted filter with a relief trench, as shown in Figure 3. In two locations within R1, the VE plan also called for a cutoff wall. The VE plan would have terminated at the inside toe of the existing toe ditch, thereby eliminating the need for additional real estate acquisition.

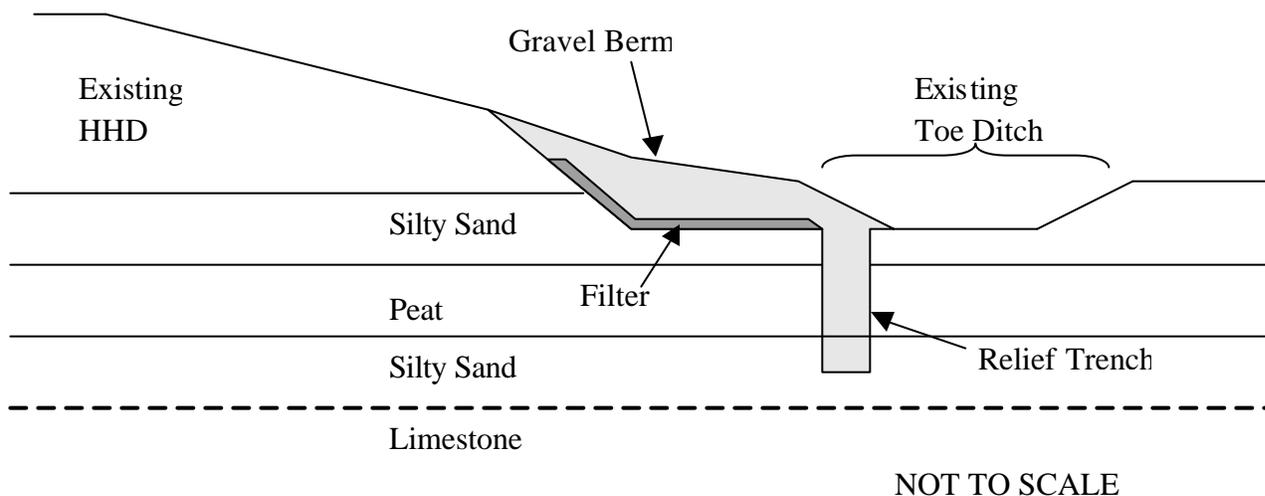


Figure 3: Conceptual Plan from VE Study

Design Documentation Report

In 2003, URS was contracted to develop a Design Documentation Report (DDR) of the conceptual VE plan for use in preparation of eventual Plans and Specifications (P&S) for construction within R1A. The Scope of Work (SOW) directed URS to consider geotechnical analyses for slope stability and safety against piping at lake elevations corresponding to the 100-year (el 21.3) and Standard Project Flood (SPF) (el 26) events. Existing conditions were modeled with the lake elevation equal to 18.5, roughly the 30-yr event.

At the 30% submittal of the DDR for R1A it was discovered through geotechnical analyses and field construction of test sections that the VE plan would actually increase groundwater flows to the toe ditch. This additional flow would contribute to flooding of adjacent properties. The functionality of the toe ditches is further complicated by the reality that local farmers will pump water into or out of the agricultural canals thus affecting the water level within the toe ditch. This is significant because the water level in the toe ditch is indicative of the tailwater condition during seepage (given the lake elevation as the headwater). If the water level inside the toe ditch is low, the larger head difference across HHD causes larger exit gradients that lower the factor of safety against piping/boils. If the water level inside the toe ditch is high, the pore pressures tend to increase, causing a reduction in shear strength that lowers the factor of safety against slope stability.

Correspondence between URS and USACE SAJ resulted in a modification to the SOW for the DDR such that any remedial solution applied to HHD should produce a stable structure, in terms of seepage, piping, and slope stability, that is independent of tailwater conditions. The SAJ district prefers not to be in the business of controlling HHD tailwater.

In order to satisfy the new design guidance, URS considered several possible rehabilitation solutions in their stability analyses. The only solution that satisfied all conditions of stability while not increasing groundwater flows to the toe ditch is shown below in Figure 4. The preferred solution is a combination of alternatives from both the MRR (cutoff wall) and the VE

Herbert Hoover Dike – Reach One

study (relief trench). This is the same solution for which construction P&S and cost estimates have been prepared for R1A, also performed by URS.

The cutoff wall would be a self-hardening cementitious slurry wall two feet thick and approximately 35 feet deep. The relief trench and gravel berm would be filled using washed, crushed stone that is graded from ½ to 1 inch. The relief trench would be lined with a geotextile filter fabric to inhibit piping by preventing the migration of fine particles.

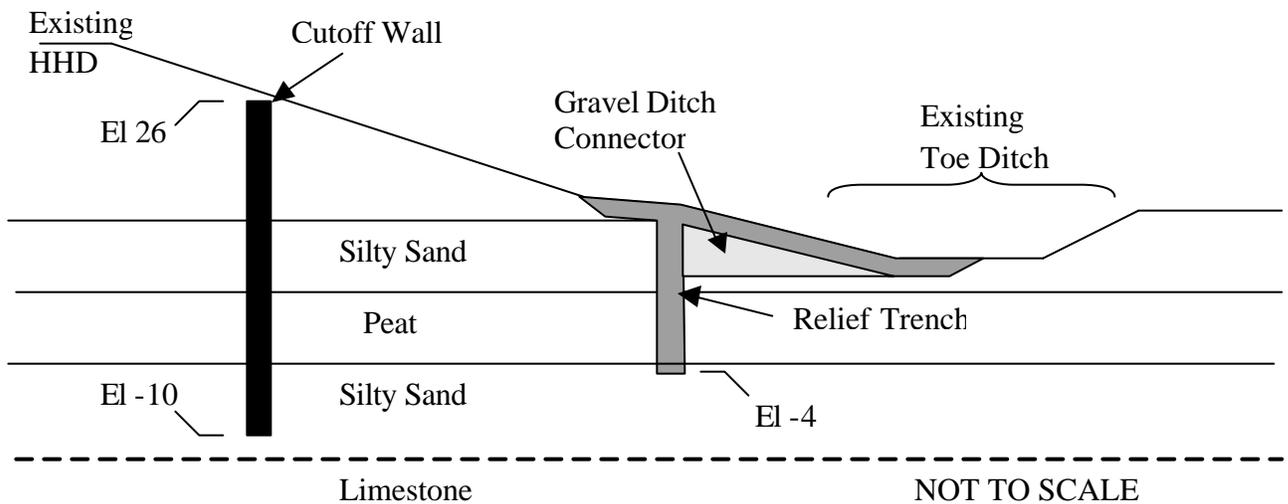


Figure 4: Preferred Solution from DDR R1A

DDR's for R1B&C, by URS, and R1D, by Civil Services, Inc (CSI), are currently being prepared. The same design guidance incorporated into the DDR R1A is being employed during seepage and stability analyses for these remaining DDR's for Reach 1. However, due to variations in subsurface geology, dike geometry, and surface features, it should be expected that the final recommended plans will vary as conditions warrant from the preferred plan for R1A. The overall intent of the rehabilitation of HHD is to have a stable structure, independent of tailwater conditions, that satisfies global stability and factors of safety against piping/boils, that does not burden the maintenance department with additional concerns, nor should the solution negatively impact regional groundwater flow.

Cost Analysis

A cost analysis was performed by the VE section of SAJ that describes the genesis of project costs from the MRR solution to the current P&S preferred solution. In summary: the construction cost of the original MRR solution was about \$80M. Accounting for escalation costs, inflation, revised real estate, and revised construction quantities, the current dollar amount estimated for construction of the MRR solution is about \$107M. A construction cost estimate has been performed only for the R1A section for which P&S have been prepared (the DDR's are in-progress for the remaining subreaches of R1). When the estimated R1A construction cost is extrapolated to the entire R1, the current P&S preferred solution is estimated to be about \$127M. More information on the costs is presented in Annex F of the Supplemental Draft EIS.

9 February 2005

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report
Revised Costs and Explanations Summary

Purpose:

This Revised Costs and Explanations Summary is intended to identify Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report (MRR) project costs as identified and estimated from the November 2000 report, and compare these costs to three specific progressions in the project's development through the present. The initial plan and compared project development and design progressions are identified as:

- Base Cost MRR Recommended Plan (In 1999 Dollars), Issued November 2000
- 1st Revision MRR Recommended Plan (In 1999 Dollars and revised Escalation with Civil Works Construction Cost Index System), Updated December 2004
- 2nd Revision MRR Recommended Plan (In 1999 Dollars with Revised Quantities and Escalation with Civil Works Construction Cost Index System), Issued with Value Engineering study recommendations and subsequent DDR, July 2002
- Current Design Revision (In 2005 Dollars and Based on Reach 1, Subreach A Unit Costs Applied for 22.35 Miles in 2005 Dollars and Escalation with Civil Works Construction Cost Index System), Issued October 2004

To compare different estimated costs over several years of development, estimated costs for the 1st and 2nd Revised Plans were further updated to 1st Quarter 2005 Dollars. The 1999 costs are updated by various interest rates or indices for escalation, inflation, or discount rates for equal comparison in 2005 dollars.

Comparing Developing Estimates:

The following descriptions represent developing progressions in the design and the respective estimate revisions. The Current Design Revision represents the Reach 1, Subreach A, final design dated October 2004. As these costs are in 1st Quarter 2005 dollars, the updating to 1st Quarter 2005 dollar levels for 1st and 2nd Revisions are also provided:

1. The November 2000 MRR recommended plan project costs are estimated in 1999 Dollars. The construction features cost was initially escalated applying 3% per annum for a three-year period. The costs for all project features are listed in Table 1 as Base Cost MRR Recommended Plan. All costs are in 2nd Quarter 1999 dollars.

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report
Revised Costs and Explanations Summary

2. The first revised project estimate includes application of escalation for construction features indexed in accordance with ER 1110-2-1304 using the Civil Works Construction Cost Index System. Only construction features are revised by CWCCIS. The revision was made to support this summary comparison. The costs for all project features are listed in Table 1 as 1st Revision MRR Recommended Plan. All costs are in 2nd Quarter 1999 dollars.
3. The 1st Revision MRR Recommended Plan construction features are escalated to 2005, real estate is updated by 7% annually, and O&M is adjusted using 3.5%, for the 5 ½-year window. The costs for all project features are listed in Table 1 as 1st Revision MRR Recommended Plan (In 2005 Dollars with CWCCIS). All costs are in 1st Quarter 2005 dollars.
4. The 2nd Revision MRR Recommended Plan cost estimate revision reflects a correction in quantities from the November 2000 report. An error in materials quantities was discovered during the 2002 Value Engineering study. Quantities were corrected for the recommended plan for filter stone and filter sand and random fill, and were applied for the entire 22.35-mile Reach 1. Estimated costs for construction features and escalation increased by approximately \$20 million. The costs for all project features are listed in Table 1 as 2nd Revision MRR Recommended Plan. All costs are in 2nd Quarter 1999 dollars.
5. The 2nd Revision MRR Recommended Plan construction features are escalated to 2005 using the Civil Works Construction Cost Index System, real estate is updated by 7% annually, and O&M is adjusted using 3.5%, for the 5 ½-year period. The costs for all project features are listed in Table 1 as 2nd Revision MRR Recommended Plan (In 2005 Dollars with CWCCIS). All costs are in 1st Quarter 2005 dollars.
6. The Current Design Revision cost estimate reflects the current Reach 1, Subreach A design featuring a partial cut-off wall and inverted filter with relief trench that was developed following a Value Engineering study conducted in 2002. The VE recommendations replaced the culvert pipe system with the inverted filter with relief trench. Subsequent analysis determined the inverted filter with relief trench required the addition of a partial cut-off wall to control seepage. The current Reach 1, Subreach A design is reflected in the Final design submitted in October 2004. The October 2004, Reach 1, Subreach A, final design and estimated cost is applied to the entire 22.35 –mile length for estimated total cost for Reach 1. The costs for all project features are listed in Table 1 as Current Design Revision (Based on Subreach 1A applied for 22.35 Miles in 2005 Dollars w/ CWCCIS). All costs are in 1st Quarter 2005 dollars.

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report
Revised Costs and Explanations Summary

The Total Present Worth Cost was developed for the respective MRR plan and revisions. Also, an Equivalent Uniform Annual Costs is provided for both the 50-year and 100-year service life. This conversion effectively identifies total project cost distributed over the project's service life in an annual amount for the initial MRR Recommended Plan and all revised plans.

See Table 1 for a comparative summary of costs of Herbert Hoover Dike Reach 1. Net differences (in million dollars or percentage) are provided outside the Table margin for the 2nd Revision MRR Recommended Plan (In 2005 Dollars with CWCCIS) and the Current Design Revision plan (In 2005 Dollars with CWCCIS applied from Subreach A through Subreach D).

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report Revised Costs and Explanations Summary

Table 1

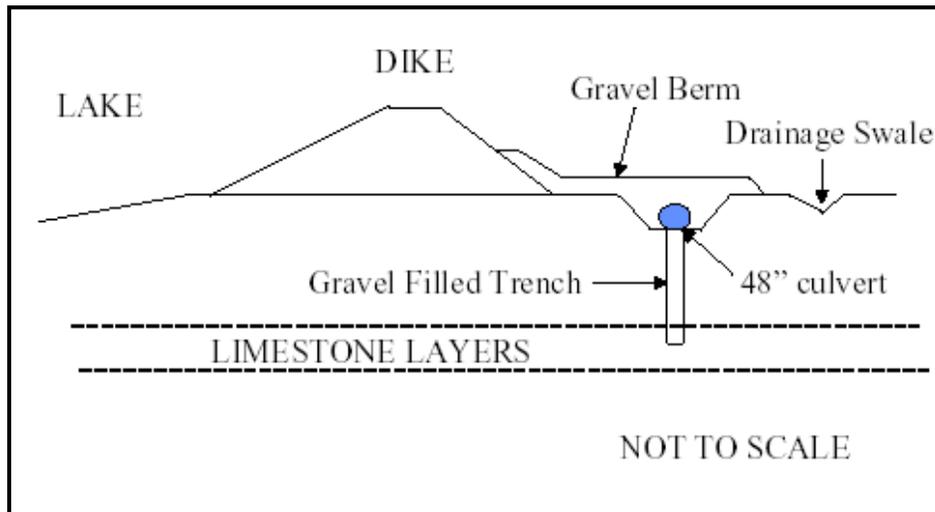
Herbert Hoover Dike Reach 1 Major Rehabilitation Comparative Cost Summary - Reach 1, Subreaches A Through D							
Cost Item	Base Costs MRR Recommended Plan (In 1999 Dollars w/ 3% Escalation for 3 Years)	1st Revision MRR Recommended Plan (In 1999 Dollars w/ CWCCIS)	1st Revision MRR Recommended Plan (In 2005 Dollars w/ CWCCIS)	2nd Revision MRR Recommended Plan (Revised Quantities in 1999 Dollars w/ CWCCIS)	2nd Revision MRR Recommended Plan (Revised Quantities in 2005 Dollars w/ CWCCIS)	Current Design Revision (Based on Subreach 1A applied for 22.35 Miles in 2005 Dollars w/ CWCCIS)	Net (Million) or %
Total Investment (Construction, E&D and SIOH)	\$67,604,980	\$67,604,980	\$67,604,980	\$85,377,838	\$85,377,838	\$119,148,936	\$33.8
Escalation for Construction Features¹	\$6,215,846	\$8,044,993	\$10,343,562	\$10,159,963	\$13,062,809	\$7,925,000	-\$5.1
Real Estate²	\$6,200,625	\$6,200,625	\$9,001,075	\$6,200,625	\$9,001,075	\$132,500	-\$8.9
Subtotal	\$80,021,451	\$81,850,598	\$86,949,617	\$101,738,426	\$107,441,722	\$127,206,436	\$19.8
Operations & Maintenance^{3 & 7}	\$50,547,431	\$50,547,431	\$61,085,559	\$50,547,431	\$61,085,559	\$59,742,592	-\$1.3
Total Present Worth Value for 50-Years	\$130,568,882	\$132,398,029	\$148,035,177	\$152,285,857	\$168,527,282	\$186,949,028	\$18.4
Total Annualized Value for 50-Years⁴	\$7,571,689	\$7,677,762	\$8,584,560	\$8,831,057	\$9,772,897	\$10,841,174	10.9%
Total Present Worth Value for 100-Years⁵	\$135,360,092	\$137,189,239	\$153,596,660	\$157,077,067	\$174,088,766	\$191,315,850	\$17.2
Total Annualized Value for 100-Years⁶	\$7,314,859	\$7,413,706	\$8,300,364	\$8,488,445	\$9,407,757	\$10,338,709	9.9%
	3-Year Construction Period	5.4-Year Construction Period					
Notes: 1	3% for 3 Years (1.092)	Civil Works Construction Cost Index System (CWCCIS 1.119)	Civil Works Construction Cost Index System (CWCCIS 1.153)	Civil Works Construction Cost Index System (CWCCIS 1.119)	Civil Works Construction Cost Index System (CWCCIS 1.153)	Civil Works Construction Cost Index System (CWCCIS 1.067)	
2	N/A	N/A	5.5-Years @ 7% Annual (1.45164)	N/A	5.5-Years @ 7% Annual (1.45164)	N/A	
3	N/A	N/A	5.5-Years @ 3.5% Annual (1.20848)	N/A	5.5-Years @ 3.5% Annual (1.20848)	5.5-Years @ 3.5% Annual (1.20848)	
4	50-Year Service @ 5 3/8% Annual (0.05799)						
5	Per ER 1110-2-8159: 100-Year Service and [\$15,000,000 X (0.0731)] Pipe Replacement at Year 50 and O&M for 100-Years	Per ER 1110-2-8159: 100-Year Service and [\$15,000,000 X (0.0731)] Pipe Replacement at Year 50 and O&M for 100-Years	Per ER 1110-2-8159: 100-Year Service and [\$15,000,000 X (0.0731)] Pipe Replacement at Year 50 and O&M for 100-Years	Per ER 1110-2-8159: 100-Year Service and [\$15,000,000 X (0.0731)] Pipe Replacement at Year 50 and O&M for 100-Years	Per ER 1110-2-8159: 100-Year Service and [\$15,000,000 X (0.0731)] Pipe Replacement at Year 50 and O&M for 100-Years	N/A	
6	100-Year Service @ 5 3/8% Annual (0.05404)						
7	N/A	N/A	N/A	N/A	N/A	O&M Discount for Pipe Line Inspection Services/SOW/ Procurement (50 - \$1,084,302 & 100 - \$1,163,557). Stop log Operations not Required (50-Yr (-\$258,665) & 100-Yr (-\$277,572)).	

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report
Revised Costs and Explanations Summary

Chronology of the Herbert Hoover Dike Design:

Herbert Hoover Dike Major Rehabilitation Report (MRR) approved in 2000 contained a selected plan utilizing a covered pipe in the toe ditch with a seepage trench beneath the pipe for collection of water, as well as serving as a piping barrier (Alternative B from MRR). This plan addresses stability, seepage, and piping issues associated with Herbert Hoover Dike rehabilitation. In the alternatives for the MRR, a cutoff wall (Alternative C), and toe ditch weirs (Alternative A) were also considered and eliminated. Figure 1 below is a typical section of the selected plan found in the MRR. The solution from the MRR also requires the addition of a new drainage swale for conveyance of storm and irrigation water. This plan requires significant real estate acquisitions for implementation. A total construction period of 3-years was assumed.

Figure 1

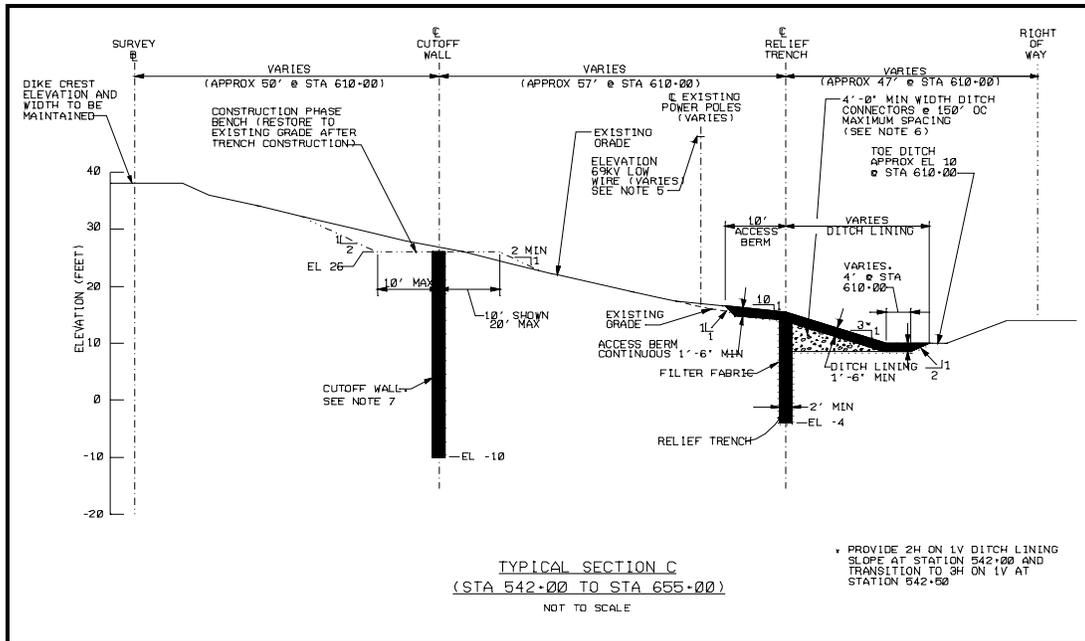


A VE study was initiated for the project in 2001 and completed in 2002. The VE study looked at alternatives to the MRR solution that may eliminate some of the costly real estate requirements and improve construction systems. The final selected plan utilized a gravel filter/seepage trench similar to the MRR, but relocated the trench lakeward to the toe berm of the dike. The VE study also utilized the existing drainage toe ditch for conveyance of water, but with no tailwater management. This solution satisfies the stability and piping problems, but does not address the additional water added to the toe ditch due to the seepage trench conveying ground water to the surface. The VE study also utilized a cutoff wall along two sections of Reach 1. During the DDR phase, the additional toe water issue was brought to light when a test section near South Bay (utilizing the VE design) proved additional water was being introduced onto private property. Discussions about additional water, no tailwater management, and real estate requirements led to modification the DDR contract to look at a combination of two alternatives from the MRR and VE study. The two features are a partial cutoff wall and seepage trench that would solve stability and piping problems, without increasing seepage rates (i.e., not effect the regional groundwater system).

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report Revised Costs and Explanations Summary

The final plan outlined by URS in the DDR utilized both the partial cutoff wall (elevation +26 to -10 ft-NGVD) and seepage trench (toe berm elevation down to -10 ft-NGVD) both located on the outside of the dike. See Figure 2 below for a typical section of the current final design for Reach 1, Subreach A.

Figure 2



The Plans and Specifications (for Reach 1, Subreach A) are currently developed in final design stage, and for this exercise the final design estimated cost for Reach 1, Subreach A, are applied for Subreaches B through D for a total estimated Reach 1 project cost. Table 2 provides the distributed estimated construction cost for each Subreach with CWCCIS indexed escalation. As the estimate was already in 2005 dollars, the escalation indices were applied to the estimated midpoint for each respective Subreach. A total construction period of 5-years and 5-months was assumed. While the current design provides improved solutions for the seepage problems, reduces or eliminates additional real estate acquisition cost and potentially reduces Operations & Maintenance; it does result in an increased cost for construction features of approximately \$19.8 million. Real estate and Operations & Maintenance cost are addressed and discussed further under their respective topic.

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report Revised Costs and Explanations Summary

Real Estate Cost Considerations:

The original MRR plan required real estate purchases involving approximately 300 parcels for construction and operations of the extended seepage trench and drainage swale. Real estate cost for lands required is a 100% local sponsor expense. This cost was unscheduled and was not budgeted for by the local sponsor. A major design objective during the development of the current design was the reduction of real estate impacts to the project. The current design reduces real estate acquisition and cost greatly; however, some expenses were incurred for two parcels (~3.5-acres in fee) and supporting temporary construction easements. Temporary construction easements are assumed for each construction Subreach contract.

After evaluation by SAJ-RE, a factor of 7% per year was used for escalation of MRR Plan 1999 real estate cost from the original MRR to 2005 dollars. Accordingly, real estate costs are shown in all plans in Table 1.

Project Service Life:

The initial MRR analyses for economic impacts were developed on a 50-year service life as is directed by ER 1105-2-100. Competing plans were compared on an equal basis. Cost and Benefits were determined to be 0.928 to 1 for the recommended plan. With identified likelihood of catastrophic dike failure due to piping, and subsequent potential for significant human suffering and loss of life, the MRR recommendation was made to implement rehabilitation of Reach 1 in the most efficient manner possible.

In accordance with ER 1110-2-8159 (addressing engineering and design for major Civil Works infrastructure projects such as locks, dams and levees), the HHD Reach 1 service life was further developed for 100-years to support comparisons under study in this summary. Both Total Present Worth Values and Total Annualized Value were developed in Table 1 for 50- and 100-years. The current 2005 discount rate of 5 3/8% was used.

Operations & Maintenance of Corrugated Metal Pipe Culvert System:

The original MRR recommended plan features a seepage/drainage berm with trench and filter fabric wrapped 48-Inch diameter corrugated metal pipe culvert with drop inlets spaced at 400-feet. Sixteen stop-log riser structures are also provided. Service life for the pipe system is considered as approximately 50 years for bituminous-coated 16 ga. galvanized steel culvert system. Estimated cost for replacement of 22.35-miles of pipe at year 50 is approximately \$15,000,000 (including costs for scope of work development, SIOH and solicitation of the contract package).

Maintenance requirements were reviewed and developed through interviews with the Construction Operations, South Florida Operations Office, and CO-OP in the district.

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report Revised Costs and Explanations Summary

The first activity identified was stop log operations for tailwater exercises for the MRR Plan. It was evaluated and averaged that one exercise would occur each year with an estimated cost of \$15,000. Present Worth for 50- and 100-Years was determined to be \$258,665 and \$277,572 respectively. These amounts were removed from the Current Plan O&M costs.

Routine cost for patrol, inspection and vegetation control, maintenance mowing, service road and crown maintenance/repair are required for all plans. Essentially, maintenance and replacement response activities would be nearly equal for the original alternative and the current design, but with the additional cost for stop log operations and periodic culvert pipe inspection, physical surveys and future replacement of culvert pipe at the end of the service life. Physical inspection of culvert systems is assumed to follow a five-year cycle, but may include physical inspection following significant weather events where the system has been stressed.

Professional services would be preferred for pipe inspection, and services would include mobilization, pipe line preparation (dewatering and venting for personnel access), closed circuit televised video of pipe systems, video defect coding reporting, system database management, and rehabilitation recommendations by formal report. Actual video inspection would have a per foot unit price ranging from \$1.40 to \$1.85 per foot. If inspection in the wet were required, sonar equipment and techniques would be used at \$4 per foot. Sonar is less reliable than CCTV and was not used in this analysis.

Estimated cost for the inspection service is approximately \$280,000 each 5-year period. District costs were also developed for preparing the contract package, SIOH and solicitation at \$70,000. Rounded total cost of \$350,000 was identified with a Present Worth value of \$1.084 million for 50-years and \$1.164 million for 100-years. As the current plan does not have the pipe systems, this amount was subtracted from the Current Design plan shown in Table 1.

Costs and Explanations Summary Conclusions:

The 2nd Revised MRR Plan (Revised Quantities in 2005 Dollars with CWCCIS) and the Current Design Revision (Based on Subreach 1A applied for 22.35 Miles in 2005 Dollars with CWCCIS) are now comparable in costs for equal estimating periods. The 2005 difference between Net Total Present Worth (50-Year) costs for two plans closed to approximately \$18.4 million from the \$19.8 million estimated construction difference; however, the economic impact for future pipe replacement and extended O&M are so distributed and discounted, the longer service life analysis does not significantly diminish the difference in total cost for construction and O&M. Note the 50- and 100-year service life difference in percentage is only 10.9% and 9.9% respectively for the two service life periods. The 100-year service life net is somewhat lower as \$17.2 million.

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report Revised Costs and Explanations Summary

Validation supporting the cost increases with the current design should recognize other measurable means than just the cost analysis deltas summarized in Table 1. The following items are to be considered:

- Applying unit cost from Subreach A to all Subreaches, the current estimate is a reasonable assumption. The major cost increase is the required partial cutoff wall. To encourage responsive and cost effective bids; three technical specifications are developed for the cutoff wall to offer maximum construction efficiency to potential bidders.
- Objectives to minimize real estate cost and encroachment beyond the original dike property boundaries were achieved. Approximately 300 real estate parcels were originally required. The funding resources for the South Florida Water Management District were not budgeted, and may not have come available to meet construction execution schedules. Delay of the for the original real estate requirements for the extended seepage design with drainage swell would have delayed the original MRR design execution. Elimination of potential schedule impacts from real estate assures recovery of schedule for construction with the Current Plan.
- The proposed current design will address and correct potential for failure of the dike caused by uncontrolled seepage and piping through the dike. The current design will perform for the extended 100-year life without a major replacement of seepage structure pipe systems in the future. Original piped seepage systems installed in the 1960's are now failing after some ~40 years of service. The expected service life for the Bentonite cutoff wall is 300-years.
- Finally, the current design more nearly achieves a single action solution without complicating O&M with frequent inspection of confined workspace pipe systems. Stop log operations for tailwater exercises during weather events are eliminated with the current plan. The requirement for future seepage drainpipe systems replacement is eliminated. When considering future O&M budget realities, it is not reasonable to obligate future O&M budget funding cycles to provide continued repair/replacement, maintenance and labor intensive actions when they can be eliminated by the current design solution.

Herbert Hoover Dike Reach 1 Major Rehabilitation Evaluation Report
Revised Costs and Explanations Summary

Table 2

Herbert Hoover Dike Reach 1 Major Rehabilitation				
Roll-Up Construction Estimate Based in Subreach 1A Final Design				
Subreach 1A Final Design In 1st Quarter 2005 Dollars				
	Reach 1A	Reach 1B	Reach 1C	Reach 1D
Construction Cost:	\$ 25,000,000	\$ 21,276,596	\$ 34,574,468	\$ 38,297,872
Seepage Berm with Partial Cut-off Wall				
Real Estate:	\$ -	\$ -	\$ -	\$ -
Escalation:	\$ 25,000,000	\$ 21,276,596	\$ 34,574,468	\$ 38,297,872
NTP	6-May-2005	4-Oct-2006	3-Oct-2007	12-Nov-2008
Duration	435	370	602	666
Completion	15-Jul-06	09-Oct-07	26-May-09	09-Sep-10
Midpoint	09-Dec-05	07-Apr-07	29-Jul-08	11-Oct-09
CWCCIS Indices				
CWBS 11				
Est. Date	562.33	562.33	562.33	562.33
Midpoint	574.93	589.26	603.46	618.72
	1.022	1.048	1.073	1.100
Total Escalation	\$ 560,169	\$ 1,018,937	\$ 2,528,849	\$ 3,840,480
Subtotals:	\$ 25,560,169	\$ 22,295,533	\$ 37,103,317	\$ 42,138,352
Total:	\$ 127,097,371 Use average of CWCCIS Indices: 1.067			