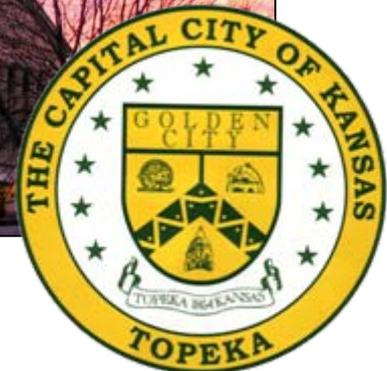




Topeka, Kansas, Flood Risk Management Project Feasibility Study and Environmental Assessment

Colonel Roger A. Wilson, Jr.
Commander
Kansas City District

Civil Works Review Board
30 January 2009





Presentation Agenda

1. Purpose of the CWRB
2. Overview of Feasibility Study and Recommended Plan
 - Project Background
 - Study Background
 - Study Authority
 - Study Area Description
 - Plan Formulation
 - Recommended Plan
3. Agency Technical Review
4. Public Information
5. Environmental Operating Principles
6. Actions for Change
7. Strategic Campaign Plan
8. Future Project Schedule
9. Summary
10. Questions
11. Recommendation



Purpose of the CWRB Briefing



- Provide the CWRB an overview of the Topeka, KS, Flood Risk Management Project.
- Obtain CWRB approval to proceed with release of the Topeka, KS, Flood Risk Management Project Feasibility Study (FS) and Environmental Assessment (EA).
- Answer questions and address comments.
- Discuss the next steps in the approval process towards a Chief's Report



Project Background

- Local levee projects date back to 1908.
- Federal project first authorized by the Flood Control Act of 1936 in response to a series of flooding events.
- First two units completed in 1939.
- Kansas River Flood of Record, 1951, led to additional project authorization in 1954.
- Modifications and construction of four additional units began 1962; system construction completed in 1974.

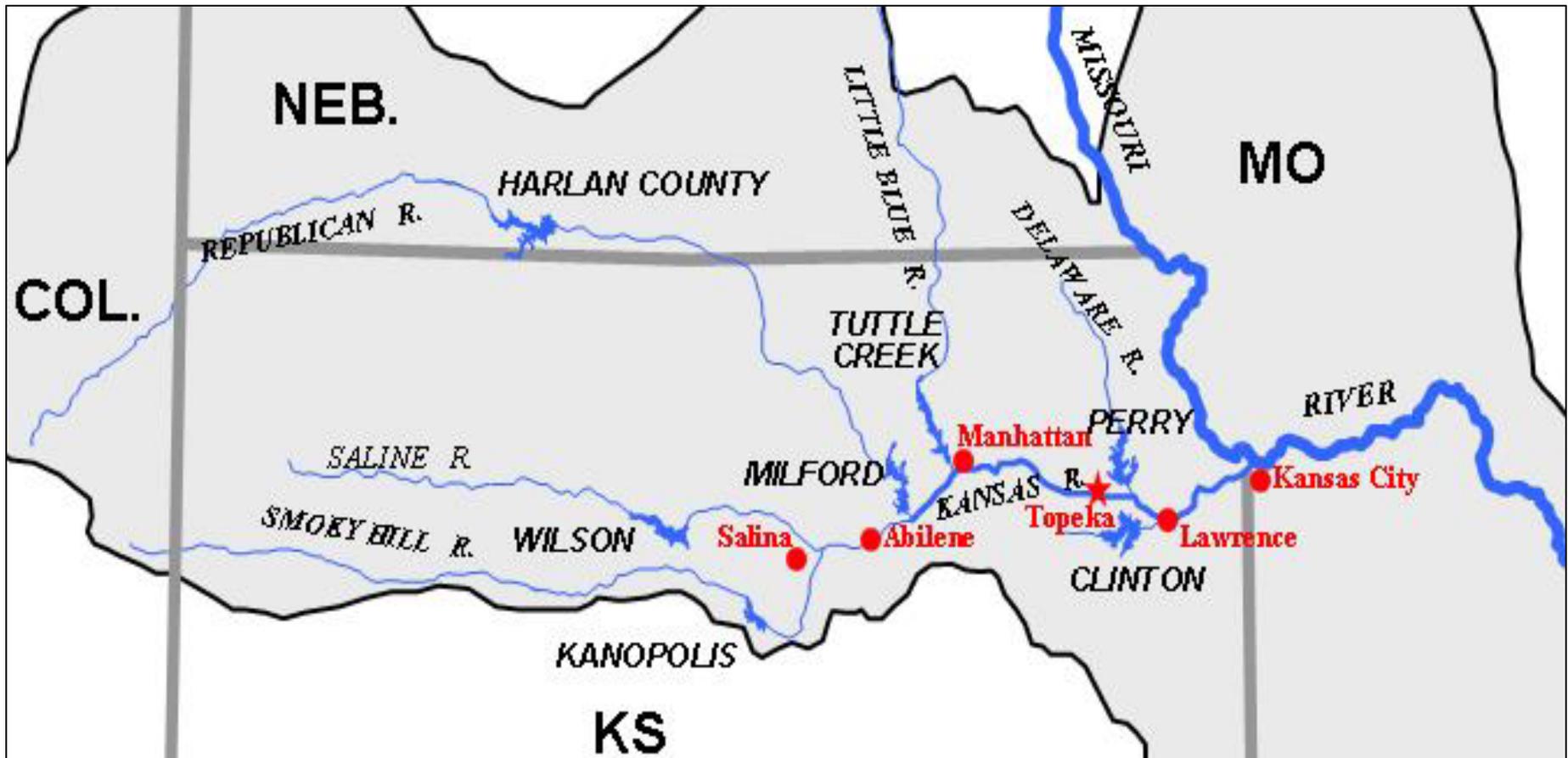




US Army Corps of Engineers



Project Background Kansas River Basin Flood Risk Management System



Study Background

- Concern was raised in the early 1990's by the KS Department of Transportation during highway bridge construction that the levees may not be high enough to provide the desired degree of flood risk management.
- Investigation by the Corps was requested by the City of Topeka and the North Topeka Drainage District in 1992.
- Reconnaissance Report
 - Completed in 1997.
 - Examined impacts of a levee raise
 - Determined a Federal interest and recommended proceeding to the Feasibility Phase.
- Feasibility Cost Sharing Agreement signed with City in August 1998.





Study Background

Purpose of the Feasibility Study

- Update and verify data on the reliability of the existing units.
- Develop alternative plans for reliability (performance) improvements.
- Select the Recommended Plan on the basis of technical effectiveness, plan completeness, economic feasibility, and environmental acceptability.





Study Authority

- Feasibility Study authorized under Section 216 of the 1970 Flood Control Act (review of completed civil works).

“The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects, the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to the significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying structures or their operation, and for improving the quality of the environment in the overall public interest”

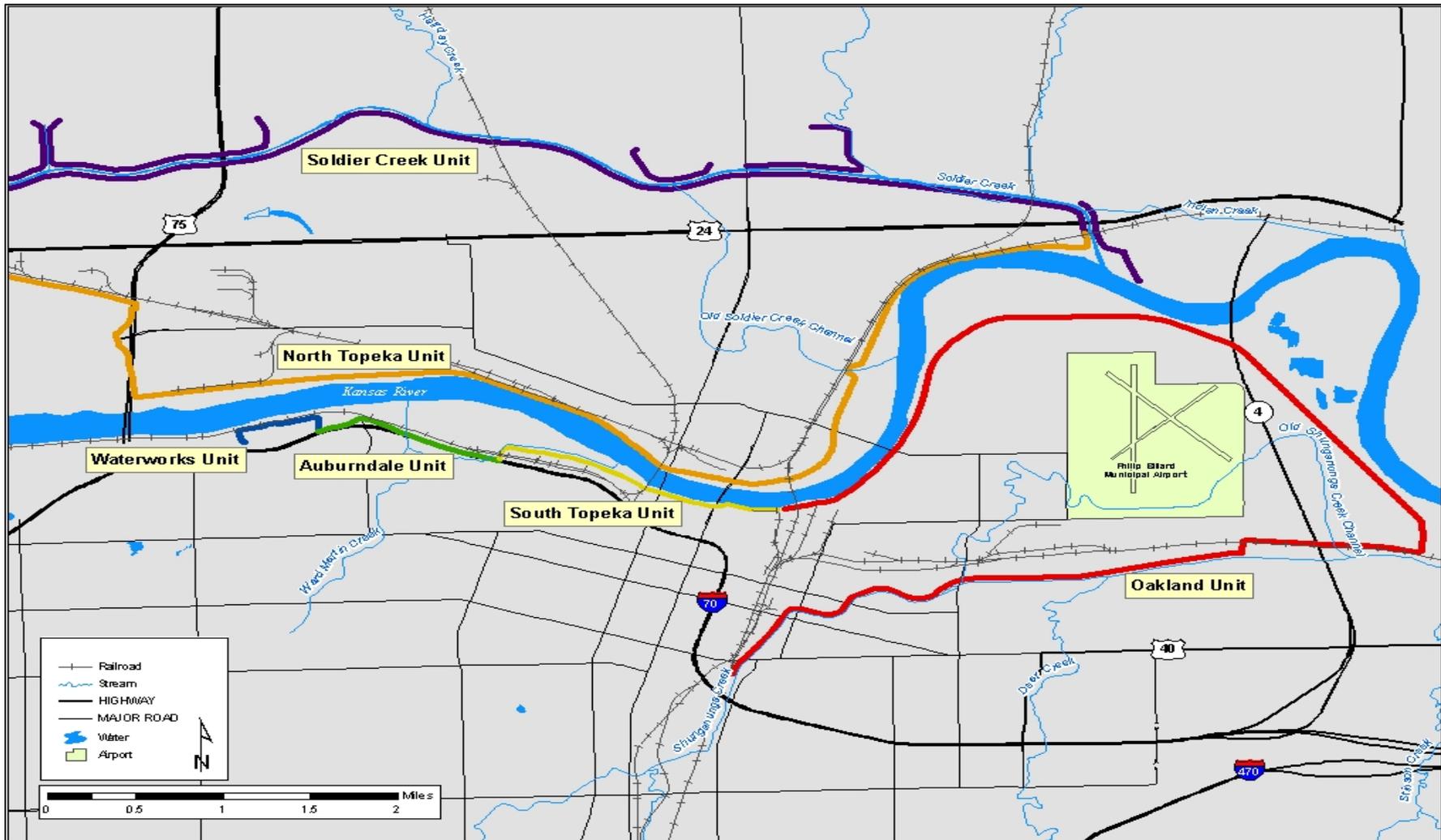
Study Area Description



- Existing system of 6 levee units provides local flood risk management for the metropolitan area of Topeka, Kansas, the state capital.
 - Local Project Sponsors: City of Topeka and North Topeka Drainage District.
 - Study area: 11,000 acres, 6,487 homes, 790 businesses. Total economic investment: \$2.67 billion.
-
- Mix of urban development and agricultural use.
 - Study area is highly urbanized. Local environment is habitat limited; primarily confined to upland forest adjacent to some areas of the existing levee system.



Topeka Levee System Study Area



Study Area Description: Waterworks Unit



- 1,998 feet of earth levee and 1,662 feet of concrete floodwall.
- Protects the Topeka Water Treatment Plant, the primary water source for the city and surrounding communities.
- Investment value: \$63.9 million.
- Includes nine pumped relief wells, four stoplog closure structures, and four drainage structures.
- Floodwall completed in 1938; levee section completed in 1959.

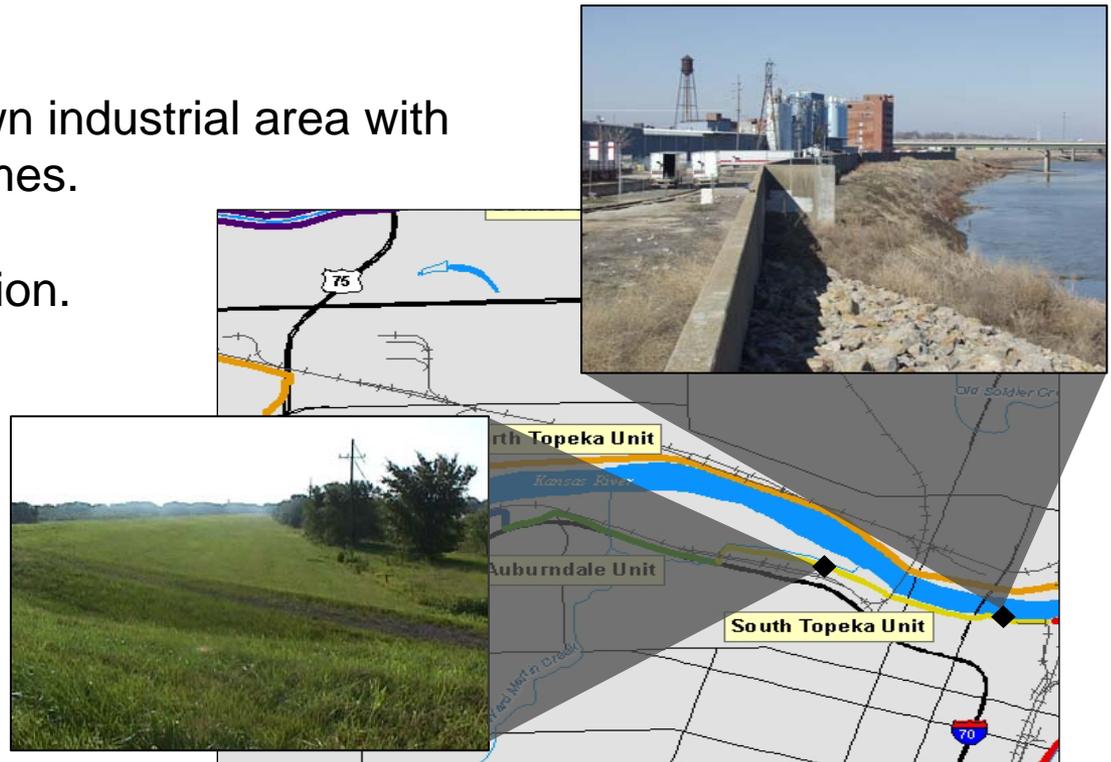
Study Area Description: Auburndale Unit

- Consists primarily of 1.3 miles of the Interstate 70 embankment.
- Protects a large, older neighborhood and retail area, including 616 homes and 18 businesses and facilities.
- investment value: \$119 million.
- Includes two pump stations, four drainage structures, 15 relief wells, and one sandbag closure structure.
- Construction completed in 1962.

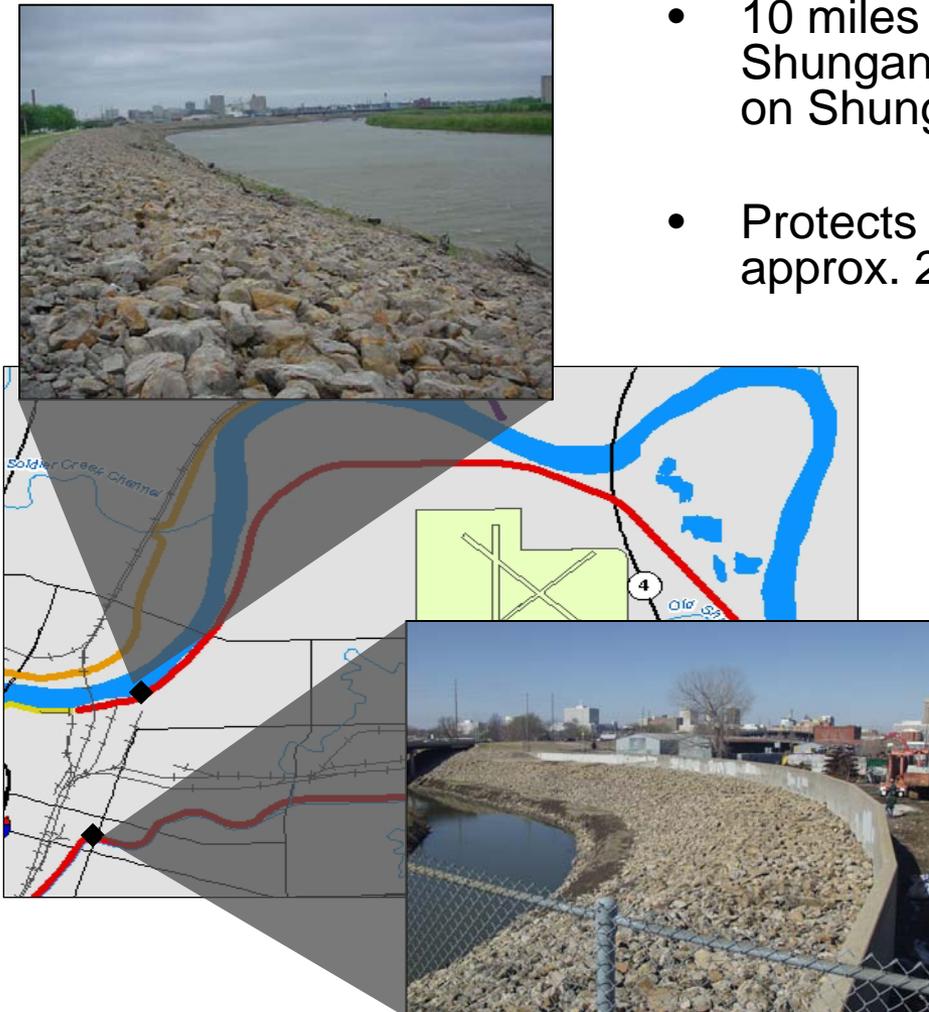


Study Area Description: South Topeka Unit

- 1.4 miles of earth levee and 1,945 ft of concrete floodwall.
- Four pump stations, 27 relief wells, 15 drainage structures, and two stoplog closure structures.
- Protects a primary downtown industrial area with 142 businesses and 80 homes.
- investment value: \$407 million.
- Original construction completed in 1939.
- Modifications completed in 1973.



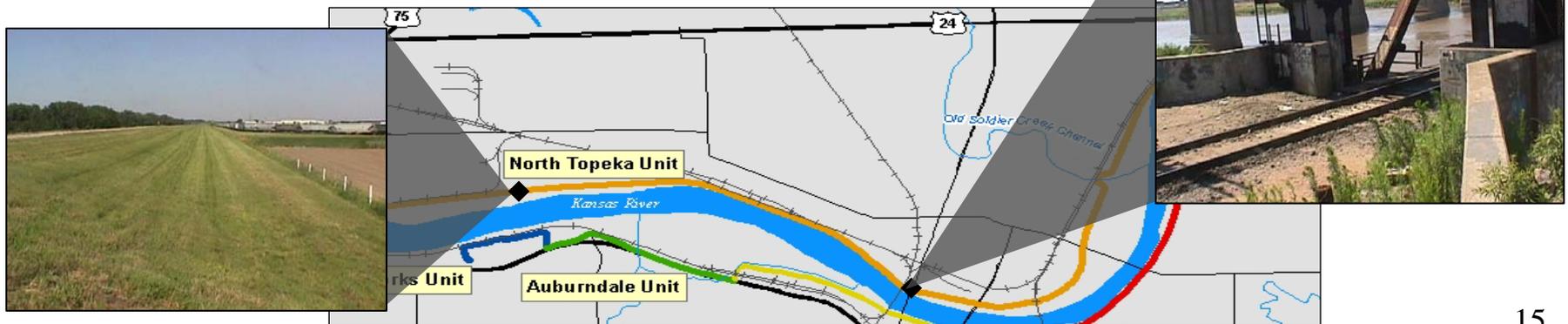
Study Area Description: Oakland Unit



- 10 miles of levee along the Kansas River and Shunganunga Creek; 515 linear feet of floodwall on Shunganunga Creek.
- Protects several urban neighborhoods with approx. 2,900 homes and 89 businesses.
- Total investment: \$578 million.
- Includes 22 relief wells, 48 drainage structures, two pump stations, and one sandbag closure structure.
- Construction completed in 1969.

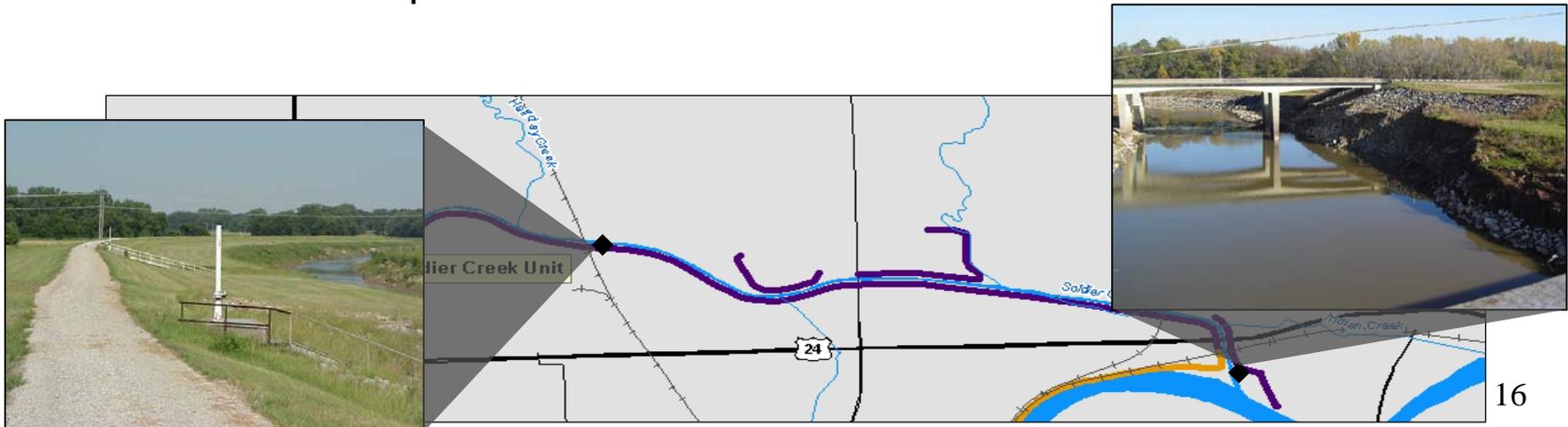
Study Area Description: North Topeka Unit

- Nine miles of levee on the left bank of the Kansas River.
- Protects several urban neighborhoods and retail and industrial areas, including 2,752 homes and 539 businesses.
- Total investment value: \$1.47 billion.
- Three pump stations, 15 drainage structures, three relief wells, one stoplog and one sandbag closure structure each.
- Construction completed in 1967.



Study Area Description: Soldier Creek Diversion Unit

- 9.2 miles of channel, 17.9 miles of earth levee including short tiebacks on several small tributaries. Connects to both ends of the North Topeka Unit.
- Relocated the Soldier Creek confluence with the Kansas River 1.6 miles downstream.
- Protects the same commercial area as North Topeka and an additional 100 homes and 700 acres of agricultural property. Investment value: \$1.5 billion.
- Construction completed in 1961.



Plan Formulation

- Original reliability concern was based on levee height. The 1997 Reconnaissance Study evaluated impacts of levee raise alternatives based on best available river hydrology.
- Feasibility Report evaluated Kansas River hydrology using updated modeling from the 2004 Flow Frequency Study.
- Updated evaluation results show that the levee system can pass the design flow without overtopping.
- Levee raise alternatives screened out from further consideration.
- Additional plan formulation focused on the geotechnical and structural features of the system.



Problems and Opportunities

Problems

- Geotechnical and structural reliabilities are unacceptable in 4 of the 6 units.
- Problems include levee underseepage, structure uplift, floodwall sliding stability, floodwall foundation stability, and pump station strength.
- No issues of concern identified in Soldier Creek or Auburndale Units.

Opportunities

- Increase the reliability of the existing system and flood risk management benefits over current condition.
- Reduce economic damages and human suffering caused by flooding in the project area.
- Preserve the current community development that has occurred within the project area and surrounding areas.





Existing Condition

- Geotechnical and structural areas of concern were analyzed for probability of failure.
- Nonexceedence probabilities to safely pass the 1% flood were determined for each unit using the standard HEC-FDA computer model.

Unit	Nonexceedence Probability vs. 1% flood event
Waterworks	92.8%
South Topeka	84.2%
Oakland	2.9%
North Topeka	14.1%

1%-chance event (100 yr flood) discharge at Topeka: 217,000 cfs.

Future Without Project

- Probability of passing base flood event will remain at unacceptable levels. Existing investment at risk; future investment questionable.
- Significant public safety risk will continue to exist for 17,000 residents within the study area.
- Increased flood-fighting needed during high water events.
- FEMA re-mapping and flood zone designation change, causing increases in flood insurance rates.



- 1% chance event under existing conditions expected to result in damages of \$768 million.
- Equivalent Annual Damages for the study area estimated at \$22,865,900.

Measures Considered and Screened

Non-Structural Measures

- Flood warning systems, flood-proofing of structures, pump station operational changes, relocation of structures and population
- No single measure, or combination of measures, was found to improve the reliability of the existing units to acceptable levels.

Structural Measures

- Uplift: Heel extension, replace structure, remove structure
- Pump station strength: Modification or replacement
- Floodwall sliding stability: Landside stability berm or foundation modification
- Floodwall foundation stability: Replace floodwall, construct new floodwall on offset alignment, construct earthen levee behind existing wall, modification of existing wall and/or foundation



Alternative Plans for Comparison

Waterworks Unit

- Alt 1. Landside floodwall stability berm

South Topeka/Oakland Unit

- Alt 1. Landside underseepage berms, replacement of S. Topeka floodwall, heel extension at E. Oakland PS, floodwall stability berm
- Alt 2. Relief wells, replacement of S. Topeka floodwall, heel extension at E. Oakland PS, floodwall stability berm

North Topeka Unit

- Alt 1. Landside underseepage berm, relief wells with pumped collector system, remove Fairchild PS
- Alt 2. Relief wells, relief wells with pumped collector system, remove Fairchild PS





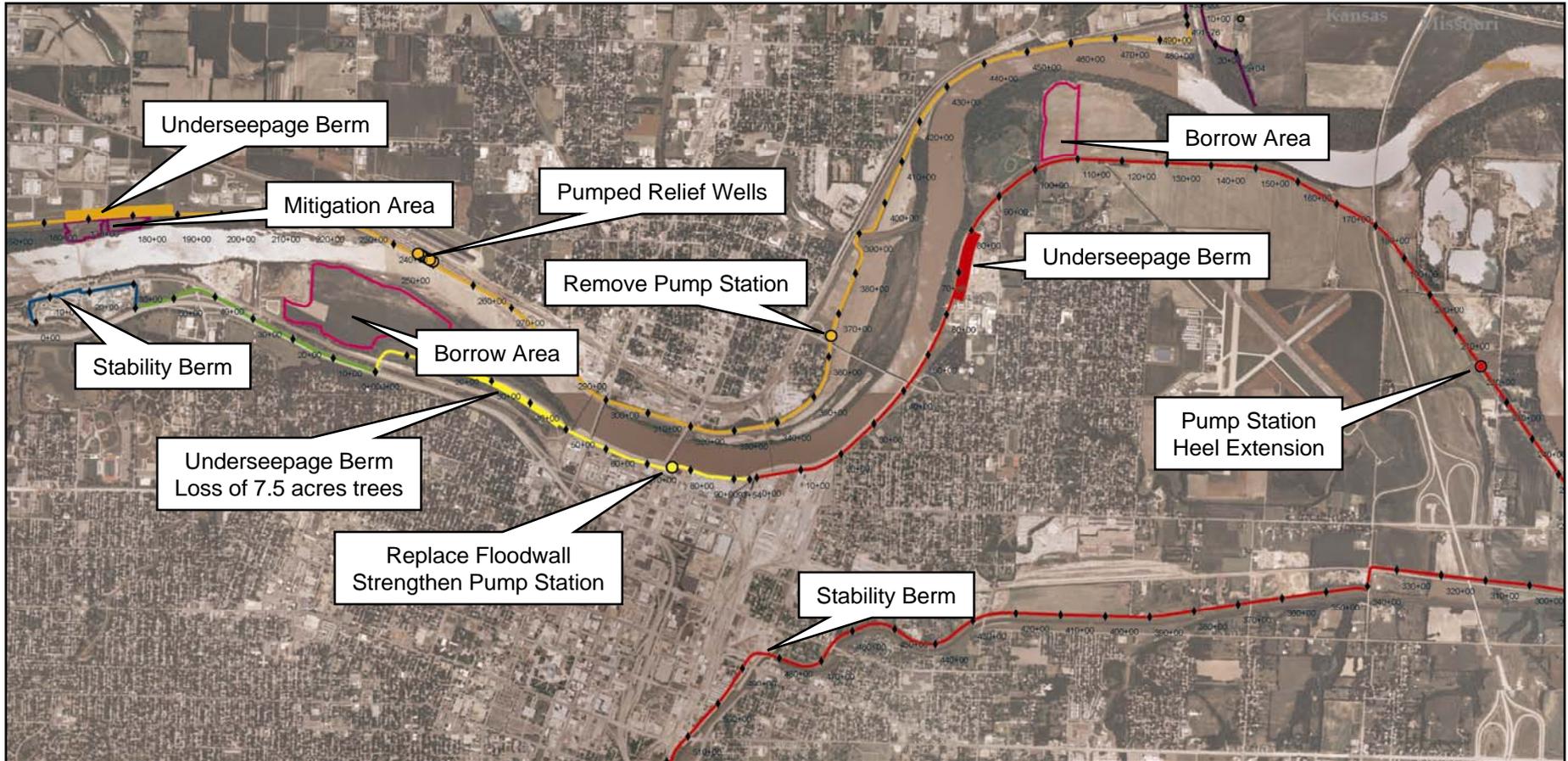
Alternative Plans Comparison Economic Analysis Results

Alternative Plan	Annual Benefits	Annual Cost	Benefit-Cost Ratio	Annual Net Benefits
Waterworks – Alt 1	\$4,900	\$2,500	2.0	\$2,400
South Topeka/Oakland Alternative 1	\$3,490,800	\$863,200	4.0	\$2,627,600
Alternative 2	\$3,490,800	\$913,400	3.8	\$2,577,400
North Topeka Alternative 1	\$10,118,000	\$151,600	66.8	\$9,966,500
Alternative 2	\$10,118,000	\$162,600	62.2	\$9,955,400

National Economic Development (NED) Plan for each unit maximizes annual net benefits for that unit.

The combination of NED plans comprises the overall system NED plan and maximizes annual net benefits for the system.

System Recommended Plan Project Components





System Recommended Plan Benefits and Costs

Unit	Annual Benefits	Annual Costs	B/C Ratio	Net Benefits
Waterworks	\$6,000	\$3,000	2.0	\$3,000
South Topeka/Oakland	\$4,014,000	\$996,000	4.0	\$3,018,000
North Topeka	\$11,408,000	\$169,000	67.4	\$11,239,000
Total System	\$15,428,000	\$1,168,000	13.2	\$14,260,000

October 2008 price level. Costs and benefits annualized over 50-year period of analysis at 4.625% interest rate.



System Recommended Plan Engineering Performance

Nonexceedance Probability vs. the 1% Flood Event

Unit	Existing Conditions	Future With Project
Waterworks	92.8%	93.3%
South Topeka	84.2%	94.6%
Oakland	2.9%	94.2%
North Topeka	14.1%	94.6%

Residual Risk: No flood risk management project can completely eliminate the risk of flooding. Some residual risk still remains.



System Recommended Plan Project Cost

Unit	Cost
Waterworks	\$ 51,000
South Topeka/Oakland	\$ 18,239,000
North Topeka	\$ 2,867,000
Total	\$ 21,157,000
Cost Sharing	
Federal (65%)	\$ 13,752,000
Non-Federal (35%)	\$ 7,405,000



System Recommended Plan Environmental and Cultural Impacts

- Recommended Plan causes no significant impacts – permanent or temporary.
- Draft EA released for public review 30 Sept 2008.
- State and Federal agency consultation identified no threatened/endangered species or cultural resource impacts.
- USFWS, NRCS, FSA, EPA, SHPO, and KDWP provided input to EA preparation.



- Temporary minor impacts will occur during construction phase.
- Permanent removal of 7.5 acres of woodland habitat to be offset by riparian plantings on land currently owned by Sponsor.



Agency Technical Review

- Project review led by Louisville District with additional reviewers in St. Paul and Seattle Districts.
- All review comments resolved and closed.
- External Peer Review not required, below cost threshold of \$40 million.
- Cost estimates reviewed and certified by Cost Estimating Center of Expertise 29 July 2008.
- Final ATR certified 26 November 2008.





Public Information

- Draft Feasibility Report and Environmental Assessment published 30 September 2008 for a 30-day public review period.
- Notice of Availability sent to local media, neighborhood and business organizations, local, state, and Federal agencies, environmental organizations and recognized Indian tribes. Report posted on Kansas City District website.
- Public Meeting held 22 October 2008 in Topeka. Meeting reported on by two local television stations.
- 7 written comments received. All comments supported the proposed project plan.
- Comments and responses incorporated into report and responses provided to comment submitters.





Environmental Operating Principles

Environmentally sound plan formulation and design (EOP 1, 2 & 5)

- Agricultural areas designated for borrow instead of treed forest and habitat areas
- Alternatives avoid work in the river to minimize aquatic resource impacts

Environmental balance and sustainability (EOP 1, 2, 3 & 4)

- Project avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community
- Borrow areas intended for agricultural re-use after project completion
- Project complies with applicable Federal laws and Corps guidance

Assess and mitigate cumulative impacts (EOP 2, 4 & 5)

- System approach ensures reliability of complete levee system
- Avoids cumulative impacts to the Kansas River basin system
- Offsets local impacts by planting of additional habitat resources

Seeks public input and comment (EOP 7)





Actions for Change

Actions for Change incorporated into the formulation process under themes of comprehensive approach and effective communication:

- Action # 1: Employ Integrated, Comprehensive and Systems-Based Approach.
- Action # 2: Employ Risk-Based Concepts in Planning.
- Action # 4: Employ Dynamic Independent Review.
- Action # 9: Effectively Communicate Risk.





Strategic Campaign Plan

Goal 2: Deliver enduring and essential water resource solutions through collaboration with partners and stakeholders

2a) Deliver integrated, sustainable, water resource solutions.

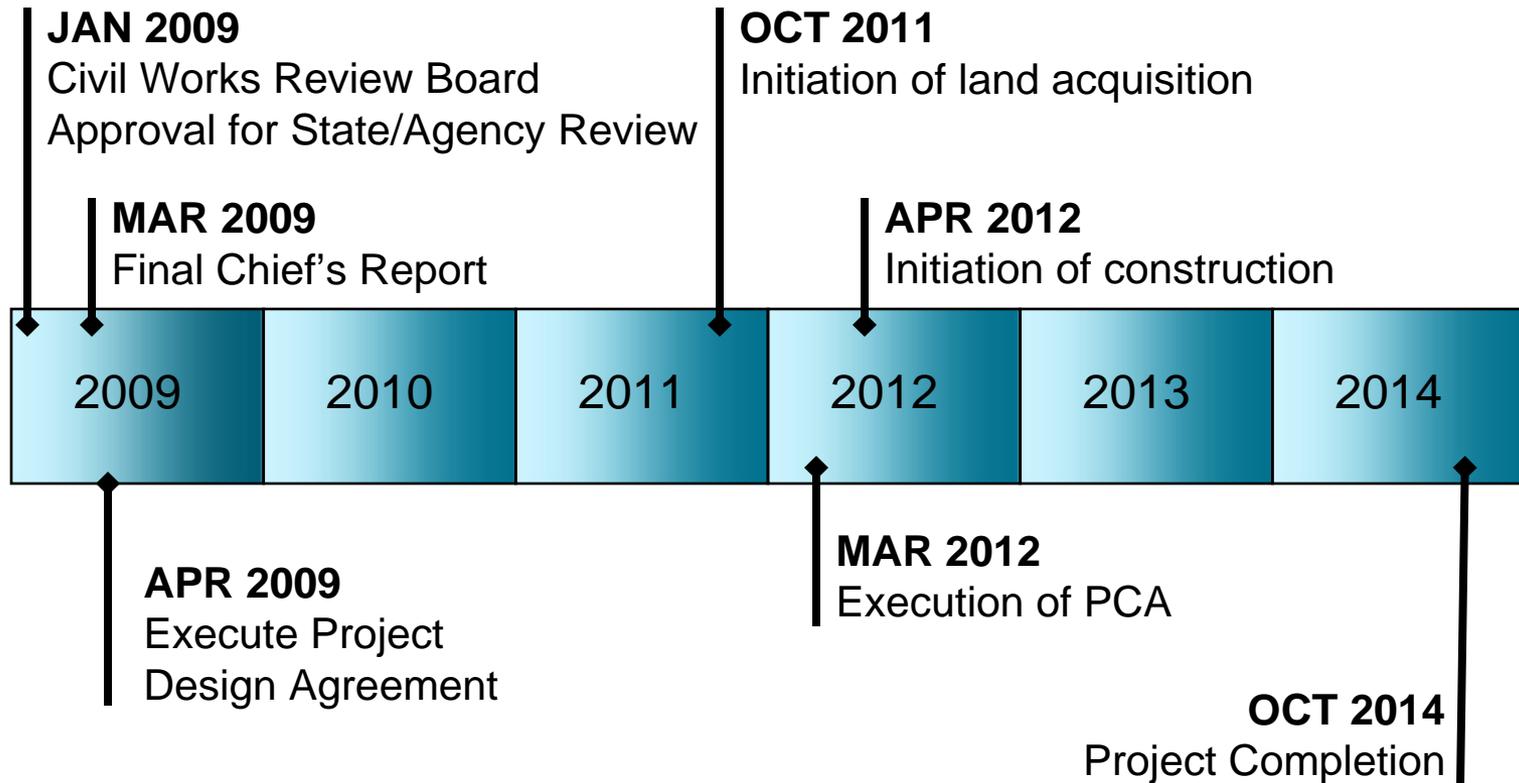
- Existing levee system approached and analyzed as a system of six individual parts that must work together to fully provide the intended flood risk management benefits to the local community.
- Levee system viewed in context with the overall Kansas River basin flood risk management system to ensure that the Recommended Plan complemented the goals of the larger system and did not induce any negative impacts to other system components.

2b) Implement collaborative approaches to effectively solve water resource problems.

- Sponsor engaged throughout the Feasibility process and assisted in identification of additional project Stakeholders.
- Federal and State agencies coordinated with during NEPA document preparation and invited to provide comment during the Draft Report comment period.
- Comments and responses incorporated into the final report and responses provided to comment submitters.



Future Project Schedule





Project Summary

- Project formulated using a systems approach within the Kansas River Basin
- Provides reliable flood risk reduction; brings existing levee system back to authorized level of flood risk management.
- Does not raise or change alignment of existing authorized features.
- Provides reduction of risk to \$2.6 B in infrastructure investment.
- Strong return on investment; overall Benefit/Cost ratio of over 13:1.
- No significant environmental impacts.
- Project has broad public & agency support.
- Total project cost is \$21M.
Cost Share: \$7M sponsor, \$14M Federal.





Questions





Recommendation

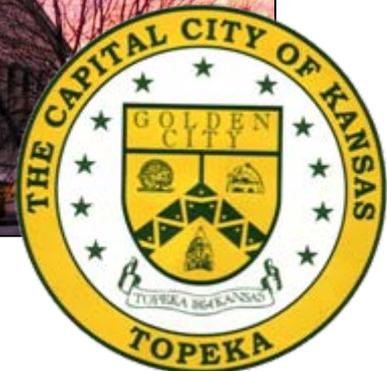
That the Civil Works Review Board approve the Topeka, Kansas, Feasibility Report and Environmental Assessment and that the Kansas City District be approved to initiate State and Agency Review.



Topeka, Kansas, Flood Risk Management Project Feasibility Study and Environmental Assessment

Comments by the
Local Project Sponsor

Randy Speaker
Deputy City Manager
City of Topeka, Kansas





NWK Lessons Learned

- Establish more realistic schedules and budgets with more consideration of incremental funding impacts and District resource prioritization.
- More proactive and earlier resolution of geotechnical and structural reliability evaluation methodologies.
- Earlier establishment of work categorization and authority determination.
- Improve vertical coordination on all aspects of policy and technical review process, especially regarding new and changing review requirements and processes.
- Establish and ensure In-Progress Review's take place during plan formulation.
- Provide complete submittal packages to ensure timely review.