City of Omaha

# LONG TERM CONTROL PLAN

for the

## Omaha Combined Sewer Overflow Control Program

**Executive Summary**

CSO!
Clean Solutions for Omaha

October 1, 2009

# Executive Summary

The City of Omaha (City), in compliance with the requirements of the Clean Water Act, the United States Environmental Protection Agency (EPA) Combined Sewer Overflow (CSO) Control Policy of 1994, and its Administrative Consent Order with the Nebraska Department of Environmental Quality (NDEQ), has developed a plan to control overflows from its combined sewer system (CSS). This plan, along with its development, is presented in detail in this document, entitled "City of Omaha Long Term Control Plan for the Omaha Combined Sewer Overflow Control Program." This Executive Summary is intended to provide a brief overview of this Long Term Control Plan (LTCP). Volume I of the LTCP is the report, and Volume II includes appendixes that provide additional information on specific portions of the report. This Executive Summary makes reference to sections of the LTCP report, and must be read in conjunction with it to gain a full understanding of the plan.

## ES.1 Introduction

The City of Omaha is located on the eastern border of Nebraska, with the Missouri River serving as both the eastern boundary of the City and the division between Nebraska and Iowa. Council Bluffs, Iowa, is located across the river to the east, as shown in Figure ES-1. The population of the Omaha metropolitan area is approximately 800,000, with the population of Omaha's sewer service area being approximately 600,000 (United States Census Bureau, 2000). Included in the service area are the cities of Omaha, Bellevue, Papillion, La Vista, Ralston, Gretna, Bennington, Boys Town, and Carter Lake. The sewers in the older, eastern part of the sewer service area are combined rather than separate. The City operates over 850 miles of combined sewers in the CSS service area. The CSS service area covers approximately 43 square miles and extends from Harrison Street on the south to Interstate 680 on the north, and from the Missouri River on the east to approximately 76th Street on the west.

FIGURE ES-1
City of Omaha and Surrounding Area


The City treats wastewater at two major treatment facilities: the 35-million gallons per day (mgd) Missouri River Wastewater Treatment Plant (MRWWTP), and the 70-mgd Papillion Creek Wastewater Treatment Plant (PCWWTP). The MRWWTP is located south of the Veterans Memorial (Highway 275) bridge along the Missouri River, and the PCWWTP is located south of Omaha near the city

of Bellevue, just upstream of where Papillion Creek joins the Missouri River. A third, very small treatment facility (the Elkhorn Wastewater Treatment Plant), located near the western boundary of the City, is scheduled to be decommissioned within 5 to 10 years. A portion of the collection system for the PCWWTP and all of the collection system for the MRWWTP are CSSs. There are currently 29 CSO outfalls in the Omaha CSS, with 19 overflowing to the Missouri River and 10 overflowing to tributaries of Papillion Creek. These CSO outfalls are shown in Figure ES-2, along with the CSS service area.

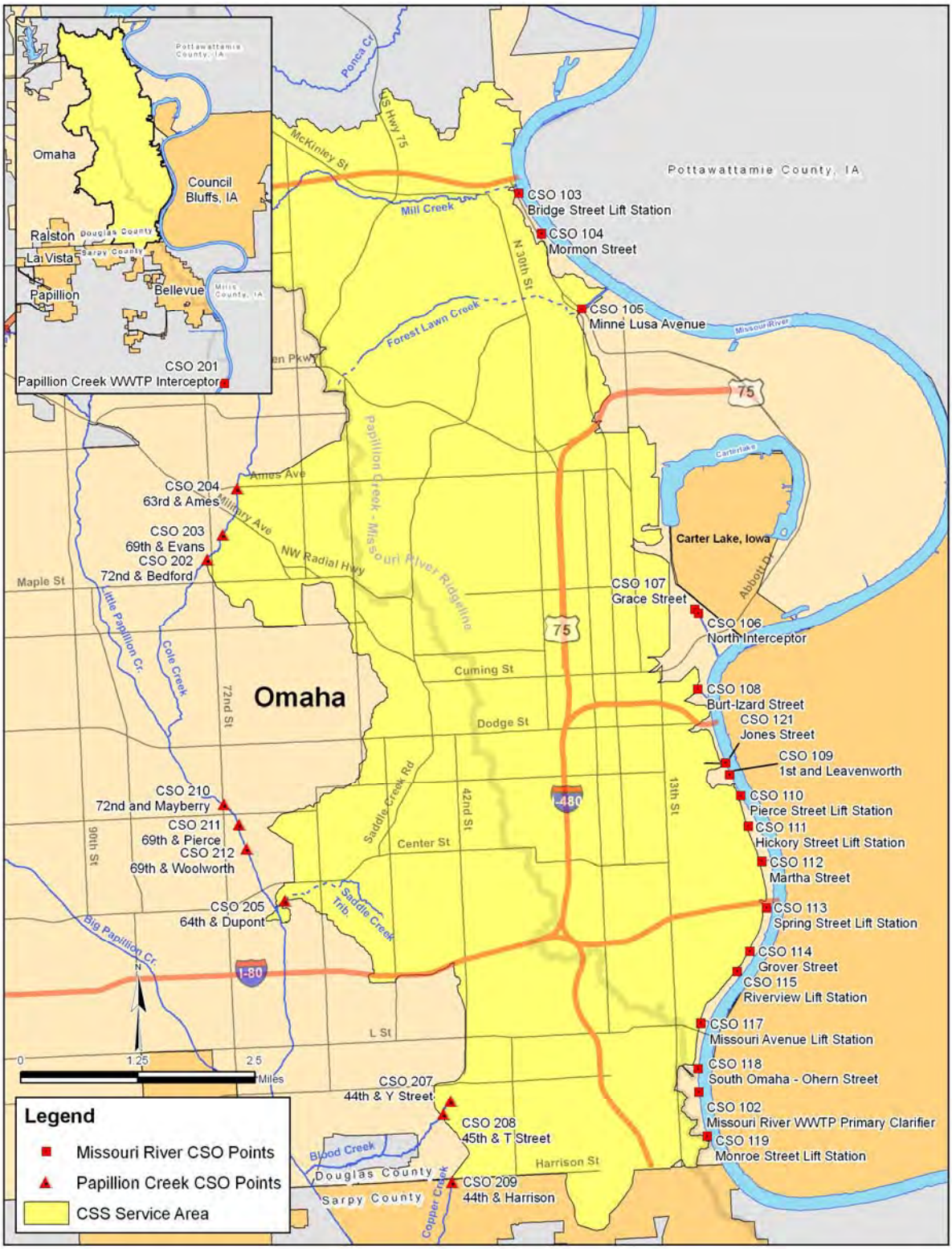
Under "Existing Conditions," which are representative of the CSS as it was in 2002 (the year of the City's first CSO permit) it is estimated that an average of 3.50 billion gallons per year of combined sewage overflows to receiving streams during 86 CSO events. Of this amount, 2.79 billion gallons are estimated to overflow to the Missouri River, and 0.71 billion gallons are estimated to overflow to the Papillion Creek system. The main pollutant of concern is *E. coli* bacteria.

The City received its first National Pollutant Discharge Elimination System (NPDES) permit for CSOs in October 2002. That permit required the City to continue to develop and implement its Nine Minimum Controls (NMC) Plan and to develop a LTCP for controlling its CSOs (Douglas County Environmental Services, 2007). In 2005, the NDEQ notified the City of the requirements to submit a "Substantively Complete" LTCP (SCLTCP) by October 2007, to submit a Final LTCP by October 2009, and to construct the selected CSO controls by 2024. NDEQ also indicated that these dates should be included in an "enforcement mechanism" such as a Consent Order.

## ES.2 Baseline Water Quality Conditions

This LTCP documents the evaluation to determine the pollutant(s) of concern (see Section 2, Baseline Conditions/Study Basins Description). This evaluation was critical in order to determine the appropriate water quality performance criteria for the controls. Results of monitoring by the United States Geological Survey (USGS) and the City were reviewed, the current water quality of the receiving streams impacted by CSO discharges was determined, and this information was compared to water quality standards. The City also reviewed the quality of the CSOs to determine if there are pollutants in the discharges in exceedance of the water quality standards as listed in NDEQ regulations. The final step was to determine, where there are high levels of pollutants in the CSOs, and whether they are high enough to cause a water quality standards exceedances in receiving streams. This analysis concluded that the only pollutant in CSOs that is impacting the streams is *E. coli*. It was also noted that there are significant sources of *E. coli* in the Papillion Creek Watershed other than CSOs that could be the source of high *E. coli* levels in the streams.

FIGURE ES-2
CSO Outfalls as of 2009



The City also performed an evaluation of Sensitive Areas in the vicinity of the CSS service area. As a result of this analysis, it was determined that:

1. At this time, no additional actions under the City's LTCP are necessary relative to endangered species impacts. Recovery of the pallid sturgeon is not solely related to the mitigation of CSO discharges. While the City understands that environmental pollution may play a role, addressing this is beyond the scope of this LTCP.
2. It is not believed that the Council Bluffs Water Works intake is impacted by the upstream CSO discharges. However, the location of the intake has been factored into the alternatives evaluated, and an effort has been made to reduce the impact of the upstream CSOs early in the implementation schedule.

Recovery of the pallid sturgeon or other species noted is not related solely to the mitigation of CSO discharges. It is believed that the Council Bluffs Water Treatment Plant is not impacted by the CSO discharges upstream of its intake.

While not strictly included as a condition for defining a sensitive area, there is a possibility of the public coming into contact with CSOs. To address this possibility, the City required controls for the CSOs to include disinfection to achieve a 126 organisms (org)/100 milliliter (mL) *E. coli* concentration as if it were a daily maximum. Additional information on how sensitive areas are addressed is included in Section 4, Selected CSO Controls and Section 7, Implementation Schedule.

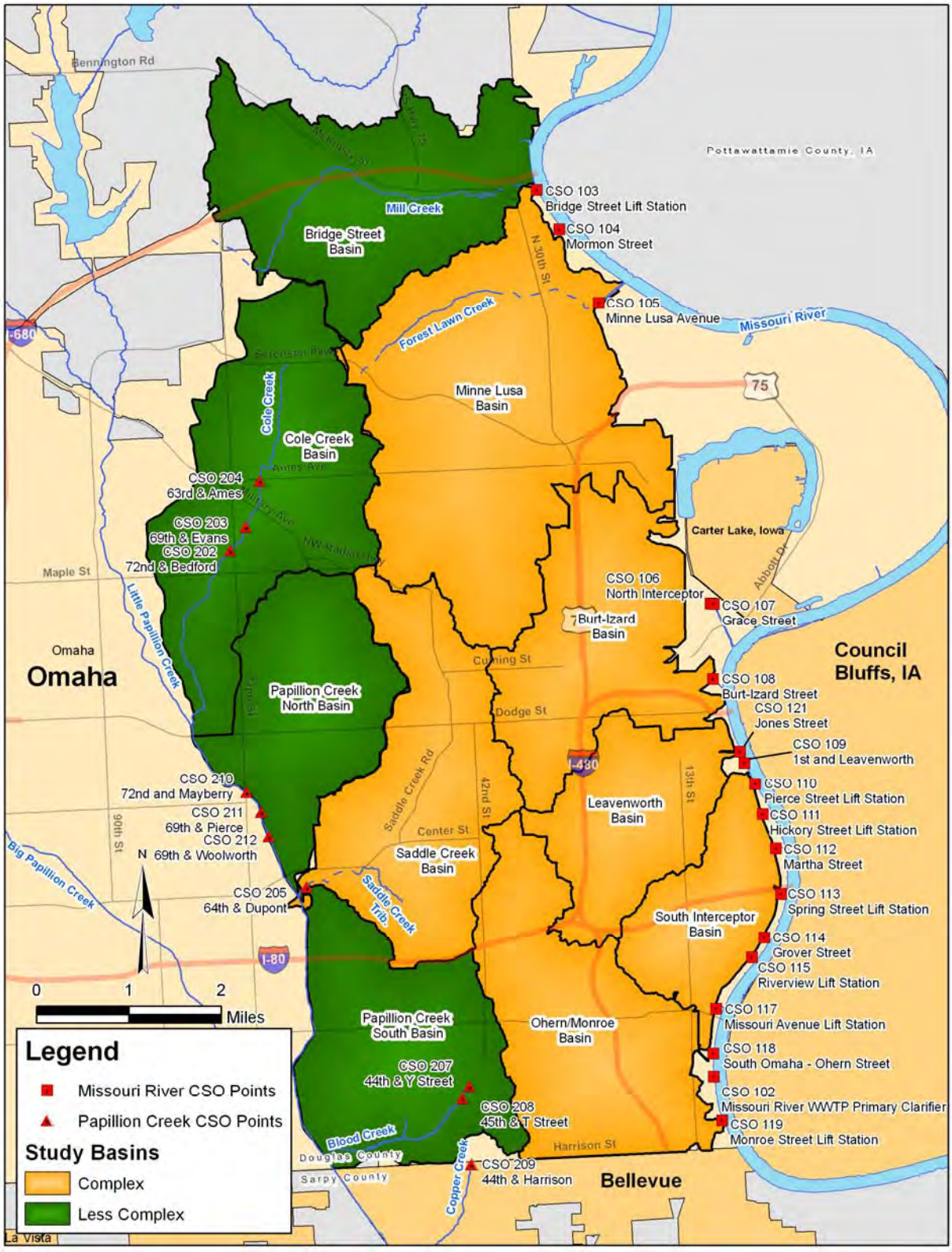
# ES.3 LTCP Development

Beginning in 2003, the City has worked on its CSO issues with NDEQ and Region VII of the EPA in a cooperative manner. This effort has included frequent meetings to provide information on CSO work and the City's sewer system. Shortly after receiving the 2005 Letter from NDEQ, the City contracted with CH2M HILL, in association with HDR Engineering and Lamp, Rynearson & Associates, to serve as the Program Management Team (PMT). The role of the PMT was to work as an extension of City staff to develop a LTCP. The City's CSS service area was divided into 10 drainage basins. Six of these drainage basins are part of the Missouri River Watershed and four are part of the Papillion Creek Watershed. Figure ES-3 shows the layout of the ten basins. A Basin Study was conducted for each basin, with each study being led by a team of consultants selected by the City. The basins were categorized as either "Complex" or "Less Complex" according to the complexity of the sewer system, basin size, land use, and anticipated CSO control solutions.

## ES.3.1 Basin Studies

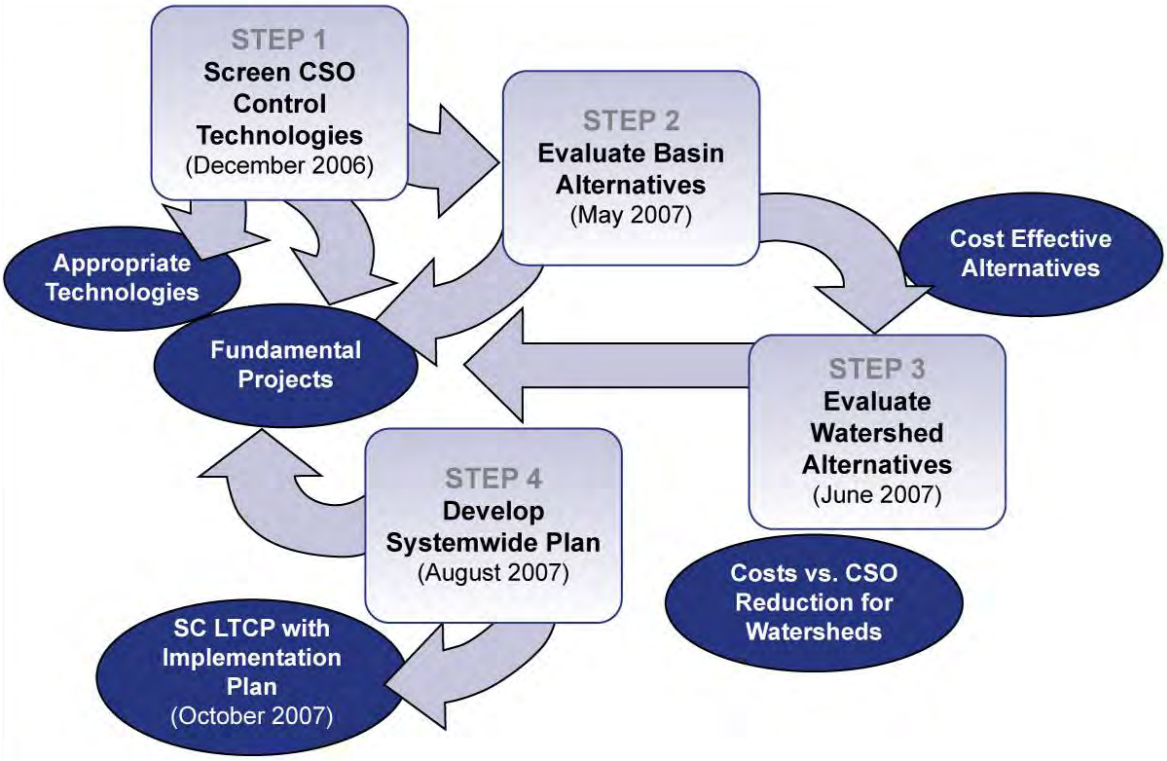
Each Basin Study for the six Complex Basins involved the development and evaluation of a range of CSO control alternatives and recommended alternatives for CSO Control Levels 1, 2, 3, and 4 (9, 4, 1 and 0 remaining overflows per year, respectively). Control technologies were screened for each CSO outfall, and then the viable technologies were used to develop "In-Basin" Alternatives. The City and Basin Consultants also evaluated several "Cross-Basin" Alternatives that would control CSOs from more than one basin with the same technology. This evaluation is detailed in Section 3, CSO Control Alternatives Evaluation.

FIGURE ES-3
Combined Sewer Study Basins



The Basin Studies were conducted under guidance provided by the City, including the development of five Protocols that provided step-by-step procedures for developing key elements of the Basin Studies. The Protocols included guidance on Program Overview, Data and Information Collection and Coordination, System Characterization, Alternatives Development and Evaluation, and InfoNet Database Management. Figure ES-4 illustrates the basic steps of alternatives development and evaluation that were followed by the City and Basin Consultants, leading up to the SCLTCP (City of Omaha, 2007).

FIGURE ES-4
Four-Step Approach for Alternatives Development and Evaluation




Using the Program's InfoWorks Model, the City provided the Basin Consultants with "baseline hydrographs" for the "Representative Year" (1969) of precipitation to serve as the basis of the evaluations, and to estimate CSO volumes under the various control levels. The baseline hydrographs were graphs of flow versus time, output from the InfoWorks Model of the CSS based on a simulation of Representative Year precipitation. The Representative Year was determined through a statistical analysis of 34 years of historical rainfall data to be a year that was representative of the typical pattern of rain in the Omaha area.

Guidance provided by the City also included a Microsoft Excel®-based Cost Tool that was adapted from a similar cost tool used for the Cincinnati LTCP but tailored to Omaha. This Cost Tool, which is a detailed set of linked spreadsheets, helped to ensure consistent monetary evaluation of alternatives. To help make sure that sewer separation alternatives were evaluated appropriately and consistently, a Sewer Separation Guidance Document was developed and provided to the Basin Consultants. In addition, a Decision Tool for the calculation of cost-benefit scores for control alternatives was provided. This tool allowed for the inclusion of non-monetary criteria.

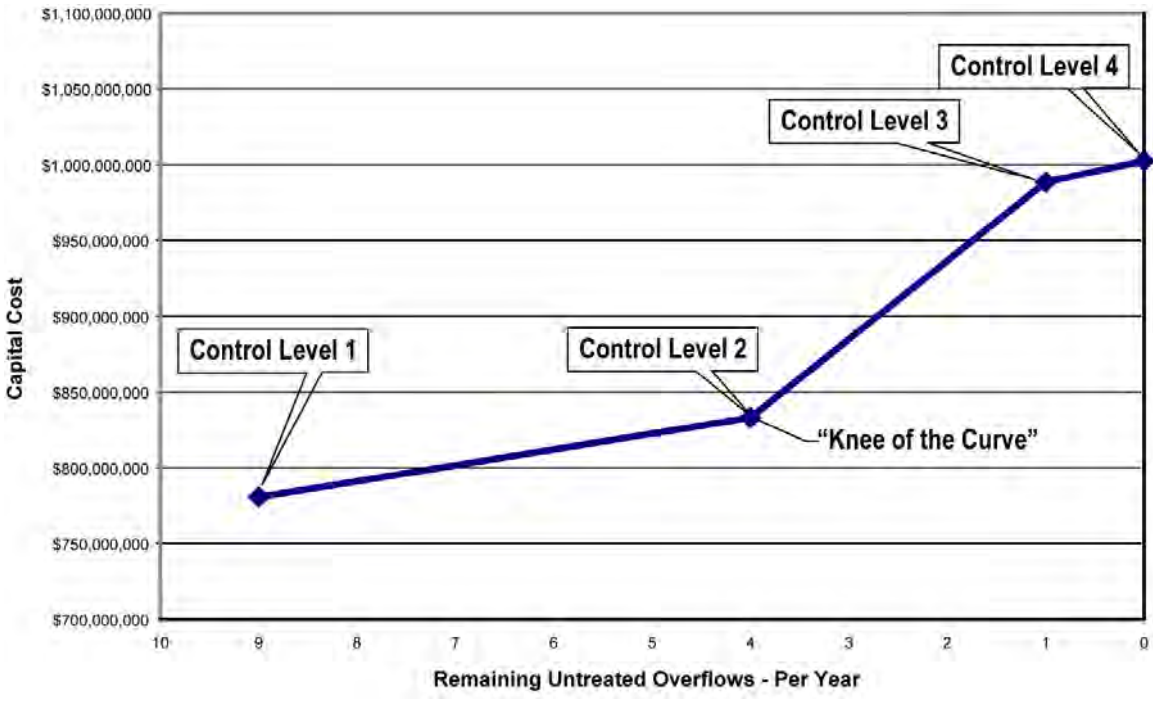
The evaluation of CSO control alternatives was based on both cost and non-monetary criteria. Eight non-monetary criteria were identified by members of the Community Basin Panel (CBP) and Basin Advisory Panels (BAP) during workshops. Criteria weights, or levels of importance, were initially established by the CBP to reflect the concerns of the overall community, and then the weights were adjusted by each BAP to reflect the perspective of basin residents. The non-monetary criteria and weights were entered into the Decision Tool, allowing cost-benefit scores to be developed for each control alternative. In this way, the recommended CSO controls were not simply the lowest cost alternatives, but rather those that considered benefits and overall value to the community in addition to cost. Results from the evaluation of In-Basin and Cross-Basin Alternatives were compiled and evaluated, and alternatives were chosen by the City for implementation.

During the Refinement Period, a substantial amount of further evaluation of the costs and controls was completed to verify the validity of the systemwide controls.

## ES 3.2 Substantively Complete Long Term Control Plan

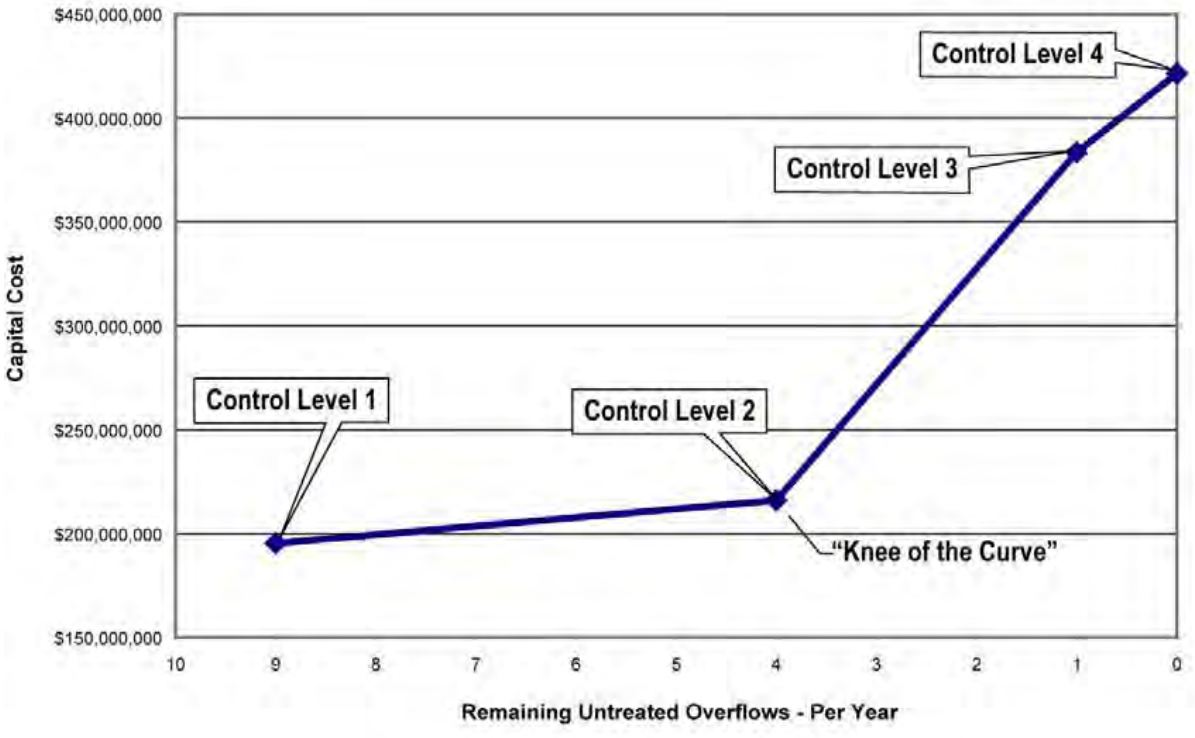
Cost-Performance Curves, which are plots of capital costs versus remaining untreated overflows at all Control Levels, were compiled for the SCLTCP (City of Omaha, 2007). The curve for the Missouri River Watershed is shown in Figure ES-5. A "knee-of-the-curve" (or significant variation in slope) is apparent at Control Level 2, indicating that it is relatively cost effective in terms of volume captured per dollar spent to go from Control Level 1 to Control Level 2, but it would be much more costly to achieve the volume reductions associated with Control Levels 3 and 4.

FIGURE ES-5
Cost-Performance Curve: Capital Cost versus Remaining Untreated Overflows for Missouri River Watershed



A Cost-Performance Curve for the projects in the Papillion Creek Watershed is shown in Figure ES-6, as compiled for the SCLTCP (City of Omaha, 2007). A "knee-of-the-curve" is again apparent at Control Level 2. During the Refinement Period (described below), a substantial amount of additional evaluation of the costs and controls was completed to verify the validity of the systemwide controls. Details of the various activities during the Refinement Period are discussed in Section 3, CSO Control Alternatives Evaluation; however, the refinements have not changed the presence of a knee of the curve at Control Level 2.

FIGURE ES-6
Cost Performance Curve: Capital Cost versus Remaining Untreated Overflows for Papillion Creek Watershed




For the following reasons, Control Level 2 was the proposed endpoint of CSO controls for both the Missouri River Watershed and Papillion Creek Watershed in the SCLTCP (City of Omaha, 2007):

- In the comparison of capital costs versus remaining overflows (Figures ES-5 and ES-6) significant "knees-of-the-curve" are apparent, indicating that it would be much more expensive and less cost effective to implement Control Levels 3 or 4 versus Control Level 2.
- Control Level 2 meets or exceeds the presumption approach criteria as defined by EPA's CSO Control Policy (EPA, 1994). More specifically, the remaining CSOs are equal to the criterion of four overflows per year, and the percentages of volume and loading captured are in exceedance of the criterion of 85 percent.
- The geometric mean of *E. coli* levels in the Missouri River downstream of all CSOs from May 1 to September 30 (the recreation season) was predicted to be in compliance with

the water quality standard of 126 org/100 mL within the range of accuracy of the water quality model developed.

- The geometric mean of *E. coli* levels in Papillion Creek downstream of all CSOs from May 1 to September 30 was not predicted to be in compliance with the water quality standard; however, further treatment of CSOs would not result in compliance due to loading sources other than CSOs.

The SCLTCP was submitted to NDEQ on schedule in October 2007 (City of Omaha, 2007). Prior to submitting the LTCP, an Administrative Consent Order was negotiated between the City and NDEQ, and a renewed CSO permit was developed.

## ES 3.3 Refinement Period

Following submission of the SCLTCP, the City embarked on a two-year Refinement Period to confirm technical concepts, refine the plan, confirm costs, and develop other aspects of the LTCP. The Refinement Period culminated in the submission of this final LTCP. Twenty-five separate refinement tasks were carried out and are discussed in Section 3, CSO Control Alternatives Evaluation. Table ES-1 provides a summary of the tasks - tasks of particular importance to the development of the Final LTCP are highlighted in bold type.

TABLE ES-1
Description of Refinement Tasks

| Task No. | Task Name | Task Description |
|---|---|---|
| 1 | *Number Not Used* | *Number Not Used* |
| 2 | **Green Solutions** | Identify potential Green Solutions projects for incorporation into the Final LTCP. Determine potential reduction in CSO volume through inclusion of the Green Solution Projects. |
| 3 | Develop Sustainability Plan | Produce vision and guidance for including sustainability elements, with project-specific goals and metrics, for CSO control projects as they are implemented. |
| 4 | **Tunnel Development/Risk Analysis** | Further investigate the technical feasibility of the proposed Deep Tunnel by collecting initial geotechnical data and identifying significant risks and how to mitigate them. Update estimated costs, perform a hydraulic evaluation, and evaluate potential tunnel lining requirements. |
| 5 | *Number Not Used* | *Number Not Used* |
| 6 | **Retention Treatment Basin (RTB) Performance Evaluation** | Compile information from other constructed RTB installations, conduct site visits, refine configuration of proposed RTBs, refine design criteria, and collect additional cost information. |

TABLE ES-1
Description of Refinement Tasks

| Task No. | Task Name | Task Description |
|---|---|---|
| 7 | **Program Risk Analysis** | Identify and quantify cost and schedule risks associated with the implementation of CSO controls, create a Risk Register tracking system, and develop risk mitigation strategies. Develop a Cost Model for the Program that incorporates potential risks and their magnitudes and probabilities. |
| 8 | Evaluate Grit Removal and Handling Challenges with CSO Control Facilities | Assess the adequacy and potential cost of the grit removal facilities recommended in the SCLTCP for tunnel drop shafts, RTBs, lift stations and storage tanks. |
| 9 | Evaluate Floatables Control for Remaining Untreated Overflows | Assess the adequacy of the floatables control facilities assumed in the SCLTCP and recommend changes, as required. Consider technologies other than netting. |
| 10 | **Refine Project Costs (Tunnel & Treatment)** | Ground-truth and refine estimates of probable construction costs for tunnels, RTBs, lift stations, and storage. Provide a comprehensive update of the Program Cost Tool, and reassess the percentages used to convert construction costs to capital costs. |
| 11 | **InfoWorks Model Refinement** | Revise the Program InfoWorks Model using field information collected by the Basin Consultants, recommendations made by the Basin Consultants, and other updated information. Recalibrate the InfoWorks Model using additional CSO flow monitoring data. Develop revised models for Existing and LTCP (2024) Conditions. |
| 12a | **Evaluate Wet Weather Flows at PCWWTP** | Evaluate the cost effectiveness of treating peak Papillion Creek Watershed flows in 2024 entirely at the PCWWTP versus constructing a CSO 201 control to achieve four or fewer untreated overflows per year. |
| 12b | **Evaluate Additional Wet Weather Flows at MRWWTP** | Evaluate the cost effectiveness of treating up to 150 mgd through preliminary and primary treatment at the MRWWTP during wet weather events and eliminating or downsizing the Missouri River Watershed CSO controls. Evaluate alternative conveyance approaches for high-strength industrial wastewater to the MRWWTP, and consider the expansion of secondary treatment at the MRWWTP to eliminate CSO 102. |
| 13 | *Number Not Used* | *Number Not Used* |

TABLE ES-1
Description of Refinement Tasks

| Task No. | Task Name | Task Description |
|---|---|---|
| 14 | **Additional Evaluations Using InfoWorks Model** | Use the updated InfoWorks Model from Refinement Task No. 11 to perform revised Representative Year precipitation runs, additional evaluations for several other Refinement Tasks, and due diligence runs to confirm the sizing and performance of the CSO controls. |
| 15 | Develop Operations & Staffing Plan | Prepare an Operations & Staffing Plan, as required by EPA guidance, for submittal to NDEQ. Develop operation and maintenance (O&M) cost information for the City's rate model. |
| 16 | Develop Post Construction Monitoring Plan | Review and comment on the USGS report on water quality sampling, update the water quality model based on USGS results and the revised InfoWorks Model runs from Refinement Task No. 14, and develop a Monitoring Plan as required by EPA for submission to NDEQ. The Monitoring Plan is presented in Section 8, Monitoring Program and CSO Wet Weather Operations Plan. |
| 17 | Continue Public Participation Program | Continue to meet with Basin Advisory Panels, the Community Basin Panel, and the general public to provide information and obtain input regarding the evolution of the LTCP. |
| 18 | Consider Impacts of Changing Regulations | Identify potential future regulations that could impact the Program and identify strategies for responding to the potential impacts. |
| 19 | **Search for Hybrid Alternatives** | Consider sewer separation, storage, and other project controls to increase benefits (e.g., reducing sewer backups and street flooding) while maintaining the cost effectiveness of the Program. |
| 20 | **Investigate Community Enhancements** | Develop guidance for considering the incorporation of community enhancement projects with CSO controls. Identify potential outside funding sources for these enhancement opportunities. |
| 21 | **Refine Project Costs & Develop a Uniform Approach (Sewer Separation)** | Ground-truth and refine costs and ensure consistency (including rehabilitation assumptions) for sewer separation. Develop a revised Sewer Separation Guidance Document for use by the Basin Consultants. Develop project definition files for all sewer separation projects. |
| 22 | **Respond to Sewer Backup Recommendation TMs** | Identify methods for addressing the previously identified sewer backup and major street flooding problem areas, including the areas proposed in the SCLTCP. |

TABLE ES-1
Description of Refinement Tasks

| Task No. | Task Name | Task Description |
|---|---|---|
| 23 | *Number Not Used* | *Number Not Used* |
| 24 | Develop Construction Delivery Plan | Revise the schedule and sequence of CSO control projects for final LTCP. Provide a framework for the implementation of the controls. Conduct an Alternative Project Delivery Workshop to explore the methods of project delivery available to the Program, including design-build and construction management at risk. |
| 25 | Data Management and Geographic Information System (GIS) | Develop a plan to assist the City in integrating GIS data gathered during the development of the SCLTCP and future GIS data into the City's GIS system. |
| 26 | **South Interceptor Force Main (SIFM) Issues** | Identify potential alignments and costs for the proposed SIFM, address various technical issues such as utilizing the proposed Deep Tunnel as a back-up to the SIFM, and examine alternative locations for the proposed Leavenworth Lift Station. |
| 27 | *Number Not Used* | *Number Not Used* |
| 28 | Identify and Address Big Picture Concerns of Agencies/Groups | Inform agencies and groups that have the ability through the issuance of permits, providing permissions/easements, or other activities to significantly impact the implementation of CSO controls about the CSO control program, and mitigate any potential concerns. |
| 29 | *Number Not Used* | *Number Not Used* |
| *30* | **Consider Elimination of RTB at CSO 105** | Evaluate alternatives for reducing or eliminating the RTB at CSO 105 proposed in the SCLTCP. |

Sources: City of Omaha, 2007; Vogel, J.R, et. al., 2009.

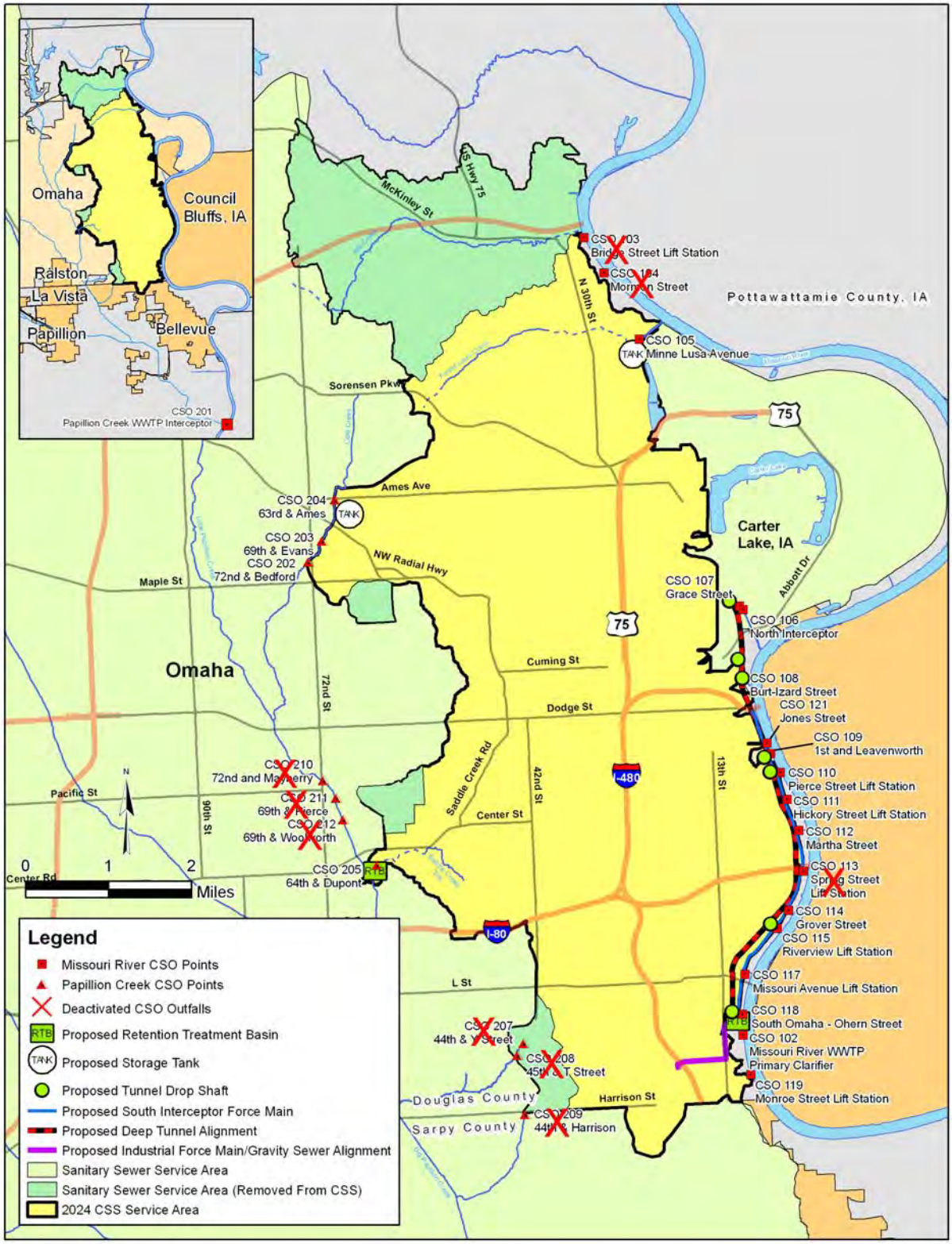
# ES.4 Final LTCP

The final CSO controls are listed below and illustrated in Figure ES-7. They are discussed in detail in Section 4, Selected CSO Controls.

In many cases, the sewer separation projects will have the additional benefit of minimizing sewer backups into basements.

- Improvements to the MRWWTP to treat a relatively continuous flow of 150 mgd during wet weather, with short-term peaks up to 180 mgd. The improvements will include a new headworks facility, additional odor control for the primary clarifiers, and a new chlorine contact basin to disinfect wet weather primary effluent flow that is above the capacity of the plant's secondary treatment system. High-strength industrial wastewater will be conveyed separately to the MRWWTP. This flow will be treated in separate primary clarifiers and pumped to secondary treatment.

FIGURE ES-7
Omaha Combined Sewer System in 2024



- Extensive sewer separation throughout the CSS service area to reduce the flow of stormwater into the CSS. This includes removal of several creeks from the CSS. In many cases, the sewer separation projects will have the additional benefit of minimizing sewer backups into basements and replace aging infrastructure. This includes the construction of a Stormwater Collector Sewer in the Minne Lusa Study Basin to re-route stormwater currently flowing into the CSS directly to the Missouri River.
- A Deep Tunnel 5.4 miles long and 17 feet in diameter to capture combined sewage from several CSO outfalls along the Missouri River and convey it to a treatment system.
- Two RTBs. One of the RTBs will be located on the MRWWTP site to treat the combined sewage conveyed by the Deep Tunnel at a peak flow rate of approximately 52 mgd. The second RTB will be located in the Saddle Creek Study Basin to treat combined sewage at a peak flow rate of approximately 315 mgd. For each RTB, sodium hypochlorite will be used as the disinfectant, and sodium bisulfite will be used to remove residual chlorine prior to discharge.
- Two storage tanks, with one located in the Minne Lusa Study Basin near the Omaha Public Power District (OPPD) North Omaha Power Plant, and one in the Cole Creek Study Basin near Branson Park.

In addition to the facilities listed, the Green Solutions Program will be expanded early in the LTCP to better define how to incorporate Green Solutions into the Program.

A Green Solutions Program will be developed early in the LTCP to better define how to incorporate Green Solutions into the Program.

The revised Program cost estimate for these controls is approximately $1.66 billion in April, 2009 dollars. This includes appropriate contingencies that are based on the risk evaluation performed during the Refinement Period.

*Miller Park in the process of being expanded to provide more stormwater retention*

Following implementation of the LTCP controls, it is estimated that approximately 94 percent of the average annual volume of combined sewage in Omaha will be controlled, and that no more than four CSO events will occur in each watershed per year during Representative Year precipitation. Out of the 29 existing CSO outfalls, nine will be deactivated. The actual number of CSO events will vary year to year; however, the control of combined sewage volume is projected to meet or exceed the 85-percent CSO control criterion consistently. The results of water quality modeling indicate that downstream of the CSOs, the Missouri River will be in compliance with the water quality standard for *E. coli* during recreation

season following implementation of the CSO controls. In addition, remaining CSOs will not preclude the Papillion Creek from being in compliance upon the application of other controls in the Papillion Creek Watershed. As explained in Section 4, Selected CSO Controls, for the same reasons as listed previously for the SCLTCP, Control Level 2 remains the proposed endpoint for the CSO controls (City of Omaha, 2007).

## ES.5 Public Involvement Process

An extensive Public Participation Program was conducted as part of developing the LTCP, including public meetings, media events, and regular presentations to neighborhood associations and organizations such as Kiwanis and Rotary Clubs. This program is discussed in Section 5, Public Participation Process.

Two levels of public advisory panels were established to act as communication focal points and to facilitate public participation in the evaluation of CSO control alternatives. The CBP consists of stakeholders appointed by the Mayor of Omaha to represent the concerns of the overall community. The BAPs were established within each basin, comprised of volunteers within the basins. The activities undertaken by the City as part of its public education program included:

- Forming the CBP and BAPs for the 10 basins.
- Giving presentations to more than 150 civic and neighborhood organizations to provide information and gain feedback.
- Creating a 1-hour documentary produced by and airing on statewide NETV. This documentary was also available On Demand through the local cable company and streamed on the omahacso.com website.
- Developing newsletters, brochures, and freestanding inserts (the majority of which were in both English and Spanish) distributed via mail, handouts at community events, newspaper delivery, and flyers posted on community bulletin boards and in local businesses and community libraries.
- Designing a freestanding display in both English and Spanish that was used at community events, City and county government offices, libraries, community centers, businesses and home shows.
- Developing an extensive website including email feedback capability, streaming video, and significant educational information.
- Hosting community-wide meetings from 2006 through 2009 to inform citizens on progress being made on the development of the plan and to encourage feedback on the CSO Program.

The City's LTCP has been influenced significantly by the input of advisory committee members and the public, who have been given an opportunity to participate in the selection of CSO control alternatives and solutions. More specific information regarding the involvement of the public in the evaluation of CSO control alternatives is included in Section 3, CSO Control Alternatives Evaluation.

The LTCP was provided to the public for a 30-day review period commencing on July 2, 2009, and ending on August 5, 2009. The LTCP was posted on the Program Website (www.omahaCSO.com) and hard copies of the document were placed in City libraries, both Greater Omaha Chamber of Commerce locations and the Neighborhood Center for review and comment.

A public meeting was held on August 18, 2009, at the Omaha Public Schools TAC Building, 3215 Cuming Street, to present the results of the LTCP and solicit final comments. Approximately 100 members of the public attended. The Mayor of Omaha and other elected officials were in attendance.

## ES.6 Financial Capability Evaluation

In order to implement the LTCP, the City developed a financial plan to provide sufficient funds, as described in Section 6, Financial Capability Evaluation. The City developed a rate model for the Sewer Enterprise Fund to determine how to equitably recover from system users the costs to pay for the CSO Program as well as other costs associated with the collection and treatment system. The rate model was used to develop proposed sewer use fees, and an ordinance was passed to set sewer rates for the years from 2010 to 2014. The model suggests that the average residential customer will pay $37.23 per month in 2014 and begin to pay over $50 per month by the year 2017. Under the rate model, funding has been included to establish a ratepayer assistance program that will be in place to help low- and fixed-income ratepayers.

The LTCP may meet EPA's affordability criteria as they exist now (see Section 6, Financial Capability Evaluation), but the criteria are flawed and the economy is so unpredictable that all that can be said is that the City should be able to implement the plan through at least 2014. Adaptive management and periodic re-evaluation of financial capability will be necessary in order to determine whether the overall program timeline as currently envisioned can be achieved without external funding.

## ES.7 Implementation Schedule

The schedule provided in Section 7, Implementation Schedule, shows the City's intent to complete the CSO controls within the 15-year implementation period. The schedule reflects the criteria required by NDEQ to factor in water quality improvements, priority projects, and financing. Periodic review of the schedule to incorporate new data, integrate new technologies that become available, and adjust the plan to fit changing circumstances or requirements will be required throughout the implementation period.

The schedule is based on information available to the City at the time of this LTCP. Efforts have been made to evaluate and account for and mitigate the factors that could result in delays in the implementation of the projects. During the course of implementation of the LTCP, the City will identify and resolve uncertainties and adjust the schedule accordingly. However, over the next 15 years there will likely be unanticipated situations that will affect the City's ability to meet the schedule.

The City's Consent Order requires the controls to be completed by 2024, and the Program schedule shows compliance with this deadline. Schedule milestone dates have been

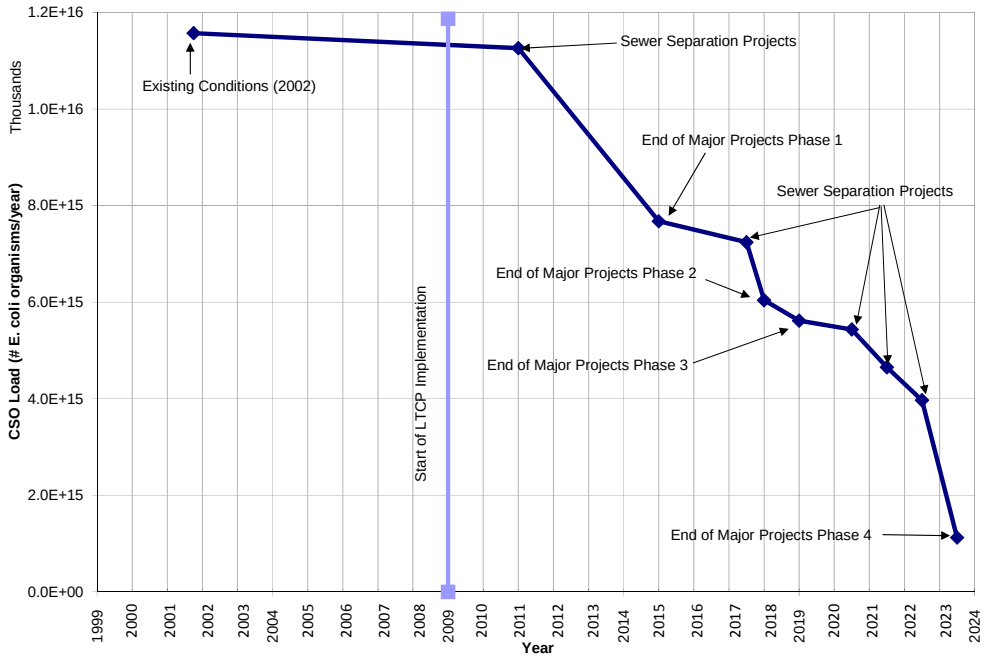
established for inclusion in the City's CSO permits with NDEQ using a phased approach. The City has divided the implementation of the major controls into four phases. These include:

- **Phase 1 – MRWWTP and Collection System Improvements.** This phase has already begun and will be completed by September 30, 2015
- **Phase 2 – Saddle Creek Retention Treatment Basin.** This phase will begin in 2010 and will be completed by December 31, 2018.
- **Phase 3 – Minne Lusa Stormwater Conveyance System and Storage Basin.** This phase will begin in 2012 and will be completed by December 31, 2019.
- **Phase 4 – Deep Tunnel/Missouri River RTB/Miscellaneous Projects.** This phase will begin in 2017 and will be completed by September 30, 2024.

A similar phased approach has also been developed for sewer separation projects. There are seven phases, as show in Section 7, Implementation Schedule.

An evaluation was performed to estimate the effects that the implementation will have on water quality. Figure ES-8 is a graphical summary of the anticipated reductions in *E. coli* loading under Representative Year precipitation over the 15-year timeframe. As shown, the largest reduction in *E. coli* loading occurs as the result of the implementation of the Phase 1 projects, as was intended by the placement of these projects early in the schedule.

FIGURE ES-8
Estimated Reductions in CSO *E. coli* Load Over Time



# ES.8 Monitoring Programs

The City has developed a Monitoring Program that meets NDEQ and EPA requirements. The CSO Monitoring Program has two separate plans:

- An Implementation Monitoring Plan that will be conducted as the controls are being completed. This monitoring will be used to gather information that will assist the City with Adaptive Management of the LTCP, and to ensure that the controls are operating as designed.
- A Post-Construction Monitoring Plan that will be used to track compliance with the CSO Policy and the City's CSO Permit requirements following implementation of all CSO controls.

Outlines of these plans are provided in Section 8, Monitoring Program and CSO Wet Weather Operations Plan. The purposes of the Implementation Monitoring Plan and the Post-Construction Monitoring Plan are to collect data and document the effectiveness of the CSO control measures compared to their performance criteria. The goals of these plans include:

- Confirming anticipated changes in CSO volume, frequency, and duration.
- Confirming that the CSO controls, such as the RTBs, are meeting their specific performance criteria.
- Confirming the environmental benefits attributable to CSO control measures and determining whether the City's CSO discharges are complying with the water quality-based requirements of the City's NPDES permits. Specifically, confirming that the controls are achieving the necessary reductions of *E. coli.*
- Confirming that the CSO points have been eliminated where sewer separation has been implemented and outfall closure is planned.

Although not legally required by state or federal regulations, the City is proposing the inclusion of in-stream water quality monitoring as part of both the Implementation Monitoring and the Post-Construction Monitoring Plans. This monitoring will help in documenting the effectiveness of the City's overall CSO control program in achieving the *E. coli* water quality goals.

The Monitoring Program elements include:

1. Conducting water quality and/or flow monitoring to confirm that the performance criteria for the individual controls are met. The City will also evaluate and potentially install a system of rain gauges and/or employ further radar processing of rainfall data to bolster the data available for evaluations of controls.
2. Gathering data to refine the design of future controls. For example, collecting data on the effectiveness of sewer separation.
3. Developing an in-stream monitoring network within portions of the Papillion Creek, its tributaries, and the Missouri River adjacent to the Omaha Metropolitan Area. The

in-stream monitoring sites will provide data that benefits both the CSO Program and the Stormwater Program.

As the LTCP is implemented, the City anticipates that it will be necessary to modify details of its monitoring plans to reflect changes in the LTCP. Reasons for changing the monitoring plans may include:

- Changes in monitoring technologies
- Addition or deletion of monitoring sites
- Addition, modification, or deletion of parameters sampled or analyzed

## ES.9 Wet Weather Operational Plan

A Wet Weather Operations Plan has been developed that is intended to provide an overview of the operation of the CSO controls proposed by the City. This Plan is discussed in Section 8, Monitoring Program and CSO Wet Weather Operations Plan. The goal of the CSO Program is to limit the number and volume of untreated CSO discharges from the CSS to the Missouri River and to tributaries of Papillion Creek to acceptable levels. Operational procedures and staffing levels for the City will need to be adjusted to incorporate new wet weather facilities into plans and procedures for the existing CSS O&M program. Wet weather operations will differ significantly from dry weather operations and will include interevent planning and preparation, procedures and monitoring during storm events, and post-event cleaning and evaluation processes. The Plan presents a general overview of the control facilities, how the City anticipates their working together, and general procedures, operation, and staffing guidelines for operation of the CSS during wet weather events based on the LTCP as proposed and general assumptions. It is anticipated that the procedures and staffing will be refined throughout the design of the individual facilities.

## ES.10 Conclusions

This LTCP presents the City's plan for controlling overflows from its CSS, and was developed in compliance with the requirements of the Clean Water Act, EPA's CSO Control Policy of 1994, and the City's Administrative Consent Order with NDEQ. The Program Cost for implementing the LTCP is estimated to be $1,662,224,000 in April 2009 dollars. The schedule provided in this LTCP shows the City's intent to complete the CSO controls within the 15-year implementation period. Periodic review of the schedule to incorporate new data, integrate new technologies that become available, and adjust the plan to fit changing circumstances or requirements will be performed throughout the implementation period.

The proposed CSO controls meet EPA's Presumption Approach of no more than an average of four untreated overflows per year or more than 85 percent capture of combined sewage during wet weather. The proposed controls also meet EPA's Demonstration Approach by not precluding water quality standards for *E. coli* from being met. The City anticipates requesting that future CSO permits be written to allow either a maximum of four overflow discharge events per year or capture and treatment of no less than 85 percent by volume of the combined sewage collected in the CSS during wet weather on an annual basis.

As a result of implementing the LTCP, nine CSO outfalls will be deactivated, approximately 5,735 acres will undergo sewer separation, and approximately 8,571 million gallons of combined sewage will be either captured or treated during an average year. The City will implement an Adaptive Management Approach to ensure that controls continue to be appropriately designed and constructed.