

Cole Creek Basin Combined Sewer Backup and Major Street Flooding Recommended Approach TM

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Executive Summary

On October 1, 2007, the City of Omaha (City) submitted a Substantively Complete Long Term Control Plan (SCLTCP) to the Nebraska Department of Environmental Quality. The overall cost for this program is estimated at \$1.5 billion (2006 dollars). A portion of these funds is planned for the separation of combined sewers, which can reduce sewer backup (SB) and street flooding (SF) problems. In addition to the sewers identified to be separated as part of the SCLTCP, the City plans to continue the on-going City sewer separation (RNC) program that is intended to specifically address SBs into basements.

An investigation was completed for the Cole Creek (CC) basin to evaluate approaches to addressing SB and SF problems known to date within the basin. This technical memorandum (TM) provides a summary of the data to allow the City to clearly identify the separation plan for the CC basin as it relates to both the combined sewer overflow (CSO) and RNC programs and also to allow the City to establish a preliminary cost for these two programs. In addition to those costs, the information compiled provides the City with the following:

- Information on reported sewer related problems that will require additional investigation.
- Identification of known areas of major street flooding.
- A basin map that indicates the areas that will be separated upon completion of the proposed work.

Table ES-1 summarizes the costs for sewer separation included in the SCLTCP for the CC basin, which will incorporate the current work planned or programmed under the City's RNC Program in the CC basin. No additional separation beyond the SCLTCP was recommended for the CC basin.

Table ES-1: Summary of SCLTCP, RNC Program, and Additional Sewer Separation Costs

Location	Estimated Costs
SCLTCP Sewer Separation	\$ 65,751,000
SCLTCP Storage Tanks	\$ 19,575,000
Current RNC Program (less any overlap with the SCLTCP)	None
TOTAL	\$ 85,326,000

Special Conditions

There are no reported major street flooding issues in the CC basin.

There is a special issue related to the CC basin: the lack of capacity in the East and West Interceptors (trunk sewers). Modeling performed in previous TMs predicted that the trunk sewer along Cole Creek surcharges during more frequent storm events. This modeling also predicted that complete separation within the combined sewer system (CSS) area will not recapture sufficient capacity to eliminate surcharging on the trunk sewer. This surcharging contributes to SB and SF issues. Field activities also suggested that operation and maintenance issues may contribute to some SB and SF calls. Further evaluation will be necessary to determine what improvements beyond sewer separation will address all of the SB and SF issues within the CC basin.

Purpose

The purpose of this Technical Memorandum (TM) is to identify methods for addressing the sewer backups (SB) and major street flooding (SF) problems within the combined sewer basins. This TM addresses only those SB/SF problems that have been reported to date and are the result of storm events and related combined sewer overloading. This TM includes a description of areas identified for sewer separation as part of the CSO controls proposed in the Substantively Complete Long Term Control Plan (SCLTCP).

Potential solutions to address the SB/SF problem areas may include:

- Sewer Separation
 - City identified sewer separation study areas for the RNC program
 - Sewer separation as part of the CSO Control Program
 - Basin Consultant (BC) identified sewer separation study areas to be added to the existing RNC program
 - Additional sewer separation projects required for the CSO program that do not provide sewer backup relief
- Backflow prevention valves
- Green solutions (stormwater management projects)
- Hybrid projects (projects that include both sewer separation and other CSO technologies).

This TM discusses the relative impact that the proposed projects have on the CSO volumes and rates.

Verification and validation of identified problems will be done as part of the preliminary design stage for sewer separation. If at any time prior to or during design of RNC projects further investigation of the identified SB/SF problems shows that inconsistent and/or significant problems cannot be validated, then the proposed separation project area may be modified or eliminated.

Project Background

The City includes more than 1,950 miles of sanitary sewers. In the eastern portion of the City, most of the storm and sanitary sewers are combined. This CSS area encompasses approximately 51 square miles in two watersheds: the Missouri River and Papillion Creek watersheds. The CSS area has been divided into ten basins for evaluation as part of the Omaha CSO Control Program. The CC basin is one of these basins with a mix of separated and combined sewer systems and is located in the Papillion Creek watershed.

The overall purpose of the Omaha CSO Control Program is to develop a Long Term Control Plan (LTCP) for the elimination or reduction of CSOs. As part of the City's LTCP, the City would like to minimize SB and SF problems in the CSS area. For the CC basin, it was determined that separation with storage near CSO outfalls 203 and 204 is the best alternative for addressing the CSS area.

CC Basin Sewer Backup and Street Flooding Issues

In addition to implementation of the City's LTCP, the City intends to minimize the SB/SF problems in the CSS area through the continuation of its Sewer Separation/Sewer Relief program, referred to as the RNC program, and additional sewer separation projects that are not part of the CSO Program. As part of the previously prepared *Cole Creek Basin Sewer Backup and Street Flooding Existing Conditions TM* (June 22, 2007), multiple data resources were used to identify potential SB and SF problem areas, including the City's geographic information system (GIS) database, Cole Creek Watershed Study, Douglas County Flood Insurance Studies (FIS), City records on sewer separation projects, computer model in InfoWorks (IW), and a visual field inspection of the basin.

In order to get a more complete picture of the historical SB/SF problems, reported SB and SF problems are illustrated in Figure 1. These SB and SF problems have been sorted into three categories. The categories are listed and defined below:

1. Flood of 1999: A problem labeled in this manner indicates that it was reported as a result of the August 6, 1999, flood. This was a large storm and exceeded the level of protection that that City can economically afford to resolve with sewer improvement projects. Therefore, these problems may well be legitimate SB and SF issues; however, no sewer improvement projects will be recommended solely because of their existence.

2. Reports not Addressed to Date: A problem labeled in this manner indicates that it appears to be unresolved and not addressed by an already completed RNC project. Problems classified in this manner (and located in clusters) indicate areas in need of additional sewer improvement projects.

3. Reports Addressed to Date: A problem labeled in this manner indicates that it appears to have already been resolved by a completed RNC project. Problems classified in this manner indicate that the surrounding area, most likely, does not need additional sewer improvement projects.

The following are general summaries from the review and analysis of the available resources:

- The 1986 Cole Creek Watershed Study identified areas where recurrences of sewer backups and street flooding were prevalent. Since the completion of this study, there have been three sewer separation projects completed in the CC basin to eliminate or reduce sewer backup and street flooding. However, the City GIS database indicate none of the completed sewer separation projects lays within the major problem areas listed in the 1986 Cole Creek Watershed Study.
- The FIS study identified flood hazard zones along Cole Creek between its confluences with Little Papillion Creek to Sorensen Parkway. The FIS data indicates that the outfall pipes would be submerged during more extreme events (10- and 100-year).
- Current baseline model results in IW indicate a high potential for surcharged sewers along Cole Creek, North 63rd Street between Taylor Street and Spaulding Street, and Boyd Street between CSO 204 and North 63rd Street. These areas will require further investigation once the model is updated with additional field data.

- After reviewing these data sources, 50 field locations were investigated to identify potential SF issues (refer to the *Cole Creek Basin Sewer Backup and Street Flooding Existing Conditions TM* (June 22, 2007)). These investigations were conducted during a period of snow melt in order to better identify SF locations. It was generally observed that street ponding was located in flat sump areas and near inlets blocked with debris. Often the areas with historical SB issues corresponded to low-lying areas, many of which had been modified through local separation projects (RNC projects).

Categorization for Addressing SB/SF Issues

The categories for addressing the CC basin SB/SF issues are identified in the following sections. These categories represent the progression of analysis to minimize/eliminate the SB/SF issues.

Category 1 - Existing Sewer Separation Completed to Date. - This category includes all the SB/SF issues that have been addressed to date by work already completed or currently under construction in the CC basin. SB/SF issues in this category have been addressed through City RNC projects or various other sewer separation projects that were completed prior to the start of the RNC program in 1990. These older projects were classified as SOS, STS, or with other various identifiers. These completed projects can be further categorized into either “separation” or “conveyance relief” projects as defined below:

Separation - Projects that separated combined sewers within the right-of-way by either: (1) providing a dedicated sanitary sewer that conveys the sanitary flows downstream, or, (2) providing a dedicated storm sewer to convey the storm sewer flows downstream, leaving the existing sewer for sanitary flows only. Separation within the right-of-way does not include separation of any private sewer laterals or taps.

Conveyance Relief - Projects that provided relief for the existing combined system to address SB/SF issues. In most cases, these projects provided a new sewer that provided relief to the existing combined system. The new sewers were sized to provide only the additional required storm flow capacity.

Category 2 - Planned Sewer Separation in Existing City RNC Program. This category includes all the SB/SF issues that have been previously identified by the City to be addressed by planned sewer separation projects through the RNC program. Note that since the LTCP recommendation for the CC basin is complete separation, the planned RNC projects will be incorporated into the CSO Program. The summary data and costs for such projects are included under Category 4.

Category 3 - Additional Sewer Separation Projects, Identified by BC, and Not Part of CSO Program. This category includes all the SB/SF issues that have been proposed to be addressed by additional sewer separation projects identified in this TM. The projects in this category are intended solely to address SB and do not provide water quality benefits for the receiving streams. *There are no additional RNC projects proposed for the CC basin.*

Category 4 - Sewer Separation included in the SCLTCP. This category includes all the SB/SF issues that have been proposed to be addressed by sewer separation through the

CSO program as part of the SCLTCP. These projects can be shown to produce water quality benefits for the receiving streams.

Category 5 –Additional Sewer Separation Projects, Added to the CSO Program. This category includes both the following:

- Additional combined sewer separation projects beyond the areas identified in the SCLTCP because they provide water quality benefits;
- Projects previously listed under Category 2 that, because they have been determined to provide water quality benefits, have been reclassified to be a part of the CSO LTCP.

No additional CSO sewer separation projects/study areas have been proposed for the CC basin.

Costs

Costs for projects in the five categories are presented below, where applicable. The costs for Category 1 projects were based on completed construction costs. The costs for projects in Categories 2 through 5 are based on engineer's estimates. The project costs presented in this TM were taken from separation costs identified in the *Cole Creek Implementation Plan TM* (dated October 8, 2007). The pipe segments from each project area were taken out of the previously completed separation cost estimate and tabulated and include:

- a) Construction cost
- b) 67 percent soft cost markup per page 1 of the Cost Tool
- c) 30 percent contingency and inflation factor
- d) Addition of Metropolitan Utilities District costs for the length of sanitary sewer reconstruction included in the study area

Summaries of each category's project costs are shown in Tables 1 through 3.

Category 1 – Existing Sewer Separation Completed to Date

The City has been implementing a sewer separation program since 1990 for some portions of the combined sewer area, including areas within the CC basin. These projects have generally been implemented in order of importance as determined in previous reports. The sewer separation projects identified as RNC projects have been designed to relieve the existing combined system and not necessarily to achieve complete sewer separation.

In general, the City believes that in the areas of RNC projects, the sewer backup and street flooding problems have been addressed. Evidence of this can be found by comparing the dates of the reported problems in the area to the dates of the RNC projects. With the exception of the 1999 flood, no complaints were received in the RNC project areas after the completion of the RNC projects.

The completed RNC Projects for the CC basin are listed in Table 1 and shown in Figure A.1 (Attachment 1). Some general statistics regarding the amount of sewer separation and areas where SBs were likely addressed are provided in the following sections. Metrics for determining the effectiveness of the RNC program and the ensuing CSO separation projects are in the process of being defined.

Table 1 – Category 1 (Completed Sewer Improvement/RNC Projects)

RNC Number	General Location	Type of Separation	Street Length of Project (LF)	Street Length of Separation (LF)	Separated Watershed Area (Acres)	Construction Cost (\$)¹
RNC 4998	56 th and Sprague	Conveyance Relief	500	16,700	11	\$51,200
RNC 5116	66 th and Bedford	Conveyance Relief	2,400	3,400	52	\$604,800
RNC 5318	67 th and Pinkney and 66 th and Emmet	Conveyance Relief	3,100	12,200	83	\$1,488,000
Total						\$2,144,000

¹ Project costs were obtained from City of Omaha and the Cole Creek completed RNC GIS shapefile "CC_rncs072606" attribute table (FINAL_COST).

Based on analysis of the available information, it was concluded that the completed RNC projects have already addressed many of the historical SB/SF problem areas in the CC basin. **SB/SF reports identified since the project completion dates require more analysis and may necessitate additional future projects to address specific issues.**

Category 2 – Planned Sewer Separation in Existing City RNC Program

The City has identified areas for planned sewer separation in the existing RNC program. These are referred to as "Planned RNC study areas." The two planned RNC study areas for the CC basin are: 56th Street and Manderson Street and 69th Street and Pratt Street. These proposed projects are shown on Figure A.2 (Attachment 1). During a meeting with City staff on January 16, 2008, no further planned RNC projects were identified and it was confirmed that no plans are available for these projects.

The CC basin was identified for separation in the SCLTCP; therefore, these planned RNC study areas were incorporated into larger separation study areas for the CC Basin as indicated in Category 4 for CSO control. The planned RNC study area for 56th Street and Manderson Street was incorporated into SA-204-1 and the RNC study area for 69th Street and Pratt Street was incorporated into SA-204-2.

Figure A.2 (Attachment 1) shows the SB reports that will be addressed by the proposed RNC projects.

Category 3 – Additional Sewer Separation Projects, Identified by BC, and Not Part of CSO Program

SB/SF problem areas that are not addressed through completed RNC projects, planned RNC study areas, or CSO Control Program sewer separation projects fall into three separate items:

- SB/SF issues located adjacent to completed RNC projects

- Clustered SB/SF issues not currently addressed by planned RNC study areas
- Outlier SB/SF issues that are not grouped and appear to be isolated issues

The first item includes SB/SF issues that are outside the limits of the completed RNC pipe extents but appear to have been addressed by that completed RNC project. These issues were identified by examining the RNC watershed, investigating the as-built plan sheets and comparing the dates of the reports to the dates of the completed RNC projects.

The second item includes other clustered problem areas that were not included in a planned RNC study area or CSO Control sewer separation study area.

The third item includes isolated events that cannot be linked to sewer capacity issues given the current information.

There have not been any areas identified within the CC basin that would require additional sewer separation beyond the CSO Program.

Category 4 – Sewer Separation Included in the SCLTCP

No Baseline Projects were identified in the SCLTCP specifically for Cole Creek. Instead, the recommendation was separation of areas contributing flows to CSOs 202, 203, and 204, with storage at CSOs 203 and 204 to meet Level 2 Control. The costs for the recommended separation study areas are listed in Table 2, and the costs for the storage tanks are listed in Table 3. Detailed cost tables for these projects are located in Attachment 2. The SB and SF complaints which will be addressed by these controls are shown on Figure A.2 (Attachment 1).

The study areas identified for this TM have been referenced as SA-XXX-Y. SA identifies the area as a study area. XXX is used to indicate the CSO number designation. In the CC basin, CSO 203 represents the 69th and Evans outfall and CSO 204 represents the 63rd and Ames outfall. Y is used to identify the specific study area number.

Table 2 – Summary of CSO SCLTCP Separation Project Costs

ID	Location	Length of New Storm Sewer (LF)	Length of New San. Sewer (LF)	Street Length of Separation	Estimated Project Cost
SA-204-1	Project 1: CSO 204 – Separation	36,000	9,650	37,000	\$ 53,665,000
SA-203-1	Project 2: CSO 203 – Separation	8,200	N/A	8,200	\$ 3,473,000
SA-202-1	Project 3: CSO 202 – Separation Only	12,000	1,550	12,800	\$ 8,613,000
	Total	56,200	11,200	58,000	\$ 65,751,000

Table 3 – Summary of CSO SCLTCP Storage Costs

ID	Location	Volume of New Storage Tank (MG)	Estimated Project Cost
SA-204-2	Project 1: CSO 204 – Storage Tank at Outfall	0.78	\$ 15,307,000
SA-203-2	Project 2: CSO 203 – Storage Tank at Outfall	0.13	\$ 4,268,000
	Total	0.91	\$ 19,575,000

Category 5 – Additional Sewer Separation Projects, Added to the CSO Program

There have not been any additional CSO sewer separation projects identified in the CC basin.

Isolated Problem Areas (Outliers)

Isolated problem areas (outliers) are any problems reported in the City’s GIS database that fall outside the sewer separation areas previously described in this TM. These outliers can be a single complaint or several scattered complaints, and are listed in Table A.1 (Attachment 2). The outliers in the CC basin are all located within the extended area of the CC basin as illustrated on Figure A.3 (Attachment 1).

- A number of outliers were identified that fall outside of the areas to be addressed by CSO controls and/or planned RNC study areas. These problems lie in the separated area outside the CSS area of the CC basin as indicated on Figure A.3 (Attachment 1). The IW model predicted, as reported in *Cole Creek Basin Sewer Backup and Street Flooding Existing Conditions TM* (June 22, 2007), that the trunk sewer along Cole Creek surcharges during more frequent storm events such as the 1-year, 2-year and 10-year return frequency storm events. This was confirmed by the flow monitoring data obtained during the infiltration and inflow analysis. Many of these outliers (particularly between Ames Avenue and Maple Street, and south of Western Avenue.) are served by sewers that connect to surcharged portions of the trunk sewer. The trunk sewer hydraulic analysis performed in the *Cole Creek Basin Inflow and Infiltration Evaluation TM* (dated March 4, 2008) also predicted that separation within the CSS area will not recapture sufficient capacity to eliminate surcharging on the trunk sewer. The CC basin study team believes that additional trunk sewer capacity is necessary to eliminate all SBs adjacent to surcharged interceptors. This issue will be investigated further in the refinement stage and could result in the development of either additional City sewer projects or Category 5 projects if shown to provide CSO benefits. Costs for this potential work are not included in this TM.
- Other outliers that fall outside the CSS area generally to the north of Ames Avenue do not appear to be impacted by the surcharge from the trunk sewers. It is likely that these SB issues are either related to localized capacity or maintenance issues within the sanitary sewer system.

- All of the additional SB and SF reports discussed previously were documented in the *Cole Creek Basin Sewer Backup and Street Flooding Existing Conditions TM* (dated June 22, 2007). Only one additional report has been acquired since the submittal date of that TM. The site was located at 2923 North 58th Street (58th Street and Northwest Radial Highway). The SB reported was a non-rain related backup at a location with no previous history of backups. It is therefore assumed that this was an isolated maintenance issue rather than a capacity issue.

Known Areas of Major Street Flooding

There are no reported major street flooding problems in the CC basin.

Green Solutions

This section discusses which sewer backup areas, if any, could benefit from Green Solutions in the CC basin. In general, it appears that the sewer backup issues can be resolved through sewer separation projects. Although green solutions may have an added benefit in problem areas, no green solutions are recommended at this time to specifically address any problem areas. Green solutions will be investigated further as part of another 2008/2009 refinement task.

Hybrid Projects

This section discusses which sewer backup areas, if any, could benefit from hybrid projects in the CC basin. As discussed earlier, it is possible that additional trunk sewer capacity, in conjunction with the SCLTCP recommended hybrid alternative of sewer separation and storage, will address the SB issues located adjacent to the undersized portions of the trunk sewer. Further evaluation for hybrid projects is to be accomplished as part of another 2008/2009 refinement task.

Impacts to CSO Flow Rates

This section estimates the impacts that the projects recommended in this TM might have on CSO rates, in addition to the CSO controls already identified in the SCLTCP. Estimates for reduction in flow rates for the CSO Projects included in the SCLTCP were included in the SCLTCP document. Refined estimates of the reductions in volume and flow rate will be calculated in late 2008 using the updated IW model. *Since there were no additional CSO or RNC projects proposed for the CC basin, no additional volume or rate reductions are identified.*

Study Area Priorities

Each of the CSO sewer separation areas in the CC basin will be subdivided into individual projects. These projects will be scheduled as part of the Final LTCP. The *Cole Creek Implementation Plan TM* (dated October 8, 2007) presented a recommended order for the implementation of the separation and storage. Ultimately the priority of these individual projects will be based on the funding levels for the sewer separation portion of the CSO Program and will likely be completed from downstream to upstream in each of the sub-

basins draining to CSO locations. Since CSO 204 is the largest sub-basin, it is recommended that construction begin in the CSO 204 sub-basin (separation and storage tank). This would be followed by construction of the storage tank at the CSO 203 outfall, followed by the CSO 202 separation. Separation of the CSO 203 sub-basin would be completed last.

Prioritization of the projects within these three sub-basins will depend on several factors, including coordination with other City projects. The project sequence will be evaluated and established by the City of Omaha and the PMT.

Acronym/Term	Definition
BC	Basin Consultant
CC	Cole Creek
City	City of Omaha
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
FIS	Flood Insurance Studies
GIS	Geographic Information System
IW	InfoWorks
LTCP	Long Term Control Plan
RNC	City's Sewer Separation Projects
SB	Sewer Backup
SCLTCP	Substantively Complete LTCP
SF	Street Flooding
TM	Technical Memorandum

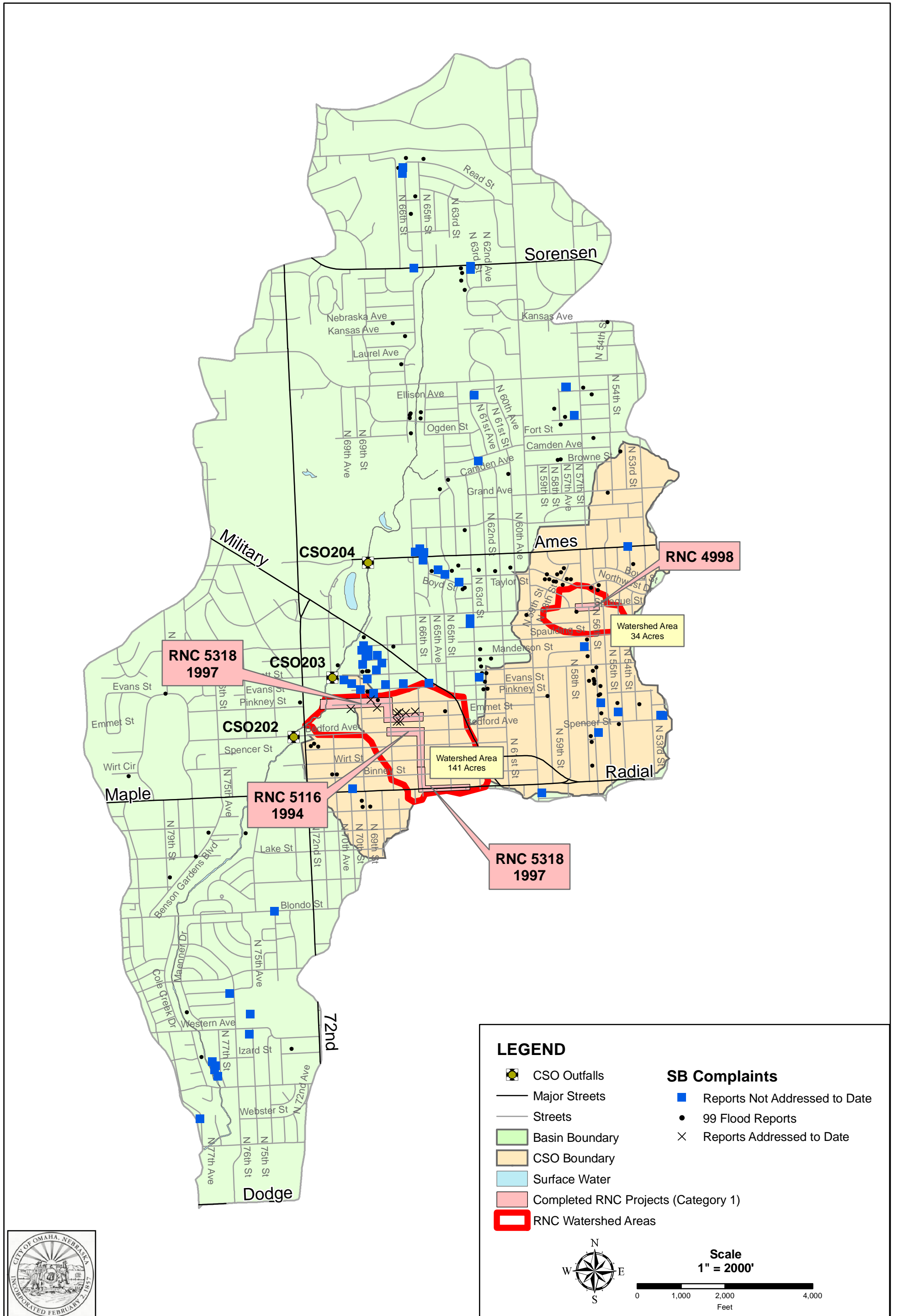
References

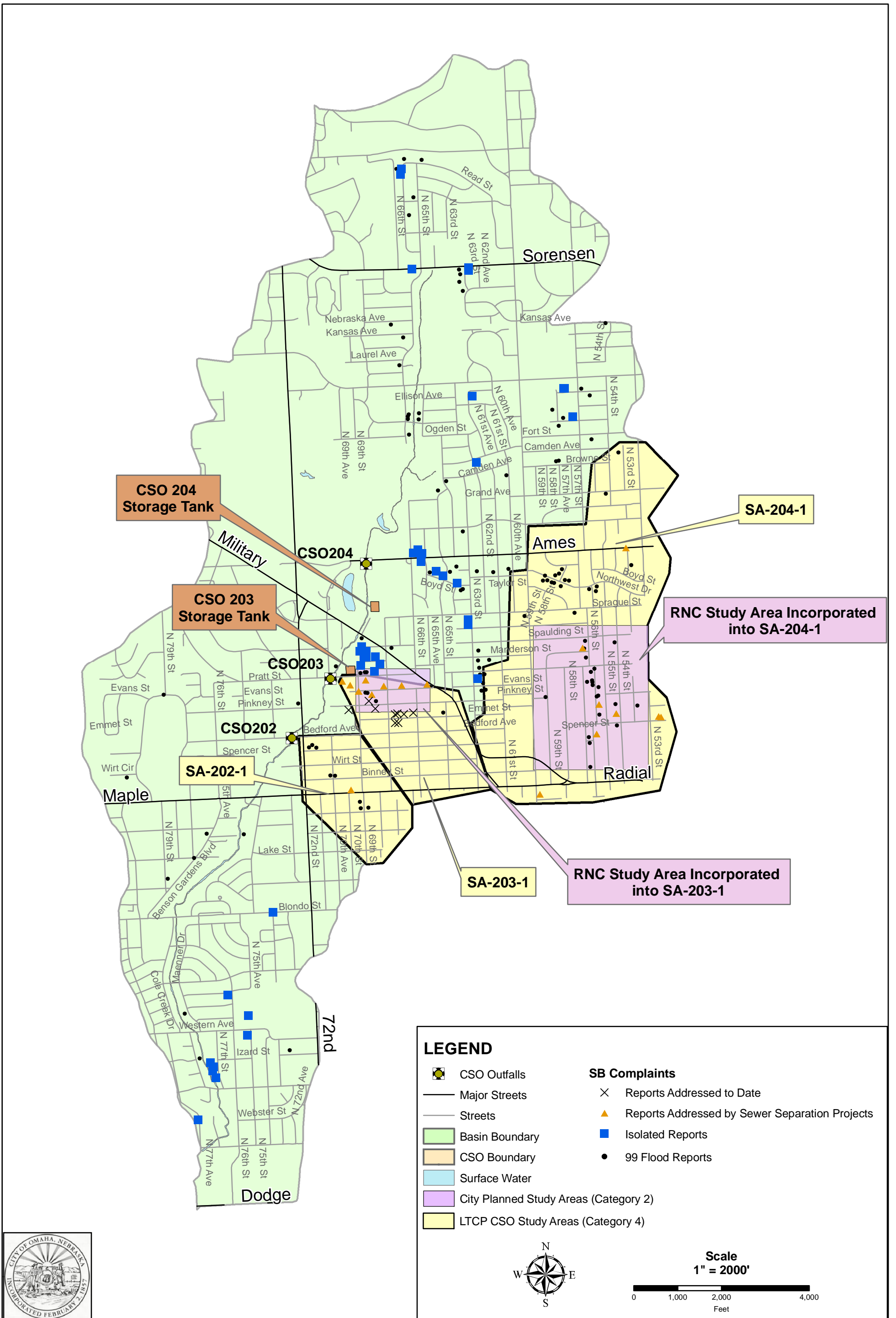
Camp Dresser & McKee Inc. (CDM). *Cole Creek Basin Sewer Backup and Street Flooding Existing Conditions TM* (dated June 22, 2007)

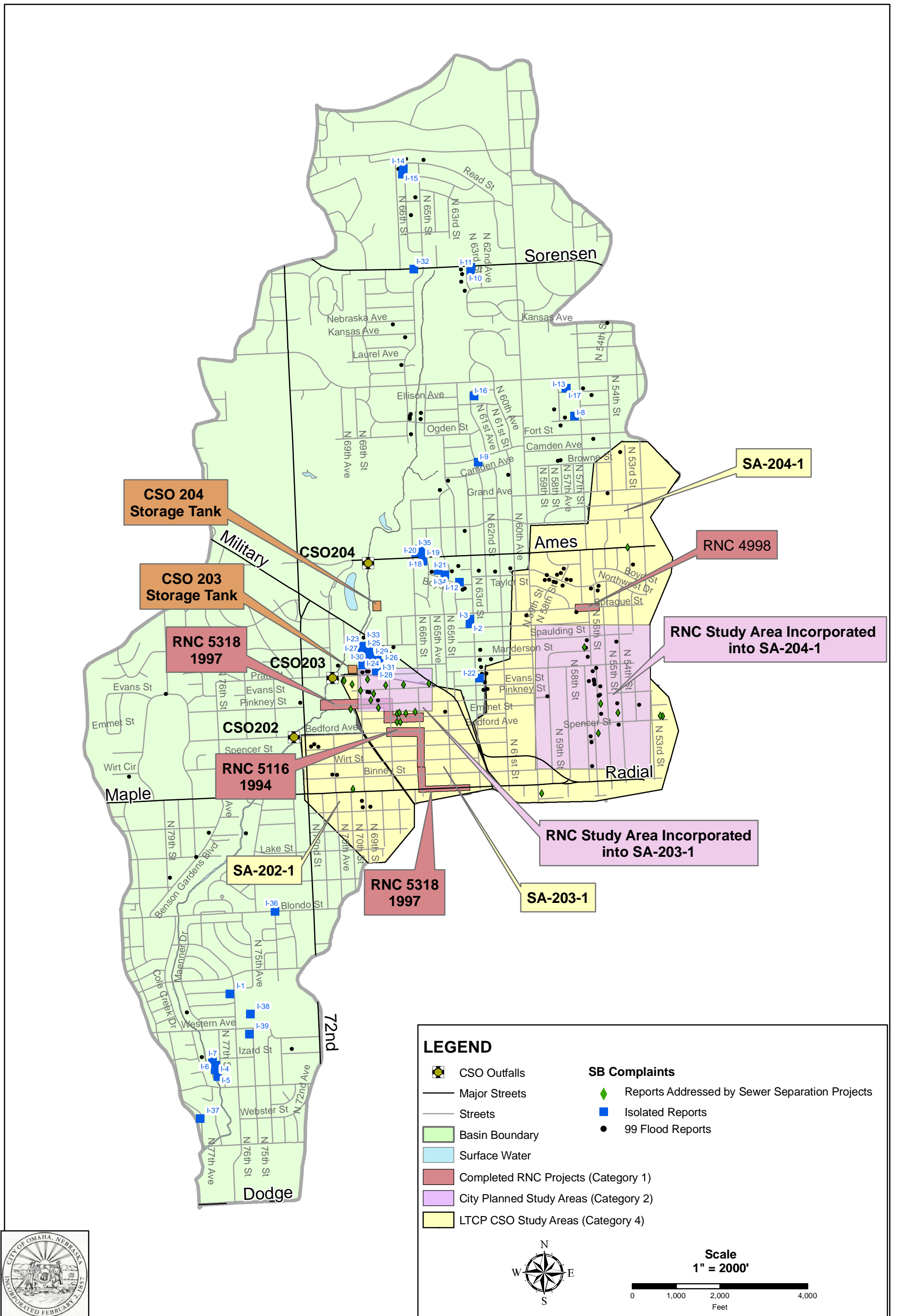
CDM. *Cole Creek Basin Implementation Plan TM* (dated October 8, 2007)

CDM. *Cole Creek Basin Inflow and Infiltration Evaluation TM* (dated March 4, 2008)

Attachment 1 – Figures







Attachment 2 – Tables

Table A.1 - Outlier Data and Windshield Survey Notes

Report ID No.	Date of Complaint	Address or General Location	LABEL	WINDSHIELD SURVEY NOTES
I-1	8/2/81	1418 N 76TH ST	UNKNOWN	N/A
I-2	11/3/83	4008 N 63RD ST	UNKNOWN	Clogged Inlets
I-3	4/29/84	4008 N 63RD ST	UNKNOWN	N/A
I-4	4/29/84	822 N 77TH ST	UNKNOWN	N/A
I-5	4/29/84	830 N 77TH ST	UNKNOWN	N/A
I-6	4/29/84	834 N 77TH ST	UNKNOWN	N/A
I-7	4/29/84	842 N 77TH ST	UNKNOWN	N/A
I-8	9/8/89	5402 N 56TH ST	SEWER BACKUP	N/A
I-9	6/22/94	5219 N 62 ST	SEWER BACKUP	N/A
I-10	6/23/94	6417 N 63 ST	SEWER BACKUP	N/A
I-11	6/23/94	6417 N 63 ST	SEWER BACKUP	N/A
I-12	7/22/93	6300 BOYD ST	MH LID BLOWN OFF	N/A
I-13	7/25/93	5624 ELLISON AVE	SEWER BACKUP	N/A
I-14	8/10/87	7136 N 65TH AV	UNKNOWN	N/A
I-15	9/3/89	7130 N 65TH AV	SEWER BACKUP	N/A
I-16	6/14/91	5615 N 61ST AV	SEWER OVERLOAD	N/A
I-17	7/27/93	5624 ELLISON AVE	SEWER BACKUP	N/A
I-18	8/11/93	6572 AMES AV	SEWER BACKUP	No Inlets
I-19	6/22/94	6572 AMES AV	SEWER BACKUP	Slight Ponding/Clogged Inlets
I-20	6/22/94	6553 AMES AV	SEWER BACKUP	No Inlets
I-21	6/22/94	6518 BOYD ST	SEWER BACKUP	Ponding
I-22	6/14/91	6139 PRATT	DIVERSION GATE	Low Spot
I-23	3/8/95	6819 SPAULDING	POSTCARD	Ponding
I-24	3/8/95	6823 SPAULDING	POSTCARD	N/A
I-25	3/8/95	6811 SPAULDING	POSTCARD	Ponding
I-26	3/8/95	6764 MANDERSON	POSTCARD	N/A
I-27	3/8/95	6784 MANDERSON	POSTCARD	Ponding
I-28	3/8/95	6759 MANDERSON	POSTCARD	N/A
I-29	3/8/95	6780 MANDERSON	POSTCARD	Ponding
I-30	3/8/95	6791 MANDERSON	POSTCARD	Ponding
I-31	3/8/95	6766 PRATT	POSTCARD	N/A
I-32	4/26/91	6520 REDICK	UNKNOWN	N/A
I-33	11/6/98	6819 SPAULDING CIR	POSTCARD	Ponding
I-34	10/22/01	4304 N 65TH ST	SEWER BACKUP	Ponding
I-35	5/24/04	6572 AMES AVE	SEWER OVERLOAD	Slight Ponding/Clogged Inlets
I-36	5/24/04	7421 BLONDO ST	MH LID BLOWN OFF	N/A
I-37	5/24/04	77TH & WEBSTER ST	MH LID BLOWN OFF	N/A
I-38	7/22/04	Western Avenue & North 75th Street	MH LID BLOWN OFF	N/A
I-39	7/22/04	Western Avenue & North 75th Street	MH LID BLOWN OFF	N/A

Cole Creek Basin Implementation Plan

CSO 202 - Sewer Separation Cost Breakdown HA-CL2

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$4,778,230									\$4,539,318	95%	\$238,911	5%	\$4,778,230	100%
Eng, Legal, Admin	5%	\$238,911	\$11,946	5%	\$23,891	10%	\$71,673	30%	\$47,782	20%	\$71,673	30%	\$11,946	5%	\$238,911	100%
Contingencies (CT Cell I39)	25%	\$1,194,557	\$0		\$0		\$59,728	5%	\$0		\$1,134,830	95%	\$0		\$1,194,557	100%
Interest	5%	\$238,911	\$0		\$0		\$0		\$0		\$238,911	100%	\$0		\$238,911	100%
PTI, Test Bore, ECI	4%	\$191,129	\$38,226	20%	\$152,903	80%	\$0		\$0		\$0		\$0		\$191,129	100%
Field Eng/Inspection	5%	\$238,911	\$0		\$0		\$0		\$0		\$215,020	90%	\$23,891	10%	\$238,911	100%
Design & Eng. Services	15%	\$716,734	\$0		\$0		\$645,061	90%	\$71,673	10%	\$0		\$0		\$716,734	100%
Program Management	2%	\$95,565	\$4,778	5%	\$9,556	10%	\$28,669	30%	\$19,113	20%	\$28,669	30%	\$4,778	5%	\$95,565	100%
Planning & Prelim Design	5%	\$238,911	\$71,673	30%	\$167,238	70%	\$0		\$0		\$0		\$0		\$238,911	100%
Performance Bond	1%	\$47,782	\$0		\$0		\$0		\$0		\$47,782	100%	\$0		\$47,782	100%
Capital Cost	67%	\$7,980,000	\$126,623	1.6%	\$353,589	4.4%	\$805,132	10.1%	\$138,569	1.7%	\$6,276,205	78.6%	\$279,526	3.5%	\$7,979,644	100.0%
CT Construction Performance Incentive		\$44,000									\$44,000				\$44,000	100.0%
CT MUD Utility Relocation		\$446,000							\$446,000						\$446,000	
Additional Cost	3%	\$143,347	\$143,347												\$143,347	
Total Project Capital Cost		\$8,613,000	\$270,000		\$353,600		\$805,100		\$584,600		\$6,320,200		\$279,500		\$8,613,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	3.1%	\$270,000
Task 2 - Prelim Design	4.1%	\$353,600
Task 3 - Final Design	9.3%	\$805,100
Task 4 - Utility Relocations	6.8%	\$584,600
Task 5 - Construction	73.4%	\$6,320,200
Task 6 - Start-Up and Close-Out	3.2%	\$279,500
Total	100.0%	\$8,613,000

Data to be Entered
 Additional Data to Be Entered if Additional Cost included
Total Construction Cost
Total Project Capital Cost
Total 50-Year Present Worth Cost

Fixed Values	
PCWWTP O&M Cost per MG:	\$670
50-Year PW Calculation (Interest Rate):	6%
50-Year PW Calculation (Years):	50
P/A Factor (Uniform Series Present Worth)	15.7619
Total Multipliers (Cost Tool Cell I52):	67%
Calculated Values	
Annual Volume to PCWWTP (MG):	0
Floatable Control Peak Flow (MGD)	5.51

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$4,408,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
Floatables Control (construction)	\$370,230
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$44,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$446,000
Additional Cost	\$143,347
Total Construction Cost (including MUD & incentive)	\$5,412,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$7,361,360
Floatables Control	\$618,284
CT Construction Performance Incentive	\$44,000
CT MUD Utility Relocation	\$446,000
Additional Cost (if recommended)	\$143,347
Total Project Capital Cost	\$8,613,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$16,553
PCWWTP	\$0
Total Annual O&M Cost	\$16,553
50-Year Present Worth	
Total Project Capital Cost	\$8,613,000
50-Year Present Worth Total Annual O&M	\$260,906
Total 50-Year Present Worth Cost	\$8,874,000

Note 1: Construction Cost = Cost Tool (CT) Project \$ Summary Cell I27 + Cell I35 + Floatables Control (construction). This does not include CT Construction Performance Incentive or CT MUD Utility Relocation. This cost is reflected in the Total Construction Cost.

Note 2: 50-Year Present Worth Estimate (Project \$ Summary Cell I58), is lower than the Project Capital Cost (Cell I57).

Therefore, the 50-Yr PW has been recalculated as the Total Project Capital Cost plus the Total Annual O&M 50-Yr PW

Note 3: Floatable Control for CSO 202 overflows above control level 2 is included in the separation cost breakdown

Cole Creek Basin Implementation Plan
CSO 203 - Sewer Separation Cost Breakdown HA-CL2

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$2,031,000									\$1,929,450	95%	\$101,550	5%	\$2,031,000	100%
Eng, Legal, Admin	5%	\$101,550	\$5,078	5%	\$10,155	10%	\$30,465	30%	\$20,310	20%	\$30,465	30%	\$5,078	5%	\$101,550	100%
Contingencies (CT Cell I39)	25%	\$507,750	\$0		\$0		\$25,388	5%	\$0		\$482,363	95%	\$0		\$507,750	100%
Interest	5%	\$101,550	\$0		\$0		\$0		\$0		\$101,550	100%	\$0		\$101,550	100%
PTI, Test Bore, ECI	4%	\$81,240	\$16,248	20%	\$64,992	80%	\$0		\$0		\$0		\$0		\$81,240	100%
Field Eng/Inspection	5%	\$101,550	\$0		\$0		\$0		\$0		\$91,395	90%	\$10,155	10%	\$101,550	100%
Design & Eng. Services	15%	\$304,650	\$0		\$0		\$274,185	90%	\$30,465	10%	\$0		\$0		\$304,650	100%
Program Management	2%	\$40,620	\$2,031	5%	\$4,062	10%	\$12,186	30%	\$8,124	20%	\$12,186	30%	\$2,031	5%	\$40,620	100%
Planning & Prelim Design	5%	\$101,550	\$30,465	30%	\$71,085	70%	\$0		\$0		\$0		\$0		\$101,550	100%
Performance Bond	1%	\$20,310	\$0		\$0		\$0		\$0		\$20,310	100%	\$0		\$20,310	100%
Capital Cost	67%	\$3,392,000	\$53,822	1.6%	\$150,294	4.4%	\$342,224	10.1%	\$58,899	1.7%	\$2,667,719	78.6%	\$118,814	3.5%	\$3,391,770	100.0%
CT Construction Performance Incentive		\$20,000									\$20,000				\$20,000	100.0%
CT MUD Utility Relocation		\$0							\$0						\$0	
Additional Cost	3%	\$60,930	\$60,930												\$60,930	
Total Project Capital Cost		\$3,473,000	\$114,800		\$150,300		\$342,200		\$58,900		\$2,687,700		\$118,800		\$3,473,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	3.3%	\$114,800
Task 2 - Prelim Design	4.3%	\$150,300
Task 3 - Final Design	9.9%	\$342,200
Task 4 - Utility Relocations	1.7%	\$58,900
Task 5 - Construction	77.4%	\$2,687,700
Task 6 - Start-Up and Close-Out	3.4%	\$118,800
Total	100.0%	\$3,473,000

Fixed Values	
PCWWTP O&M Cost per MG:	\$670
50-Year PW Calculation (Interest Rate):	6%
50-Year PW Calculation (Years):	50
P/A Factor (Uniform Series Present Worth)	15.7619
Total Multipliers (Cost Tool Cell I52):	67%

Calculated Values	
Annual Volume to PCWWTP (MG):	0
Floatable Control Peak Flow (MGD)	In storage Cost

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$2,031,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
Floatables Control (construction)	\$0
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$20,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$0
Additional Cost	\$60,930
Total Construction Cost (including MUD & incentive)	\$2,112,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$3,392,000
CT Construction Performance Incentive	\$20,000
CT MUD Utility Relocation	\$0
Additional Cost (if recommended)	\$60,930
Total Project Capital Cost	\$3,473,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$10,249
PCWWTP	\$0
Total Annual O&M Cost	\$10,249
50-Year Present Worth	
Total Project Capital Cost	\$3,473,000
50-Year Present Worth Total Annual O&M	\$161,543
Total 50-Year Present Worth Cost	\$3,635,000

- Data to be Entered
- Additional Data to Be Entered if Additional Cost included
- Total Construction Cost
- Total Project Capital Cost
- Total 50-Year Present Worth Cost

Note 1: Construction Cost = Cost Tool (CT) Project \$ Summary Cell I27 + Cell I35 + Floatables Control (construction). This does not include CT Construction Performance Incentive or CT MUD Utility Relocation. This cost is reflected in the Total Construction Cost.
 Note 2: 50-Year Present Worth Estimate (Project \$ Summary Cell I58), is lower than the Project Capital Cost (Cell I57).
 Therefore, the 50-Yr PW has been recalculated as the Total Project Capital Cost plus the Total Annual O&M 50-Yr PW

Cole Creek Basin Implementation Plan

CSO 203 - Storage (0.13 MG) Cost Breakdown HA-CL2

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$2,534,508									\$2,407,782	95%	\$126,725	5%	\$2,534,508	100%
Eng, Legal, Admin	5%	\$126,725	\$6,336	5%	\$12,673	10%	\$38,018	30%	\$25,345	20%	\$38,018	30%	\$6,336	5%	\$126,725	100%
Contingencies (CT Cell I39)	25%	\$633,627	\$0		\$0		\$31,681	5%	\$0		\$601,946	95%	\$0		\$633,627	100%
Interest	5%	\$126,725	\$0		\$0		\$0		\$0		\$126,725	100%	\$0		\$126,725	100%
PTI, Test Bore, ECI	4%	\$101,380	\$20,276	20%	\$81,104	80%	\$0		\$0		\$0		\$0		\$101,380	100%
Field Eng/Inspection	5%	\$126,725	\$0		\$0		\$0		\$0		\$114,053	90%	\$12,673	10%	\$126,725	100%
Design & Eng. Services	15%	\$380,176	\$0		\$0		\$342,159	90%	\$38,018	10%	\$0		\$0		\$380,176	100%
Program Management	2%	\$50,690	\$2,535	5%	\$5,069	10%	\$15,207	30%	\$10,138	20%	\$15,207	30%	\$2,535	5%	\$50,690	100%
Planning & Prelim Design	5%	\$126,725	\$38,018	30%	\$88,708	70%	\$0		\$0		\$0		\$0		\$126,725	100%
Performance Bond	1%	\$25,345	\$0		\$0		\$0		\$0		\$25,345	100%	\$0		\$25,345	100%
Capital Cost	67%	\$4,233,000	\$67,164	1.6%	\$187,554	4.4%	\$427,065	10.1%	\$73,501	1.7%	\$3,329,076	78.6%	\$148,269	3.5%	\$4,232,628	100.0%
CT Construction Performance Incentive		\$22,000									\$22,000				\$22,000	100.0%
CT MUD Utility Relocation		\$13,000							\$13,000						\$13,000	
Additional Cost	0%	\$0	\$0												\$0	
Total Project Capital Cost		\$4,268,000	\$67,200		\$187,600		\$427,100		\$86,500		\$3,351,100		\$148,300		\$4,268,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	1.6%	\$67,200
Task 2 - Prelim Design	4.4%	\$187,600
Task 3 - Final Design	10.0%	\$427,100
Task 4 - Utility Relocations	2.0%	\$86,500
Task 5 - Construction	78.5%	\$3,351,100
Task 6 - Start-Up and Close-Out	3.5%	\$148,300
Total	100.0%	\$4,268,000

Fixed Values	
PCWWTP O&M Cost per MG:	\$670
50-Year PW Calculation (Interest Rate):	6%
50-Year PW Calculation (Years):	50
P/A Factor (Uniform Series Present Worth)	15.7619
Total Multipliers (Cost Tool Cell I52):	67%

Calculated Values	
Annual Volume to PCWWTP (MG):	1.106
Floatable Control Peak Flow (MGD)	5.71

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$2,160,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
Floatables Control (construction)	\$374,508
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$22,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$13,000
Additional Cost	\$0
Total Construction Cost (including MUD & incentive)	\$2,570,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$3,607,200
Floatables Control	\$625,428
CT Construction Performance Incentive	\$22,000
CT MUD Utility Relocation	\$13,000
Additional Cost (if recommended)	\$0
Total Project Capital Cost	\$4,268,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$35,776
PCWWTP	\$741
Total Annual O&M Cost	\$36,517
50-Year Present Worth	
Total Project Capital Cost	\$4,268,000
50-Year Present Worth Total Annual O&M	\$575,576
50-Year Present Worth Equipment Replacement Cost (Life Cycle Analysis Cell G108)	\$168,913
Total 50-Year Present Worth Cost	\$5,012,000

- Data to be Entered
- Additional Data to Be Entered if Additional Cost included
- Total Construction Cost
- Total Project Capital Cost
- Total 50-Year Present Worth Cost

Note 1: Construction Cost = Cost Tool (CT) Project \$ Summary Cell I27 + Cell I35 + Floatables Control (construction). This does not include CT Construction Performance Incentive or CT MUD Utility Relocation. This cost is reflected in the Total Construction Cost.

Note 2: 50-Year Present Worth Estimate (Project \$ Summary Cell I58), is lower than the Project Capital Cost (Cell I57). Therefore, the 50-Yr PW has been recalculated as the Total Project Capital Cost (which includes MUD and incentive) plus the 50-Yr PW of the Annual O&M and the Equipment Replacement Cost from the Life Cycle Cell G108

Note 3: Floatable Control for CSO 203 overflows above control level 2 is included in the storage cost breakdown

Cole Creek Basin Implementation Plan

CSO 204 - Sewer Separation Cost Breakdown HA-CL2

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$30,219,000									\$28,708,050	95%	\$1,510,950	5%	\$30,219,000	100%
Eng, Legal, Admin	5%	\$1,510,950	\$75,548	5%	\$151,095	10%	\$453,285	30%	\$302,190	20%	\$453,285	30%	\$75,548	5%	\$1,510,950	100%
Contingencies (CT Cell I39)	25%	\$7,554,750	\$0		\$0		\$377,738	5%	\$0		\$7,177,013	95%	\$0		\$7,554,750	100%
Interest	5%	\$1,510,950	\$0		\$0		\$0		\$0		\$1,510,950	100%	\$0		\$1,510,950	100%
PTI, Test Bore, ECI	4%	\$1,208,760	\$241,752	20%	\$967,008	80%	\$0		\$0		\$0		\$0		\$1,208,760	100%
Field Eng/Inspection	5%	\$1,510,950	\$0		\$0		\$0		\$0		\$1,359,855	90%	\$151,095	10%	\$1,510,950	100%
Design & Eng. Services	15%	\$4,532,850	\$0		\$0		\$4,079,565	90%	\$453,285	10%	\$0		\$0		\$4,532,850	100%
Program Management	2%	\$604,380	\$30,219	5%	\$60,438	10%	\$181,314	30%	\$120,876	20%	\$181,314	30%	\$30,219	5%	\$604,380	100%
Planning & Prelim Design	5%	\$1,510,950	\$453,285	30%	\$1,057,665	70%	\$0		\$0		\$0		\$0		\$1,510,950	100%
Performance Bond	1%	\$302,190	\$0		\$0		\$0		\$0		\$302,190	100%	\$0		\$302,190	100%
Capital Cost	67%	\$50,466,000	\$800,804	1.6%	\$2,236,206	4.4%	\$5,091,902	10.1%	\$876,351	1.7%	\$39,692,657	78.7%	\$1,767,812	3.5%	\$50,465,730	100.0%
CT Construction Performance Incentive		\$302,000									\$302,000				\$302,000	100.0%
CT MUD Utility Relocation		\$1,991,000							\$1,991,000						\$1,991,000	
Additional Cost	3%	\$906,570	\$906,570												\$906,570	
Total Project Capital Cost		\$53,665,000	\$1,707,400		\$2,236,200		\$5,091,900		\$2,867,400		\$39,994,700		\$1,767,800		\$53,665,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	3.2%	\$1,707,400
Task 2 - Prelim Design	4.2%	\$2,236,200
Task 3 - Final Design	9.5%	\$5,091,900
Task 4 - Utility Relocations	5.3%	\$2,867,400
Task 5 - Construction	74.5%	\$39,994,700
Task 6 - Start-Up and Close-Out	3.3%	\$1,767,800
Total	100.0%	\$53,665,000

Data to be Entered
Additional Data to Be Entered if Additional Cost included
Total Construction Cost
Total Project Capital Cost
Total 50-Year Present Worth Cost

Fixed Values	
PCWWTP O&M Cost per MG:	\$670
50-Year PW Calculation (Interest Rate):	6%
50-Year PW Calculation (Years):	50
P/A Factor (Uniform Series Present Worth)	15.7619
Total Multipliers (Cost Tool Cell I52):	67%

Calculated Values	
Annual Volume to PCWWTP (MG):	0
Floatable Control Peak Flow (MGD)	In Storage Cost

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$30,219,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
Floatables Control (construction)	\$0
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$302,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$1,991,000
Additional Cost	\$906,570
Total Construction Cost (including MUD & incentive)	\$33,419,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$50,465,730
CT Construction Performance Incentive	\$302,000
CT MUD Utility Relocation	\$1,991,000
Additional Cost (if recommended)	\$906,570
Total Project Capital Cost	\$53,665,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$57,908
PCWWTP	\$0
Total Annual O&M Cost	\$57,908
50-Year Present Worth	
Total Project Capital Cost	\$53,665,000
50-Year Present Worth Total Annual O&M	\$912,738
Total 50-Year Present Worth Cost	\$54,578,000

Note 1: Construction Cost = Cost Tool (CT) Project \$ Summary Cell I27 + Cell I35 + Floatables Control (construction). This does not include CT Construction Performance Incentive or CT MUD Utility Relocation. This cost is reflected in the Total Construction Cost.

Note 2: 50-Year Present Worth Estimate (Project \$ Summary Cell I58), is lower than the Project Capital Cost (Cell I57).

Therefore, the 50-Yr PW has been recalculated as the Total Project Capital Cost plus the Total Annual O&M 50-Yr PW

Cole Creek Basin Implementation Plan

CSO 204 - Storage (0.78 MG) Cost Breakdown HA-CL2

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$9,082,672									\$8,628,539	95%	\$454,134	5%	\$9,082,672	100%
Eng, Legal, Admin	5%	\$454,134	\$22,707	5%	\$45,413	10%	\$136,240	30%	\$90,827	20%	\$136,240	30%	\$22,707	5%	\$454,134	100%
Contingencies (CT Cell I39)	25%	\$2,270,668	\$0		\$0		\$113,533	5%	\$0		\$2,157,135	95%	\$0		\$2,270,668	100%
Interest	5%	\$454,134	\$0		\$0		\$0		\$0		\$454,134	100%	\$0		\$454,134	100%
PTI, Test Bore, ECI	4%	\$363,307	\$72,661	20%	\$290,646	80%	\$0		\$0		\$0		\$0		\$363,307	100%
Field Eng/Inspection	5%	\$454,134	\$0		\$0		\$0		\$0		\$408,720	90%	\$45,413	10%	\$454,134	100%
Design & Eng. Services	15%	\$1,362,401	\$0		\$0		\$1,226,161	90%	\$136,240	10%	\$0		\$0		\$1,362,401	100%
Program Management	2%	\$181,653	\$9,083	5%	\$18,165	10%	\$54,496	30%	\$36,331	20%	\$54,496	30%	\$9,083	5%	\$181,653	100%
Planning & Prelim Design	5%	\$454,134	\$136,240	30%	\$317,894	70%	\$0		\$0		\$0		\$0		\$454,134	100%
Performance Bond	1%	\$90,827	\$0		\$0		\$0		\$0		\$90,827	100%	\$0		\$90,827	100%
Capital Cost	67%	\$15,168,000	\$240,691	1.6%	\$672,118	4.4%	\$1,530,430	10.1%	\$263,397	1.7%	\$11,930,090	78.7%	\$531,336	3.5%	\$15,168,063	100.0%
CT Construction Performance Incentive		\$85,000									\$85,000				\$85,000	100.0%
CT MUD Utility Relocation		\$54,000							\$54,000						\$54,000	
Additional Cost	0%	\$0	\$0												\$0	
Total Project Capital Cost		\$15,307,000	\$240,700		\$672,100		\$1,530,400		\$317,400		\$12,015,100		\$531,300		\$15,307,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	1.6%	\$240,700
Task 2 - Prelim Design	4.4%	\$672,100
Task 3 - Final Design	10.0%	\$1,530,400
Task 4 - Utility Relocations	2.1%	\$317,400
Task 5 - Construction	78.5%	\$12,015,100
Task 6 - Start-Up and Close-Out	3.5%	\$531,300
Total	100.0%	\$15,307,000

Data to be Entered

Additional Data to Be Entered if Additional Cost included

Total Construction Cost

Total Project Capital Cost

Total 50-Year Present Worth Cost

Fixed Values	
PCWWTP O&M Cost per MG:	\$670
50-Year PW Calculation (Interest Rate):	6%
50-Year PW Calculation (Years):	50
P/A Factor (Uniform Series Present Worth)	15.7619
Total Multipliers (Cost Tool Cell I52):	67%

Calculated Values	
Annual Volume to PCWWTP (MG):	7.907
Floatable Control Peak Flow (MGD)	23.24

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$8,494,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
Floatables Control (construction)	\$588,672
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$85,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$54,000
Additional Cost	\$0
Total Construction Cost (including MUD & incentive)	\$9,222,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$14,185,000
Floatables Control	\$983,000
CT Construction Performance Incentive	\$85,000
CT MUD Utility Relocation	\$54,000
Additional Cost (if recommended)	\$0
Total Project Capital Cost	\$15,307,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$37,577
PCWWTP	\$5,298
Total Annual O&M Cost	\$42,875
50-Year Present Worth	
Total Project Capital Cost	\$15,307,000
50-Year Present Worth Total Annual O&M	\$675,785
50-Year Present Worth Equipment Replacement Cost (Life Cycle Analysis Cell G108)	\$592,529
Total 50-Year Present Worth Cost	\$16,575,000

Note 1: Construction Cost = Cost Tool (CT) Project \$ Summary Cell I27 + Cell I35 + Floatables Control (construction). This does not include CT Construction Performance Incentive or CT MUD Utility Relocation. This cost is reflected in the Total Construction Cost.

Note 2: 50-Year Present Worth Estimate (Project \$ Summary Cell I58), is lower than the Project Capital Cost (Cell I57). Therefore, the 50-Yr PW has been recalculated as the Total Project Capital Cost (which includes MUD and incentive) plus the 50-Yr PW of the Annual O&M and the Equipment Replacement Cost from the Life Cycle Cell G108

Note 3: Floatable Control for CSO 204 overflows above control level 2 is included in the storage cost breakdown