

Task 7.1 Burt-Izard Combined Sewer Backup and Major Street Flooding Recommended Approach TM

TO: Document Control Center, CH2M HILL
Matt Krumholz, Omaha CSO PMT

COPY Marty Grate, City of Omaha
Jim Theiler, City of Omaha
Tom Heinemann, Omaha CSO PMT

FROM: Burt-Izard Basin Study Team

FILE: BL.07.02

DATE: February 29, 2008

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 (NDEQ). 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 sewer separation (RNC) program that is intended to specifically address SBs into basements.

An investigation was completed for the Burt-Izard (BI) 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 BI Basin as it relates to both the 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 BI Basin, the current work planned or programmed under the City's RNC Program in the BI Basin, and additional costs that will be required to continue separation of more recently identified SB areas in the BI Basin.

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

Location	Estimated Costs (\$ Mil)
SCLTCP Sewer Separation	\$ 117.95
Current RNC Program (less any overlap with the SCLTCP)	\$ 10.41
Additional Sewer Separation Areas	\$ 31.97
TOTAL	\$ 160.33

Special Conditions

There are no reported major street flooding issues that were left unresolved with projects designated for sewer separation to relieve sewer backup issues in this TM.

There are no other special issues related to the BI Basin.

Purpose

The purpose of this Technical Memorandum (TM) is to identify methods for addressing the sewer backup (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 combined sewer overflow (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 CSO volume 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 of Omaha (City) contains over 1,950 miles of sewers. In the eastern portion of the City, most of the storm and sanitary sewers are combined. This combined sewer system (CSS) area encompasses approximately 51 square miles in two watersheds: the Missouri River and the Papillion Creek watersheds. The entire CSS area has been divided into ten basins for evaluation as part of the Omaha CSO Program. The Burt-Izard (BI) Basin is one of these basins. Each basin is being evaluated by a separate engineering team. The overall goal of the data analysis is to develop a Final Basin Plan, which will be incorporated into the Program's Long Term Control Plan (LTCP) for the City's CSS.

BI 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 combined sewer service 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 "Burt-Izard CSO Sewer Backup and Street Flooding Existing Conditions TM" (dated May 31, 2007), the existing problem areas were identified by using available information, including the City's GIS database, previous sewer reports, the InfoWorks model, community outreach efforts, Basin Advisory Panel (BAP) meetings, and plans of projects completed to date. The SB/SF Existing Conditions TM summarized the available information from each of these sources.

In order to get a more complete picture of the historical SB/SF problems, a map illustrating reported SB and SF problems are included in Figure 1. Reported SB and SF issues on Figure 1 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 completed RNC project. Problems classified in this manner indicate that the surrounding area, most likely, does not need additional sewer improvement projects.

During the various BAP meetings in 2007, BAP members were shown the existing SB/SF problem area map (based on historic GIS data) and were given an opportunity to provide input on other known problem areas. In addition, members of the BAP were given a flyer entitled "City of Omaha CSO Sewer Backup and Street Flooding Questionnaire". An updated version of this document entitled "CSO Sewer Backup and Street Flooding Questionnaire" was also distributed to residents and included in neighborhood newsletters as a means of obtaining further information on actual storm related sewer problems.

The problem areas that were identified by this community outreach are discussed below. It should be noted that these problem reports are often vague in nature but represent the extent of the information that was received from the citizens.

All of the reports discussed below were documented in the SB/SF Existing Conditions TM. No additional reports have been acquired since the submittal of that TM. In many cases, these reports are located in areas of existing clusters.

The community outreach SB/SF issues have been categorized as follows:

- Located within a completed RNC or sewer separation project area or a City planned RNC Area;
- Located within an existing cluster area, outside a completed or planned RNC Area;
- Located in an isolated area; or
- Located outside of the BI basin.

It is assumed that the reported sewer backups located in a completed or planned RNC area have either already been addressed by the completed RNC or will be addressed in the future by the planned RNC project.

The following information summarizes the SB/SF problems identified through community outreach activities by category.

SB/SF report located within a Completed or Planned RNC Project/Study Area:

- 26th and Grant – sewer backup (to be addressed in 2008 with sewer separation project construction),
- 25th and Parker – sewer backup (to be addressed in 2008 with sewer separation project construction),
- St. Benedict’s at 2423 Grant Street – sewer backup (to be addressed in 2008 with sewer separation project construction),
- The south end of Long School Neighborhood Association building, 2417 Grant Street – sewer backup (to be addressed in 2008 with sewer separation project construction),
- 25th and Burt to 28th and Burt - manhole covers blow off (sewer separation project to address this issue is currently under design),
- Creighton University - sewer backups at Criss and Rigger Science Buildings, McClain Hall, and Library (the Webster Street sewer extension project to address these issues is currently being bid),
- 16th and Burt Street – sewer backup,
- 28th Avenue and Izard – sewer backup,
- 20th and Clark – sewer backup,
- Reports of standing water at 24th and Maple.

Additional SB/SF report located within an Existing Cluster Area:

- 3505 California Street – sewer backup,
- Homeowners reported overland flooding in the alleys between California and Cass from 33rd to 34th Street,
- Overland flow problems near 34th from Davenport to Cass, including water in the park.

Additional SB/SF report located in an Isolated Area:

- 22nd and Manderson – sewer backup,
- 36th and Myrtle Avenue – sewer backup.

Additional SB/SF report located in Another Basin:

- 23rd and Pacific – sewer backup – (Leavenworth),
- 36th Avenue and Spaulding – sewer backup (Minne Lusa),
- Southwest of Adams Park – sewer backup (Minne Lusa),
- 36th and Lake – sewer backup (Minne Lusa).

Categorization for Addressing SB/SF Issues

The categories and costs for addressing the BI 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 - Completed RNC/Sewer Improvement Projects. This category includes all the SB/SF issues that have been addressed to date by projects already completed or currently under construction in the BI 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 some of these planned RNC projects provide water quality benefits and are listed under the CSO Program. The summary data and costs for such projects are included under Category 4 or 5.

Category 3 - Additional Sewer Separation Projects, Identified by Basin Consultant, 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.

Category 4 – Sewer Separation included in the Substantively Complete LTCP. 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 Final CSO LTCP.

The remaining SB/SF reports that were not resolved are referred to as isolated SB/SF reports (outliers). These outliers have been investigated further through a windshield survey.

Areas with major street flooding that were not addressed with sewer separation projects to relieve SBs are identified at the conclusion of this TM.

Costs

Costs for projects in the five categories are presented below. 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 for Categories 2 through 5 presented in this report were taken from the separation costs developed during the evaluation described in the "BI Basin Alternatives Evaluation TM" (dated May 3, 2007). The specific sewers identified for each project area were copied from the sewer separation alternative cost estimate and tabulated. The detailed cost break-outs are included in Appendix A. The costs shown include **a)** the construction cost, **b)** 67% soft cost markup per page 1 of the Cost Tool, **c)** 30% contingency and inflation factor, and **d)** the addition of MUD costs for the length of sanitary sewer reconstruction included in the study area. Summaries of each project cost are shown in Tables 1 through 5.

Category 1 – Completed RNC/Sewer Improvement Projects

The existing RNC/sewer improvement projects completed to date in the BI basin are listed in Table 1 and illustrated on Figure 1. The table identifies the type of project (separation or conveyance relief), street length of the project disturbed, street length of the ultimate area for separation/conveyance relief benefiting from the project, separated watershed area, and construction cost.

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

RNC Project	Year Constructed	Separation / Conveyance Relief	Street Length of Project	Street Length of Separation/ Conveyance Relief	Separated Watershed Area ²	Construction Cost (\$ Mil)
OPW 51139/RNC 5988	2006	Separation	Note 1	Note 1	Note 1	Note 1
RNC 5447	1998	Conveyance Relief	2900 LF	7500 LF	34 Ac.	\$0.82
RNC 5686	2001	Conveyance Relief	3300 LF	15,350 LF	116 Ac.	\$0.56
RNC 5850	2002	Conveyance Relief	800 LF	2,450 LF	38 Ac.	\$0.12
RNC 5882	2004	Conveyance Relief	3200 LF	6,850 LF	89 Ac.	\$0.75
RNC 6061	2003	Conveyance Relief	700 LF	Trunk Sewer Extension only	NA	\$1.62
RNC 5449	2003	Conveyance Relief	1600 LF	4,400 LF	145 Ac.	\$0.38
Summary						\$4.25

¹Project costs are identified in the section for Category 4 (Sewer Separation included in the SCLTCP)

²Includes upstream project areas.

The completed sewer improvement/RNC projects have already addressed some of the historical SB/SF problem areas in the BI Basin. In some instances, it appears that sewer backups not located within the sewer improvement/RNC project limits, but within the vicinity (hydrologic limits) of the completed sewer improvement/RNC projects may have also been addressed. The hydrologic limits for each project are the expected extent (mostly upstream) of the effectiveness of the project. These areas are indicated in Figure 1. **SB/SF reports identified since the project completion data 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 City’s planned RNC project study areas address many of the clustered SB/SF issues. The study areas for the BI basin that fall into Category 2 are illustrated on Figure 2. Table 2 identifies the length of new storm and sanitary sewers, street length of separation, and estimated project cost.

The planned RNC study areas were identified by name by the City. For this TM they 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 BI basin, CSO 107 represents the Grace Street

outfall and CSO 108 represents the BI outfall. Y is used to identify the specific study area number.

Table 2 – Category 2 (Planned Sewer Separation in Existing City RNC Program)

ID	Location	Length of New Storm Sewer	Length of New San. Sewer	Street Length of Separation	Project Cost (\$ Mil)
SA-108-1	33 rd & Jackson Streets	2,300	4,590	20,436	\$5.57
SA-108-2a	SW 30 th & Myrtle Streets	350	9,530	42,668	\$4.84
SA-108-2b	NE 30 th & Myrtle Streets	Costs included in SA-108-2a			
SA-108-3	B-I, Phases I, II, III ¹	Note 2	Note 2	Note 2	Note 2
SA-107-1	26 th & Grant Streets	Note 2	Note 2	Note 2	Note 2
SA-107-2	26 th & Corby Streets	Note 3	Note 3	Note 3	Note 3
	Total				\$ 10.41

¹ Includes Webster Street Storm and Sanitary and Nicholas Street Storm and Sanitary projects

² Project costs are identified in the section for Category 4 (Sewer Separation included in the SCLTCP)

³ Project data and costs are identified in the section for Category 5 (Additional Sewer Separation Projects, Added to the CSO Program)

33rd & Jackson, 30th & Myrtle (SA-108-1, SA-108-2[a,b])

The City has not completed any preliminary sewer separation layouts for 33rd and Jackson Streets (SA-108-1), SW 30th and Myrtle Streets (SA-108-2a), or NE 30th and Myrtle Streets (SA-108-2b). For this TM, preliminary layouts for these two areas were based on the previously completed sewer separation layouts identified in the “BI Alternatives Evaluation TM” (dated May 31, 2007). SA-108-2 was divided into two separate projects because a ridge line divides the area as indicated in Figure 2. The natural drainage is either to the south (SA-108-2a) or to the east (SA-108-2b).

B-I, Phases I, II, III (SA-108-3)

This project includes the extensions of the Webster Street storm and sanitary sewers and the Nicholas Street storm and sanitary sewers. The City has completed design and construction on each of these phases of the project. This project will address some of the SB problem areas. This project was included in the Substantively Complete LTCP as a baseline project because it provides water quality benefits for the receiving stream. Therefore, this project is included in Category 4, with the project data and costs identified in Table 4.

26th and Grant Streets (SA-107-1)

This project includes the construction of sanitary sewers to separate the area and eliminate SB problems. The City recently bid this project and construction is progressing. This project will address most of the SBs for SA-107-1. Further separation projects are recommended in this area and will be part of the phased 26th and Corby Streets project (SA-107-2). Preliminary sewer separation layouts for these areas were based on the previously completed layouts from the “BI Alternatives Evaluation TM”. This project was included in the Substantively Complete LTCP as a baseline project because it provides water quality

benefits for the receiving stream. Therefore, this project is included in Category 4, with the project data and costs identified in Table 4.

26th and Corby Streets (SA-107-2)

This project includes the construction of sanitary and storm sewers to separate the area and eliminate SB problems. The City has completed a preliminary sewer separation layout for SA-107-2 that ties into SA-107-1. The layouts for this area provided by the City do not match the layouts presented in the "BI Alternatives Evaluation TM"; however, the project scale is similar. Therefore, the costs for SA-107-2 were based on the previously referenced BI Basin sewer separation layouts. Since this project will provide water quality benefits for the receiving stream by conveying flows through the 26th and Grant Streets project, it is included in Category 5, with the project data and costs identified in Table 5.

The SB/SF problems that are anticipated to be addressed from the planned RNC projects (Category 2) are shown in Figure 2.

Category 3 – Additional Sewer Separation Proposed Study Areas, Identified by Basin Consultant, and Not Part of the CSO Program

Category 3 addresses the remaining SB problem areas with clustered reports that were not included in a planned RNC project area (Category 2) or covered by a completed RNC/Sewer Separation project (Category 1). There are several of these areas identified by the BI Basin Study Team. These areas are listed below and referred to as "Additional Sewer Separation Projects":

- SA-108-4 - Area bounded by Leavenworth and Pacific Streets and 30th to 33rd Streets.
- SA-108-5 - Area bounded by Cass and Burt Streets and 32nd to 36th Streets.
- SA-107-3 - Area bounded by Emmet and Manderson Streets and 27th to 31st Streets.
- SA-107-4 - Area bounded by Pratt and Sahler Streets and 27th to 31st Streets.
- SA-107-5 - Area bounded by Spaulding and Sahler Streets and 24th to 27th Streets.

In each designated area, a sewer separation project is the recommended method of addressing these SB/SF project areas. Figure 2 shows the proposed new project areas and the reports that would be addressed. A preliminary sewer separation layout for these areas was based on the previously prepared sewer separation layouts in the "BI Alternatives Evaluation TM". Table 3 identifies the length of new storm and sanitary sewers, street lengths of separation, and project costs.

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

ID	Location	Length of New Storm Sewer	Length of New San. Sewer	Street Length of Separation	Project Cost (\$ Mil)
SA-108-4	SE 33 rd & Leavenworth	2,400	0	12,057	\$1.02
SA-108-5	33 rd & Cass	100	6,100	20,090	\$3.98
SA-107-3	NW 28 th & Manderson	0	2,820	6,119	\$1.35
SA-107-4	W of 30 th Street Emmet to Manderson	3,480	1,890	15,748	\$2.26
SA-107-5	Spaulding, 24 th to 28th	3,600	2,130	6,351	\$1.80
	Total				\$10.41

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.

SA-108-4

This project includes new storm sewers to allow for specific area separation and SB elimination, but the flows will eventually combine back into the combined Turner Park Trunk Sewer.

SA-108-5

This project includes new storm sewers that will connect to the extended Webster Street Sewer Extension to eliminate SB issues. Since the Webster Street Sewer Extension is a combined sewer, this project does not provide any water quality benefit for the receiving stream.

SA-107-3, SA-107-4, and SA-107-5

These projects are located at the northern portion of the BI Basin. Storm and sanitary sewers are included to allow for SB elimination. The sewer layouts convey the flows back into the combined sewer system.

Category 4 - Sewer Separation Included in the Substantively Complete LTCP

The BI Basin Baseline Projects included sewer separation of the Webster Street Storm and Sanitary Sewers, Nicholas Street Storm and Sanitary Sewers, and 26th and Grant Streets Project. These projects were previously described in Category 2. Because these projects were included as Baseline CSO projects, the project costs were included in the Substantively Complete LTCP, and thus the project costs are included in this Category.

The Substantively Complete LTCP also identified sewer separation as the CSO Control technology for the Conestoga subbasin and portions of the North Freeway South subbasins (InfoWorks model subcatchments 105, 116, 118, 129, 135, 388, 390, and 414) as indicated on Figure 2. These areas were identified for separation as a continuation of the Nicholas Street Storm and Sanitary Sewer extension project. Specifically, these areas will allow for stormwater to be separated and removed from the combined sewer system for direct conveyance to the Missouri River. This reduction of stormwater will result in a reduction of combined sewer overflow volume conveyed to the tunnel drop structure for CSO 107 (Grace Street) or overflowed at CSO 107. Sanitary sewer flows will also be directly conveyed to the Burt-Izard Lift Station for conveyance to the Missouri River Wastewater Treatment Plant (MRWWTP).

The CSO study area designations and descriptions indicated in Figure 2 are as follows:

- SA-107-6. Study area would convey separated sanitary flows into the Nicholas Street sanitary sewers from an area bounded by Grace Street on the south, 15th Street on the east, 21st Street on the west, and Binney Street on the north.
- SA-108-6. Study area would convey separated sanitary and storm flows into the Nicholas Street sanitary and storm sewers from an area bounded by Lake Street on the north, the North Freeway (Highway 75) on the east, 32nd Street on the west, and Nicholas Street on the south.
- SA-108-7. Study area would convey separated sanitary and storm flows into the Nicholas Street sanitary and storm sewers from an area bounded by Grace Street on the north, 20th Street on the east, the North Freeway (Highway 75) on the west, and Nicholas Street on the south.
- SA-108-8. Study area would convey separated sanitary and storm flows into the Nicholas Street sanitary and storm sewers from an area bounded by Grace Street on the north, 16th Street on the east, 20th Street on the west, and Nicholas Street on the south.

The CSO controls presented in the SCLTCP will address some of the SB problems in the northern portion of the BI basin. These issues are identified on Figure 2.

These defined study areas for CSO Control Program sewer separation overlap the previously identified 26th and Grant Streets project. Separation layouts in these areas need to be updated to reflect this project that is currently under construction. These project areas also partially overlap the 26th and Corby Streets project. The CSO Sewer Separation Project areas are summarized in Table 4.

Table 4 – Category 4 (Sewer Separation Included in the Substantively Complete LTCP)

ID	Location	Length of New Storm Sewer	Length of New San. Sewer	Street Length of Separation	Project Cost (\$Mil)
OPW 51139/ RNC 5988	Separation	5,082	319	7,100	\$2.67
SA-108-3	B-I, Phases I, II, III	12,400	11,880	61,631	\$55.41
SA-107-1	26 th & Grant Streets	12,065	5,700	31,557	\$16.93
SA-107-6	16 th and Grant Streets	600	17,490	38,108	\$10.74
SA-108-6	30 th and Burdette Streets	2,350	7,830	27,643	\$5.53
SA-108-7	23 rd and Seward Streets	10,995	11,670	27,127	\$19.51
SA-108-8	18 th and Seward Streets	4,225	3,630	16,198	\$7.16
	Total				\$117.95

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

This category includes sewer separation projects that meet the following requirements:

- Additional CSO sewer separation projects, identified by the BC, beyond the areas identified in the Substantively Complete LTCP. These projects are identified as CSO sewer separation projects because they will provide water quality benefits for the receiving stream.
- Projects previously listed under Category 2, and not included in the Substantively Complete LTCP, that have been determined to provide water quality benefits for the receiving stream.

The previously identified 26th and Corby Streets (SA-107-2) project will convey separated sanitary and storm sewer flows through the 26th and Grant Streets (SA-107-1) project and Nicholas Street Sanitary and Storm Sewers. Therefore, the separated storm water will be conveyed to the Missouri River. The separated sanitary sewer flows will be conveyed to the Burt-Izard Lift Station. This project will thus provide water quality benefits for the receiving stream.

Table 5 – Category 5 (Additional Sewer Separation Projects Added to the CSO Program)

ID	Location	Length of New Storm Sewer	Length of New San. Sewer	Street Length of Separation	Project Cost (\$Mil)
SA-107-2	26 th & Corby Streets**	19,300	15,660	50,368	\$21.56
	Total				\$21.56

**The project costs listed for SA-107-2 we obtained from the Alternative Evaluation TM dated May 31st, 2007. Further coordination with the City of Omaha will be required for this area.

Known Areas of Major Street Flooding

In the BI Basin there were several reported street flooding problems. The major street flooding problems identified in the basin were on Burt Street from 24th Street to 27th Street; 30th Street and Cuming Street near the MAT facility; 28th Street and Farnam Street; 24th Street and Leavenworth Street; and an area bounded by 33rd Street on the east, Davenport Street on the north, Cass Street on the south, and 34th Street on the west. These SF problems fall in the areas of projects already identified in the previous categories to eliminate SB issues; therefore, no additional SF projects or remaining issues were identified for the BI 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 a few scattered complaints. The outliers in the BI basin are shown on Figure 3 and are designated as I-1, I-2, etc. A windshield survey was conducted for each of these outliers to note any obvious factors that could be causing SB/SF problems. The results of the windshield survey are included in Appendix B and summarized in Table 6.

Table 6: Isolated Report Summary

Report ID No.	Address or General Location	Date of Complaint	Reported Complaint	Possible Cause of Problem Based on Windshield Survey
I-1	113 N 18 th Street	6/20/78	Unknown	No apparent cause. Multiple Complaints warrant further investigation. Prior to 1985
I-2	113 N 18 th Street	8/9/79	Unknown	No apparent cause. Multiple Complaints warrant further investigation. Prior to 1985
I-3	113 N 18 th Street	5/3/81	Unknown	No apparent cause. Multiple Complaints warrant further investigation. Prior to 1985
I-4	4119 N 22 nd Street	9/5/89	Backup	Basement 3' below street grade.
I-5	109 N 9 th Street	9/11/89	Unknown	Main level four feet above street. No apparent reason
I-6	1413 N 17 th Street	7/22/93	Backup	No apparent cause
I-7	1413 N 17 th Street	8/11/93	Backup	No apparent cause
I-8	2902 N 16 th Street	8/12/93	Backup	Potential roof drains connected
I-9	3614 N 22 Street	7/28/96	Sewer Overload	Empty Lot. No apparent cause
I-10	1516 Capitol Ave	8/10/78	Unknown	New Omaha World Herald. Report prior to 1985
I-11	1804 Dodge Street	8/10/78	Unknown	Report prior to 1985

I-12	2400 Chicago Street	7/22/93	Manhole Cover Off	No apparent cause
I-13	900 Douglas Street	7/14/87	Unknown	Potential roof drains connected
I-14	108 N 18 th Street	7/1/82	Unknown	Report prior to 1985
I-15	2600 N 16 th Street	5/1/89	Unknown	No apparent cause
I-16	2425 Florence Blvd.	9/8/89	Backup	No apparent cause
I-17	1900 Sprague Street	8/11/93	Manhole Cover Off	Flat area. No apparent cause
I-18	2908 Lake Street	8/11/93	Backup	No apparent cause
I-19	2908 Lake Street	8/12/93	Backup	No apparent cause
I-20	3900 Burt Street	6/22/94	Manhole Cover Off	Flat area
I-21	1502 Yates Street	4/29/91	Backup	House is gone
I-22	2816 N 31 st Street	1/5/96	Postcard	Empty Lot. No apparent cause
I-23	1503 Locust Street	5/31/99	Unknown	New Habitat for Humanity House. No apparent cause.
I-24	1419 Locust Street	5/24/04	Unknown	No apparent cause
I-25	17 th and Chicago	5/24/04	Surface Flooding	Fairly flat street grade
I-26	2800 Dodge Street	5/24/04	Manhole Cover Off	No apparent cause
I-27	3915 Cuming Street	5/24/04	Sewer Overload	Potential roof drains connected
I-28	507 S 31 st Street	2/4/05	Sewer Overload	House on a hill. No apparent cause
I-29	2415 N 20 th Street	2/4/05	Backup and Surface Flooding	Potential surface flood / potential roof drains connected
I-30	2414 N 20 th Street	2/4/05	Backup and Surface Flooding	Potential surface flood / potential roof drains connected
I-31	2633 Decatur Street	n/a	Backup and Surface Flooding	No apparent cause
I-32	Nil	n/a		
I-33	507 S 31 st Street	n/a	Backup	
I-34	15 th and Cuming Street	n/a	Manhole Cover Off	Webster Street Project will address problem
I-35	20 th and Clark	n/a	Backup	Addressed by 26 th and Grant Project.
I-36	28 th Ave and IZARD	n/a	Backup	Steep street grades. No apparent cause
I-37	22 nd and Manderson	n/a	Backup	No apparent cause.

Summary of Project Designations for Additional Sewer Separation Projects vs. Additional CSO Projects

The City planned RNC project areas (Category 2) and the newly identified sewer separation project areas (Category 3) were evaluated to determine if they should be included in the Final LTCP for the CSO Control Program. In general, CSO sewer separation projects are defined as projects that result in a reduction in the magnitude, frequency or duration of CSOs. Sewer separation projects that are not in the CSO program are those projects that do not directly benefit the CSO program but serve to reduce SBs. In some instances a sewer separation project will include construction of a storm or sanitary sewer that ties back into the combined system upstream of the CSO diversion for the basin. Recommendations for each project previously included in the categories above are summarized in this section; however, the final categorization will be made by the City. Table 7 shows each project and its recommendation.

Table 7: Summary of Sewer Separation Project Classifications

Study Area	RNC or CSO Project	Notes
SA-108-1	RNC	Sewers in this project area will allow for specific area separation and relief, but they will eventually combine back into the combined Turner Park Trunk Sewer, making this an RNC project. Eventually, this area could be separated with an upstream extension of the Webster Street sanitary sewer. In this case, portions of the project area could be considered a CSO project.
SA-108-2a and SA-108-2b	RNC	Sewers in this project area will connect to the Webster Street Sewer Extension, which is a combined sewer. This would be an RNC project, unless Webster Street or another trunk sewer can be separated in the future. Some separation can occur by taking sanitary flows into the Webster Street sanitary sewer.
SA-108-3	CSO	Projects in this area have been completed or are under design/construction. These areas have allowed for water quality improvements to the receiving streams.
SA-107-1	CSO	Sewers in this project area will, in the future, be separated through the Nicholas Street storm and sanitary sewer extensions. These projects will reduce CSO volume and magnitudes and, therefore, are considered CSO projects.
SA-107-2	CSO	A project in this area is under construction. Any further sewer separation in this area will be connected through the separate Nicholas Street storm and sanitary sewer extensions. These projects will reduce CSO volume and magnitudes and, therefore, are considered CSO projects.
SA-108-4	RNC	Sewers in this project area will allow for specific area separation and relief, but they will eventually combine back into the combined Turner Park Trunk Sewer, making this an RNC project. Eventually, this area could be separated with an upstream extension of the Webster Street sanitary sewer. In this case, portions of the project area could eventually be considered a CSO project.
SA-108-5	RNC	Sewers in this project area will connect to the Webster Street Sewer Extension, which is a combined sewer. This would be an RNC project, unless Webster Street or another trunk sewer can be separated in the future. Some separation can occur by taking sanitary flows into the Webster Street sanitary sewer.
SA-107-3, SA-107-4, and SA-107-5	RNC	The proposed sewer layouts route the separated flows back into combined sewers, and thus these would be RNC projects. However, sewers in this area could, in the future, be separated through the Nicholas Street storm and sanitary sewer extensions. These projects could ultimately reduce CSO volume and magnitudes and therefore could eventually be considered CSO projects.

Green Solutions

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

Impacts to CSO Volumes and Flowrates

Refined estimates of the reductions in volume and flow rate will be calculated in late 2008 using the updated InfoWorks Model.

Study Area Priorities

This section presents a list of priorities for each study area. The study areas included in the CSO Control Program will be compiled with comparable study areas from other basins and will then be subdivided into individual projects. These projects will be scheduled as part of the Final LTCP. The study areas identified to be included in the RNC Program will be compiled with study areas from other basins. The analysis and design of specific RNC projects will be dependent on funding available for this program and coordination with CSO activities.

The priority listing below is divided between the RNC Program and CSO Control Program. In general, the prioritization should address the most significant problem areas first. In addition, the proposed study areas should generally be analyzed from downstream to upstream. Using these criteria, the study areas are listed below in order of their significance. Projects for some of the study areas could be designed and constructed at the same time. The project sequence will be evaluated further by the City and PMT. SA-107-1 (26th and Grant Streets) is currently under construction and will be completed prior to other areas. This area will eventually be separated into the Nicholas Street Sewer.

CSO Sewer Separation Projects (Category 4 and Category 5)

1. SA-108-3 (Burt-Izard Trunk Sewers). A project should be completed in the near future to extend the Nicholas Street Storm Sewer. This will allow for many of the severe problem areas located in the northern portion of the basin to be separated through additional projects (including the 26th and Grant and 26th and Corby projects).

The Webster Street Sewer extension is currently under design and construction will be completed by late 2009. Further extension of the Webster Street sewers past the North Freeway and also into the Turner Park area should be completed to allow for separation in the western and southwestern portions of the basin.

2. SA-107-1 (26th and Grant Streets). This project is currently under construction and will allow for sanitary sewer flows to be conveyed directly to the dedicated Nicholas Street sanitary sewer for SB relief.

3. SA-107-2. (26th and Corby Streets) This area is upstream of the 26th and Grant project. This area has significant problems and should be addressed shortly after the 26th and Grant project. The project should be designed to tie into the Nicholas Street Sewers.
4. SA-107-6, SA-108-6, SA-108-7, and SA-108-8. Each of these project areas will provide water quality benefits to the receiving streams. Storm water flows will be conveyed through the Nicholas Street storm sewer to the Missouri River, thus providing CSO volume reductions. No specific priority is given for these projects; additional analysis for street replacement or MUD water/gas main replacement should be conducted to establish the priorities of these projects.

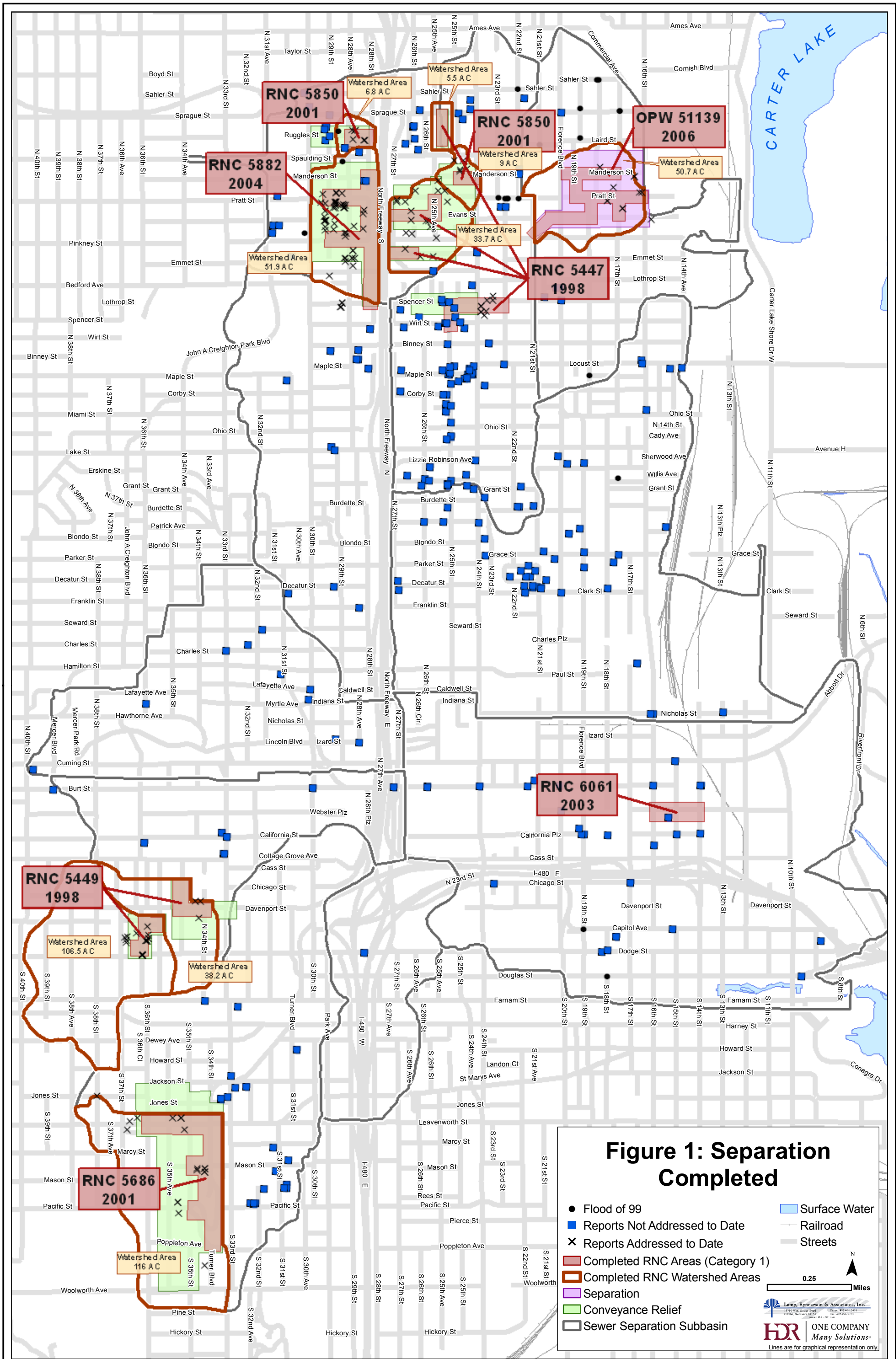
Planned RNC Project (Category 2) and Additional Sewer Separation Projects (Category 3)

1. SA-107-3, -4, and -5. These areas are upstream of the 26th and Corby area. These areas also have significant problems that should be addressed after the 26th and Corby project. The projects should be designed to tie into the Nicholas Street Sewers.
2. SA-108-1. This area is located in the Turner Park area. Separation of this area could either take place before or after the Webster Street sanitary sewer is extended into the area. In either case, the design should accommodate future separation to the Webster Street sanitary sewer.
3. SA-108-2. This area should be separated after the Webster Street Sewer extension has been completed past the North Freeway. Any sewer separation design in this area should accommodate future separation to the new Webster Street storm and sanitary sewers.
4. SA-108-5. This area should be separated after the Webster Street Sewer extension has been completed west past the North Freeway. Any sewer separation design in this area should accommodate future separation to the new Webster Street storm and sanitary sewers.
5. SA-108-4. This area should be separated after SA-108-1 has been completed. The new Webster Street sanitary sewer extension will assist in separating this area.

Acronym/Term	Definition
BAP	Basin Advisory Panel
BC	Basin Consultant
BI	Burt-Izard
City	City of Omaha
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
GIS	Geographic Information System
ES	Executive Summary
LF	Linear Feet
LTCP	Long Term Control Plan
MAT	Metro Area Transit
MGD	Million Gallons per Day
MRWWTP	Missouri River Wastewater Treatment Plant
MUD	Metropolitan Utilities District
OPW	Omaha Public Works
PMT	Program Management Team
RNC	Combined Sewer Renovation/Separation (Project)
SA	Study Area
SB	Sewer Backup
SF	Street Flooding
SCLTCP	Substantively Complete Long Term Control Plan
TM	Technical Memorandum

Attachment 1 – Figures

- Figure 1 Separation Completed**
- Figure 2 Proposed Future Separation**
- Figure 3 Final Basin Plan**



RNC 5850
2001

RNC 5850
2001

OPW 51139
2006

RNC 5882
2004

RNC 5447
1998

RNC 6061
2003

RNC 5449
1998

RNC 5686
2001

Watershed Area
5.5 A.C.

Watershed Area
6.8 A.C.

Watershed Area
9 A.C.

Watershed Area
50.7 A.C.

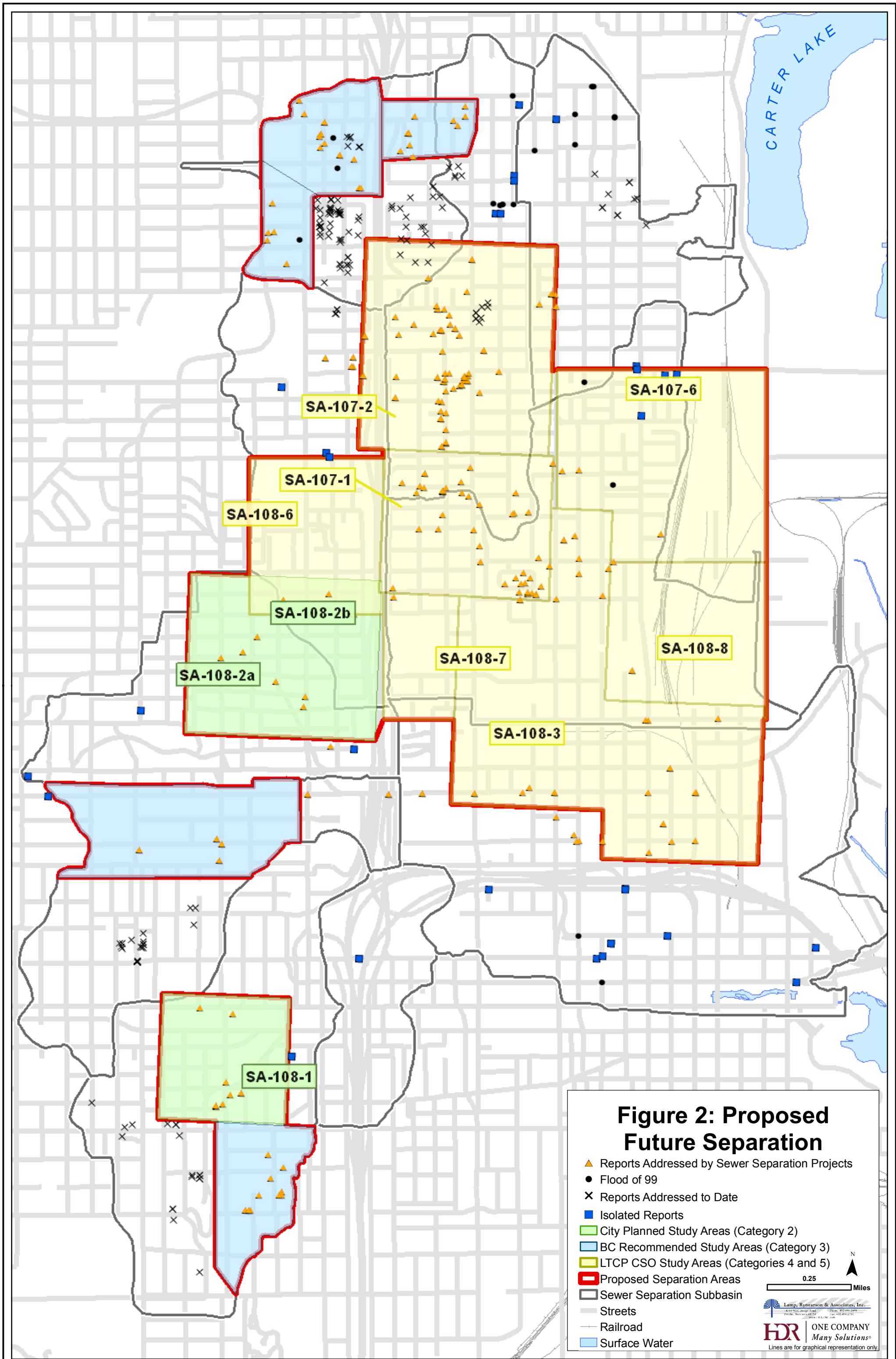
Watershed Area
51.9 A.C.

Watershed Area
33.7 A.C.

Watershed Area
106.5 A.C.

Watershed Area
38.2 A.C.

Watershed Area
116 A.C.



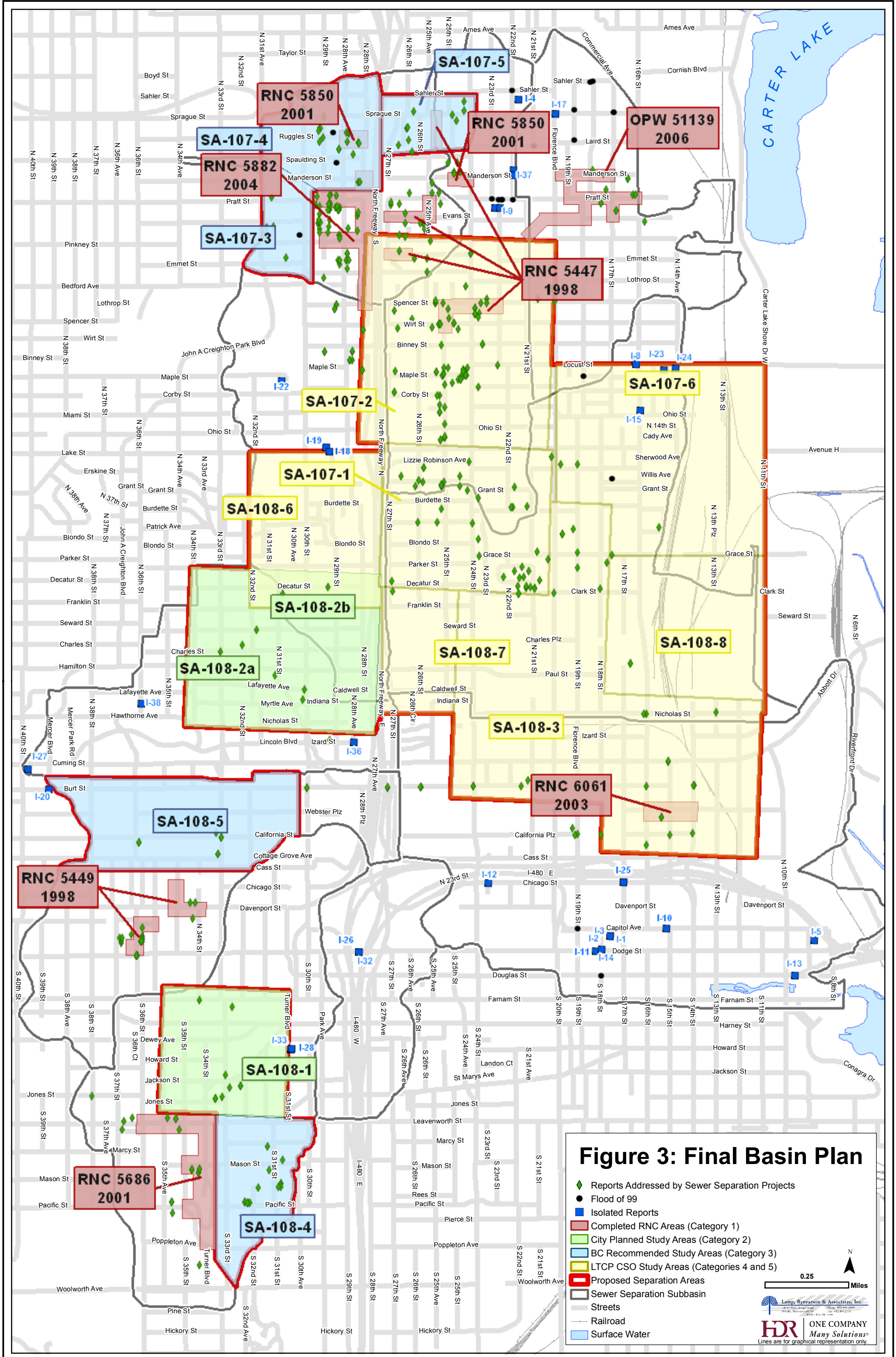


Figure 3: Final Basin Plan

- ◆ Reports Addressed by Sewer Separation Projects
- Flood of 99
- Isolated Reports
- Completed RNC Areas (Category 1)
- City Planned Study Areas (Category 2)
- BC Recommended Study Areas (Category 3)
- LTCP CSO Study Areas (Categories 4 and 5)
- Proposed Separation Areas
- Sewer Separation Subbasin
- Streets
- Railroad
- Surface Water

0.25 Miles

Lamp, Rynearson & Associates, Inc.
 1401 N. Dodge Road, Suite 200, Lincoln, NE 68502
 (402) 441-2222
 www.lra.com

HDR ONE COMPANY
 Many Solutions[®]
 Lines are for graphical representation only.

Appendix A – Cost Estimates

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 107 1) - Category 4

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$8,006,078									\$7,605,774	95%	\$400,304	5%	\$8,006,078	100%
Eng, Legal, Admin	5%	\$400,304	\$20,015	5%	\$40,030	10%	\$120,091	30%	\$80,061	20%	\$120,091	30%	\$20,015	5%	\$400,304	100%
Contingencies	25%	\$2,001,520					\$100,076	5%			\$1,901,444	95%			\$2,001,520	100%
Interest	5%	\$400,304									\$400,304	100%			\$400,304	100%
PTI, Test Bore, ECI	4%	\$320,243	\$64,049	20%	\$256,194	80%									\$320,243	100%
Field Eng/Inspection	5%	\$400,304									\$360,274	90%	\$40,030	10%	\$400,304	100%
Design & Eng. Services	15%	\$1,200,912					\$1,080,821	90%	\$120,091	10%					\$1,200,912	100%
Program Management	2%	\$160,122	\$8,006	5%	\$16,012	10%	\$48,036	30%	\$32,024	20%	\$48,036	30%	\$8,006	5%	\$160,122	100%
Planning & Prelim Design	5%	\$400,304	\$120,091	30%	\$280,213	70%									\$400,304	100%
Performance Bond	1%	\$80,061									\$80,061	100%			\$80,061	100%
Capital Cost		\$13,370,150	\$212,161	1.6%	\$592,450	4.4%	\$1,349,024	10.1%	\$232,176	1.7%	\$10,515,983	78.7%	\$468,356	3.5%	\$13,370,150	100.0%
MUD Utility Relocation		\$3,474,720							\$3,474,720						\$3,474,720	
Construction Performance Incentive		\$80,061									\$80,061				\$80,061	
Rev Capital Cost		\$16,925,000	\$212,161	1.3%	\$592,450	3.5%	\$1,349,024	8.0%	\$3,706,896	###	\$10,596,044	62.6%	\$468,356	2.8%	\$16,924,931	100.0%
Program Contengency	30%	\$5,077,500														
Total Capital Cost		\$22,002,500														

Task 1 - Additional Study	\$212,000	1.3%
Task 2 - Prelim Design	\$592,000	3.5%
Task 3 - Final Design	\$1,349,000	8.0%
Task 4 - Utility Relocations	\$3,707,000	21.9%
Task 5 - Construction	\$10,596,000	62.6%
Task 6 - Start-up and Close-out	\$468,000	2.8%
Total Capital Cost	\$16,925,000	100.0%
Program Contengency	\$5,077,500	30%
Total Capital Cost	\$22,002,500	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 107 2) - Category 5

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$10,999,660									\$10,449,677	95%	\$549,983	5%	\$10,999,660	100%
Eng, Legal, Admin	5%	\$549,983	\$27,499	5%	\$54,998	10%	\$164,995	30%	\$109,997	20%	\$164,995	30%	\$27,499	5%	\$549,983	100%
Contingencies	25%	\$2,749,915					\$137,496	5%			\$2,612,419	95%			\$2,749,915	100%
Interest	5%	\$549,983									\$549,983	100%			\$549,983	100%
PTI, Test Bore, ECI	4%	\$439,986	\$87,997	20%	\$351,989	80%									\$439,986	100%
Field Eng/Inspection	5%	\$549,983									\$494,985	90%	\$54,998	10%	\$549,983	100%
Design & Eng. Services	15%	\$1,649,949					\$1,484,954	90%	\$164,995	10%					\$1,649,949	100%
Program Management	2%	\$219,993	\$11,000	5%	\$21,999	10%	\$65,998	30%	\$43,999	20%	\$65,998	30%	\$11,000	5%	\$219,993	100%
Planning & Prelim Design	5%	\$549,983	\$164,995	30%	\$384,988	70%									\$549,983	100%
Performance Bond	1%	\$109,997									\$109,997	100%			\$109,997	100%
Capital Cost		\$18,369,432	\$291,491	1.6%	\$813,975	4.4%	\$1,853,443	10.1%	\$318,990	1.7%	\$14,448,053	78.7%	\$643,480	3.5%	\$18,369,432	100.0%
MUD Utility Relocation		\$3,081,600							\$3,081,600						\$3,081,600	
Construction Performance Incentive		\$109,997									\$109,997				\$109,997	
Rev Capital Cost		\$21,561,000	\$291,491	1.4%	\$813,975	3.8%	\$1,853,443	8.6%	\$3,400,590	###	\$14,558,050	67.5%	\$643,480	3.0%	\$21,561,029	100.0%
Program Contengency	30%	\$6,468,300														
Total Capital Cost		\$28,029,300														

Task 1 - Additional Study	\$291,000	1.3%
Task 2 - Prelim Design	\$814,000	3.8%
Task 3 - Final Design	\$1,853,000	8.6%
Task 4 - Utility Relocations	\$3,401,000	15.8%
Task 5 - Construction	\$14,558,000	67.5%
Task 6 - Start-up and Close-out	\$643,000	3.0%
Total Capital Cost	\$21,561,000	100.0%
Program Contengency	\$6,468,300	30%
Total Capital Cost	\$28,029,300	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 107 3) - Category 3

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$804,813									\$764,572	95%	\$40,241	5%	\$804,813	100%
Eng, Legal, Admin	5%	\$40,241	\$2,012	5%	\$4,024	10%	\$12,072	30%	\$8,048	20%	\$12,072	30%	\$2,012	5%	\$40,241	100%
Contingencies	25%	\$201,203					\$10,060	5%			\$191,143	95%			\$201,203	100%
Interest	5%	\$40,241									\$40,241	100%			\$40,241	100%
PTI, Test Bore, ECI	4%	\$32,193	\$6,439	20%	\$25,754	80%									\$32,193	100%
Field Eng/Inspection	5%	\$40,241									\$36,217	90%	\$4,024	10%	\$40,241	100%
Design & Eng. Services	15%	\$120,722					\$108,650	90%	\$12,072	10%					\$120,722	100%
Program Management	2%	\$16,096	\$805	5%	\$1,610	10%	\$4,829	30%	\$3,219	20%	\$4,829	30%	\$805	5%	\$16,096	100%
Planning & Prelim Design	5%	\$40,241	\$12,072	30%	\$28,168	70%									\$40,241	100%
Performance Bond	1%	\$8,048									\$8,048	100%			\$8,048	100%
Capital Cost		\$1,344,038	\$21,328	1.6%	\$59,556	4.4%	\$135,611	10.1%	\$23,340	1.7%	\$1,057,122	78.7%	\$47,082	3.5%	\$1,344,038	100.0%
MUD Utility Relocation		\$0							\$0						\$0	
Construction Performance Incentive		\$8,048									\$8,048				\$8,048	
Rev Capital Cost		\$1,352,000	\$21,328	1.6%	\$59,556	4.4%	\$135,611	10.0%	\$23,340	1.7%	\$1,065,170	78.8%	\$47,082	3.5%	\$1,352,086	100.0%
Program Contengency	30%	\$405,600														
Total Capital Cost		\$1,757,600														

Task 1 - Additional Study	\$21,000	1.6%
Task 2 - Prelim Design	\$60,000	4.4%
Task 3 - Final Design	\$136,000	10.1%
Task 4 - Utility Relocations	\$23,000	1.7%
Task 5 - Construction	\$1,065,000	78.8%
Task 6 - Start-up and Close-out	\$47,000	3.5%
Total Capital Cost	\$1,352,000	100.0%
Program Contengency	\$405,600	30%
Total Capital Cost	\$1,757,600	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 107 4) - Category 3

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$1,228,677									\$1,167,243	95%	\$61,434	5%	\$1,228,677	100%
Eng, Legal, Admin	5%	\$61,434	\$3,072	5%	\$6,143	10%	\$18,430	30%	\$12,287	20%	\$18,430	30%	\$3,072	5%	\$61,434	100%
Contingencies	25%	\$307,169					\$15,358	5%			\$291,811	95%			\$307,169	100%
Interest	5%	\$61,434									\$61,434	100%			\$61,434	100%
PTI, Test Bore, ECI	4%	\$49,147	\$9,829	20%	\$39,318	80%									\$49,147	100%
Field Eng/Inspection	5%	\$61,434									\$55,290	90%	\$6,143	10%	\$61,434	100%
Design & Eng. Services	15%	\$184,302					\$165,871	90%	\$18,430	10%					\$184,302	100%
Program Management	2%	\$24,574	\$1,229	5%	\$2,457	10%	\$7,372	30%	\$4,915	20%	\$7,372	30%	\$1,229	5%	\$24,574	100%
Planning & Prelim Design	5%	\$61,434	\$18,430	30%	\$43,004	70%									\$61,434	100%
Performance Bond	1%	\$12,287									\$12,287	100%			\$12,287	100%
Capital Cost		\$2,051,891	\$32,560	1.6%	\$90,922	4.4%	\$207,032	10.1%	\$35,632	1.7%	\$1,613,867	78.7%	\$71,878	3.5%	\$2,051,891	100.0%
MUD Utility Relocation		\$195,840							\$195,840						\$195,840	
Construction Performance Incentive		\$12,287									\$12,287				\$12,287	
Rev Capital Cost		\$2,260,000	\$32,560	1.4%	\$90,922	4.0%	\$207,032	9.2%	\$231,472	#####	\$1,626,154	72.0%	\$71,878	3.2%	\$2,260,017	100.0%
Program Contengency	30%	\$678,000														
Total Capital Cost		\$2,938,000														

Task 1 - Additional Study	\$33,000	1.5%
Task 2 - Prelim Design	\$91,000	4.0%
Task 3 - Final Design	\$207,000	9.2%
Task 4 - Utility Relocations	\$231,000	10.2%
Task 5 - Construction	\$1,626,000	71.9%
Task 6 - Start-up and Close-out	\$72,000	3.2%
Total Capital Cost	\$2,260,000	100.0%
Program Contengency	\$678,000	30%
Total Capital Cost	\$2,938,000	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 107 5) - Category 3

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$1,073,231									\$1,019,569	95%	\$53,662	5%	\$1,073,231	100%
Eng, Legal, Admin	5%	\$53,662	\$2,683	5%	\$5,366	10%	\$16,098	30%	\$10,732	20%	\$16,098	30%	\$2,683	5%	\$53,662	100%
Contingencies	25%	\$268,308					\$13,415	5%			\$254,892	95%			\$268,308	100%
Interest	5%	\$53,662									\$53,662	100%			\$53,662	100%
PTI, Test Bore, ECI	4%	\$42,929	\$8,586	20%	\$34,343	80%									\$42,929	100%
Field Eng/Inspection	5%	\$53,662									\$48,295	90%	\$5,366	10%	\$53,662	100%
Design & Eng. Services	15%	\$160,985					\$144,886	90%	\$16,098	10%					\$160,985	100%
Program Management	2%	\$21,465	\$1,073	5%	\$2,146	10%	\$6,439	30%	\$4,293	20%	\$6,439	30%	\$1,073	5%	\$21,465	100%
Planning & Prelim Design	5%	\$53,662	\$16,098	30%	\$37,563	70%									\$53,662	100%
Performance Bond	1%	\$10,732									\$10,732	100%			\$10,732	100%
Capital Cost		\$1,792,296	\$28,441	1.6%	\$79,419	4.4%	\$180,839	10.1%	\$31,124	1.7%	\$1,409,689	78.7%	\$62,784	3.5%	\$1,792,296	100.0%
MUD Utility Relocation		\$0							\$0						\$0	
Construction Performance Incentive		\$10,732									\$10,732				\$10,732	
Rev Capital Cost		\$1,803,000	\$28,441	1.6%	\$79,419	4.4%	\$180,839	10.0%	\$31,124	1.7%	\$1,420,421	78.8%	\$62,784	3.5%	\$1,803,028	100.0%
Program Contengency	30%	\$540,900														
Total Capital Cost		\$2,343,900														

Task 1 - Additional Study	\$28,000	1.6%
Task 2 - Prelim Design	\$79,000	4.4%
Task 3 - Final Design	\$181,000	10.0%
Task 4 - Utility Relocations	\$31,000	1.7%
Task 5 - Construction	\$1,420,000	78.8%
Task 6 - Start-up and Close-out	\$63,000	3.5%
Total Capital Cost	\$1,803,000	100.0%
Program Contengency	\$540,900	30%
Total Capital Cost	\$2,343,900	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 107 6) - Category 4

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$6,289,647									\$5,975,165	95%	\$314,482	5%	\$6,289,647	100%
Eng, Legal, Admin	5%	\$314,482	\$15,724	5%	\$31,448	10%	\$94,345	30%	\$62,896	20%	\$94,345	30%	\$15,724	5%	\$314,482	100%
Contingencies	25%	\$1,572,412					\$78,621	5%			\$1,493,791	95%			\$1,572,412	100%
Interest	5%	\$314,482									\$314,482	100%			\$314,482	100%
PTI, Test Bore, ECI	4%	\$251,586	\$50,317	20%	\$201,269	80%									\$251,586	100%
Field Eng/Inspection	5%	\$314,482									\$283,034	90%	\$31,448	10%	\$314,482	100%
Design & Eng. Services	15%	\$943,447					\$849,102	90%	\$94,345	10%					\$943,447	100%
Program Management	2%	\$125,793	\$6,290	5%	\$12,579	10%	\$37,738	30%	\$25,159	20%	\$37,738	30%	\$6,290	5%	\$125,793	100%
Planning & Prelim Design	5%	\$314,482	\$94,345	30%	\$220,138	70%									\$314,482	100%
Performance Bond	1%	\$62,896									\$62,896	100%			\$62,896	100%
Capital Cost		\$10,503,710	\$166,676	1.6%	\$465,434	4.4%	\$1,059,806	10.1%	\$182,400	1.7%	\$8,261,451	78.7%	\$367,944	3.5%	\$10,503,710	100.0%
MUD Utility Relocation		\$172,800							\$172,800						\$172,800	
Construction Performance Incentive		\$62,896									\$62,896				\$62,896	
Rev Capital Cost		\$10,739,000	\$166,676	1.6%	\$465,434	4.3%	\$1,059,806	9.9%	\$355,200	3.3%	\$8,324,348	77.5%	\$367,944	3.4%	\$10,739,407	100.0%
Program Contengency	30%	\$3,221,700														
Total Capital Cost		\$13,960,700														

Task 1 - Additional Study	\$167,000	1.6%
Task 2 - Prelim Design	\$465,000	4.3%
Task 3 - Final Design	\$1,060,000	9.9%
Task 4 - Utility Relocations	\$355,000	3.3%
Task 5 - Construction	\$8,324,000	77.5%
Task 6 - Start-up and Close-out	\$368,000	3.4%
Total Capital Cost	\$10,739,000	100.0%
Program Contengency	\$3,221,700	30%
Total Capital Cost	\$13,960,700	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 108 1) - Category 2

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$3,177,609									\$3,018,729	95%	\$158,880	5%	\$3,177,609	100%
Eng, Legal, Admin	5%	\$158,880	\$7,944	5%	\$15,888	10%	\$47,664	30%	\$31,776	20%	\$47,664	30%	\$7,944	5%	\$158,880	100%
Contingencies	25%	\$794,402					\$39,720	5%			\$754,682	95%			\$794,402	100%
Interest	5%	\$158,880									\$158,880	100%			\$158,880	100%
PTI, Test Bore, ECI	4%	\$127,104	\$25,421	20%	\$101,683	80%									\$127,104	100%
Field Eng/Inspection	5%	\$158,880									\$142,992	90%	\$15,888	10%	\$158,880	100%
Design & Eng. Services	15%	\$476,641					\$428,977	90%	\$47,664	10%					\$476,641	100%
Program Management	2%	\$63,552	\$3,178	5%	\$6,355	10%	\$19,066	30%	\$12,710	20%	\$19,066	30%	\$3,178	5%	\$63,552	100%
Planning & Prelim Design	5%	\$158,880	\$47,664	30%	\$111,216	70%									\$158,880	100%
Performance Bond	1%	\$31,776									\$31,776	100%			\$31,776	100%
Capital Cost		\$5,306,607	\$84,207	1.6%	\$235,143	4.4%	\$535,427	10.1%	\$92,151	1.7%	\$4,173,789	78.7%	\$185,890	3.5%	\$5,306,607	100.0%
MUD Utility Relocation		\$230,400							\$230,400						\$230,400	
Construction Performance Incentive		\$31,776									\$31,776				\$31,776	
Rev Capital Cost		\$5,569,000	\$84,207	1.5%	\$235,143	4.2%	\$535,427	9.6%	\$322,551	5.8%	\$4,205,566	75.5%	\$185,890	3.3%	\$5,568,783	100.0%
Program Contengency	30%	\$1,670,700														
Total Capital Cost		\$7,239,700														

Task 1 - Additional Study	\$84,000	1.5%
Task 2 - Prelim Design	\$235,000	4.2%
Task 3 - Final Design	\$535,000	9.6%
Task 4 - Utility Relocations	\$323,000	5.8%
Task 5 - Construction	\$4,206,000	75.5%
Task 6 - Start-up and Close-out	\$186,000	3.3%
Total Capital Cost	\$5,569,000	100.0%
Program Contengency	\$1,670,700	30%
Total Capital Cost	\$7,239,700	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 108 A 2B) - Category 2

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$2,821,642									\$2,680,560	95%	\$141,082	5%	\$2,821,642	100%
Eng, Legal, Admin	5%	\$141,082	\$7,054	5%	\$14,108	10%	\$42,325	30%	\$28,216	20%	\$42,325	30%	\$7,054	5%	\$141,082	100%
Contingencies	25%	\$705,411					\$35,271	5%			\$670,140	95%			\$705,411	100%
Interest	5%	\$141,082									\$141,082	100%			\$141,082	100%
PTI, Test Bore, ECI	4%	\$112,866	\$22,573	20%	\$90,293	80%									\$112,866	100%
Field Eng/Inspection	5%	\$141,082									\$126,974	90%	\$14,108	10%	\$141,082	100%
Design & Eng. Services	15%	\$423,246					\$380,922	90%	\$42,325	10%					\$423,246	100%
Program Management	2%	\$56,433	\$2,822	5%	\$5,643	10%	\$16,930	30%	\$11,287	20%	\$16,930	30%	\$2,822	5%	\$56,433	100%
Planning & Prelim Design	5%	\$141,082	\$42,325	30%	\$98,757	70%									\$141,082	100%
Performance Bond	1%	\$28,216									\$28,216	100%			\$28,216	100%
Capital Cost		\$4,712,142	\$74,774	1.6%	\$208,802	4.4%	\$475,447	10.1%	\$81,828	1.7%	\$3,706,227	78.7%	\$165,066	3.5%	\$4,712,142	100.0%
MUD Utility Relocation		\$100,800							\$100,800						\$100,800	
Construction Performance Incentive		\$28,216									\$28,216				\$28,216	
Rev Capital Cost		\$4,841,000	\$74,774	1.5%	\$208,802	4.3%	\$475,447	9.8%	\$182,628	3.8%	\$3,734,443	77.1%	\$165,066	3.4%	\$4,841,159	100.0%
Program Contengency	30%	\$1,452,300														
Total Capital Cost		\$6,293,300														

Task 1 - Additional Study	\$75,000	1.5%
Task 2 - Prelim Design	\$209,000	4.3%
Task 3 - Final Design	\$475,000	9.8%
Task 4 - Utility Relocations	\$183,000	3.8%
Task 5 - Construction	\$3,734,000	77.1%
Task 6 - Start-up and Close-out	\$165,000	3.4%
Total Capital Cost	\$4,841,000	100.0%
Program Contengency	\$1,452,300	30%
Total Capital Cost	\$6,293,300	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 108 3) - Category 4

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$10,091,148									\$9,586,591	95%	\$504,557	5%	\$10,091,148	100%
Eng, Legal, Admin	5%	\$504,557	\$25,228	5%	\$50,456	10%	\$151,367	30%	\$100,911	20%	\$151,367	30%	\$25,228	5%	\$504,557	100%
Contingencies	25%	\$2,522,787					\$126,139	5%			\$2,396,648	95%			\$2,522,787	100%
Interest	5%	\$504,557									\$504,557	100%			\$504,557	100%
PTI, Test Bore, ECI	4%	\$403,646	\$80,729	20%	\$322,917	80%									\$403,646	100%
Field Eng/Inspection	5%	\$504,557									\$454,102	90%	\$50,456	10%	\$504,557	100%
Design & Eng. Services	15%	\$1,513,672					\$1,362,305	90%	\$151,367	10%					\$1,513,672	100%
Program Management	2%	\$201,823	\$10,091	5%	\$20,182	10%	\$60,547	30%	\$40,365	20%	\$60,547	30%	\$10,091	5%	\$201,823	100%
Planning & Prelim Design	5%	\$504,557	\$151,367	30%	\$353,190	70%									\$504,557	100%
Performance Bond	1%	\$100,911									\$100,911	100%			\$100,911	100%
Capital Cost		\$16,852,217	\$267,415	1.6%	\$746,745	4.4%	\$1,700,358	10.1%	\$292,643	1.7%	\$13,254,723	78.7%	\$590,332	3.5%	\$16,852,217	100.0%
MUD Utility Relocation		\$3,456,000							\$3,456,000						\$3,456,000	
Construction Performance Incentive		\$100,911									\$100,911				\$100,911	
Rev Capital Cost		\$20,409,000	\$267,415	1.3%	\$746,745	3.7%	\$1,700,358	8.3%	\$3,748,643	#####	\$13,355,634	65.4%	\$590,332	2.9%	\$20,409,129	100.0%
Program Contengency	30%	\$6,122,700														
Total Capital Cost		\$26,531,700														

Task 1 - Additional Study	\$267,000	1.3%
Task 2 - Prelim Design	\$747,000	3.7%
Task 3 - Final Design	\$1,700,000	8.3%
Task 4 - Utility Relocations	\$3,749,000	18.4%
Task 5 - Construction	\$13,356,000	65.4%
Task 6 - Start-up and Close-out	\$590,000	2.9%
Total Capital Cost	\$20,409,000	100.0%
Program Contengency	\$6,122,700	30%
Total Capital Cost	\$26,531,700	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 108 4) - Category 3

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$605,286									\$575,022	95%	\$30,264	5%	\$605,286	100%
Eng, Legal, Admin	5%	\$30,264	\$1,513	5%	\$3,026	10%	\$9,079	30%	\$6,053	20%	\$9,079	30%	\$1,513	5%	\$30,264	100%
Contingencies	25%	\$151,322					\$7,566	5%			\$143,755	95%			\$151,322	100%
Interest	5%	\$30,264									\$30,264	100%			\$30,264	100%
PTI, Test Bore, ECI	4%	\$24,211	\$4,842	20%	\$19,369	80%									\$24,211	100%
Field Eng/Inspection	5%	\$30,264									\$27,238	90%	\$3,026	10%	\$30,264	100%
Design & Eng. Services	15%	\$90,793					\$81,714	90%	\$9,079	10%					\$90,793	100%
Program Management	2%	\$12,106	\$605	5%	\$1,211	10%	\$3,632	30%	\$2,421	20%	\$3,632	30%	\$605	5%	\$12,106	100%
Planning & Prelim Design	5%	\$30,264	\$9,079	30%	\$21,185	70%									\$30,264	100%
Performance Bond	1%	\$6,053									\$6,053	100%			\$6,053	100%
Capital Cost		\$1,010,828	\$16,040	1.6%	\$44,791	4.4%	\$101,991	10.1%	\$17,553	1.7%	\$795,043	78.7%	\$35,409	3.5%	\$1,010,828	100.0%
MUD Utility Relocation		\$0							\$0						\$0	
Construction Performance Incentive		\$6,053									\$6,053				\$6,053	
Rev Capital Cost		\$1,017,000	\$16,040	1.6%	\$44,791	4.4%	\$101,991	10.0%	\$17,553	1.7%	\$801,096	78.8%	\$35,409	3.5%	\$1,016,880	100.0%
Program Contengency	30%	\$305,100														
Total Capital Cost		\$1,322,100														

Task 1 - Additional Study	\$16,000	1.6%
Task 2 - Prelim Design	\$45,000	4.4%
Task 3 - Final Design	\$102,000	10.0%
Task 4 - Utility Relocations	\$18,000	1.8%
Task 5 - Construction	\$801,000	78.8%
Task 6 - Start-up and Close-out	\$35,000	3.4%
Total Capital Cost	\$1,017,000	100.0%
Program Contengency	\$305,100	30%
Total Capital Cost	\$1,322,100	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 108 5) - Category 3

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$2,352,051									\$2,234,448	95%	\$117,603	5%	\$2,352,051	100%
Eng, Legal, Admin	5%	\$117,603	\$5,880	5%	\$11,760	10%	\$35,281	30%	\$23,521	20%	\$35,281	30%	\$5,880	5%	\$117,603	100%
Contingencies	25%	\$588,013					\$29,401	5%			\$558,612	95%			\$588,013	100%
Interest	5%	\$117,603									\$117,603	100%			\$117,603	100%
PTI, Test Bore, ECI	4%	\$94,082	\$18,816	20%	\$75,266	80%									\$94,082	100%
Field Eng/Inspection	5%	\$117,603									\$105,842	90%	\$11,760	10%	\$117,603	100%
Design & Eng. Services	15%	\$352,808					\$317,527	90%	\$35,281	10%					\$352,808	100%
Program Management	2%	\$47,041	\$2,352	5%	\$4,704	10%	\$14,112	30%	\$9,408	20%	\$14,112	30%	\$2,352	5%	\$47,041	100%
Planning & Prelim Design	5%	\$117,603	\$35,281	30%	\$82,322	70%									\$117,603	100%
Performance Bond	1%	\$23,521									\$23,521	100%			\$23,521	100%
Capital Cost		\$3,927,925	\$62,329	1.6%	\$174,052	4.4%	\$396,321	10.1%	\$68,209	1.7%	\$3,089,419	78.7%	\$137,595	3.5%	\$3,927,925	100.0%
MUD Utility Relocation		\$28,800							\$28,800						\$28,800	
Construction Performance Incentive		\$23,521									\$23,521				\$23,521	
Rev Capital Cost		\$3,980,000	\$62,329	1.6%	\$174,052	4.4%	\$396,321	10.0%	\$97,009	2.4%	\$3,112,939	78.2%	\$137,595	3.5%	\$3,980,246	100.0%
Program Contengency	30%	\$1,194,000														
Total Capital Cost		\$5,174,000														

Task 1 - Additional Study	\$62,000	1.6%
Task 2 - Prelim Design	\$174,000	4.4%
Task 3 - Final Design	\$396,000	9.9%
Task 4 - Utility Relocations	\$97,000	2.4%
Task 5 - Construction	\$3,113,000	78.2%
Task 6 - Start-up and Close-out	\$138,000	3.5%
Total Capital Cost	\$3,980,000	100.0%
Program Contengency	\$1,194,000	30%
Total Capital Cost	\$5,174,000	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 108 6) - Category 4

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$3,161,866									\$3,003,773	95%	\$158,093	5%	\$3,161,866	100%
Eng, Legal, Admin	5%	\$158,093	\$7,905	5%	\$15,809	10%	\$47,428	30%	\$31,619	20%	\$47,428	30%	\$7,905	5%	\$158,093	100%
Contingencies	25%	\$790,467					\$39,523	5%			\$750,943	95%			\$790,467	100%
Interest	5%	\$158,093									\$158,093	100%			\$158,093	100%
PTI, Test Bore, ECI	4%	\$126,475	\$25,295	20%	\$101,180	80%									\$126,475	100%
Field Eng/Inspection	5%	\$158,093									\$142,284	90%	\$15,809	10%	\$158,093	100%
Design & Eng. Services	15%	\$474,280					\$426,852	90%	\$47,428	10%					\$474,280	100%
Program Management	2%	\$63,237	\$3,162	5%	\$6,324	10%	\$18,971	30%	\$12,647	20%	\$18,971	30%	\$3,162	5%	\$63,237	100%
Planning & Prelim Design	5%	\$158,093	\$47,428	30%	\$110,665	70%									\$158,093	100%
Performance Bond	1%	\$31,619									\$31,619	100%			\$31,619	100%
Capital Cost		\$5,280,316	\$83,789	1.6%	\$233,978	4.4%	\$532,774	10.1%	\$91,694	1.7%	\$4,153,111	78.7%	\$184,969	3.5%	\$5,280,316	100.0%
MUD Utility Relocation		\$216,000							\$216,000						\$216,000	
Construction Performance Incentive		\$31,619									\$31,619				\$31,619	
Rev Capital Cost		\$5,528,000	\$83,789	1.5%	\$233,978	4.2%	\$532,774	9.6%	\$307,694	5.6%	\$4,184,730	75.7%	\$184,969	3.3%	\$5,527,935	100.0%
Program Contengency	30%	\$1,658,400														
Total Capital Cost		\$7,186,400														

Task 1 - Additional Study	\$84,000	1.5%
Task 2 - Prelim Design	\$234,000	4.2%
Task 3 - Final Design	\$533,000	9.6%
Task 4 - Utility Relocations	\$308,000	5.6%
Task 5 - Construction	\$4,185,000	75.7%
Task 6 - Start-up and Close-out	\$185,000	3.3%
Total Capital Cost	\$5,528,000	100.0%
Program Contengency	\$1,658,400	30%
Total Capital Cost	\$7,186,400	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 108 7) - Category 4

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$9,725,994									\$9,239,694	95%	\$486,300	5%	\$9,725,994	100%
Eng, Legal, Admin	5%	\$486,300	\$24,315	5%	\$48,630	10%	\$145,890	30%	\$97,260	20%	\$145,890	30%	\$24,315	5%	\$486,300	100%
Contingencies	25%	\$2,431,499					\$121,575	5%			\$2,309,924	95%			\$2,431,499	100%
Interest	5%	\$486,300									\$486,300	100%			\$486,300	100%
PTI, Test Bore, ECI	4%	\$389,040	\$77,808	20%	\$311,232	80%									\$389,040	100%
Field Eng/Inspection	5%	\$486,300									\$437,670	90%	\$48,630	10%	\$486,300	100%
Design & Eng. Services	15%	\$1,458,899					\$1,313,009	90%	\$145,890	10%					\$1,458,899	100%
Program Management	2%	\$194,520	\$9,726	5%	\$19,452	10%	\$58,356	30%	\$38,904	20%	\$58,356	30%	\$9,726	5%	\$194,520	100%
Planning & Prelim Design	5%	\$486,300	\$145,890	30%	\$340,410	70%									\$486,300	100%
Performance Bond	1%	\$97,260									\$97,260	100%			\$97,260	100%
Capital Cost		\$16,242,410	\$257,739	1.6%	\$719,724	4.4%	\$1,638,830	10.1%	\$282,054	1.7%	\$12,775,093	78.7%	\$568,971	3.5%	\$16,242,410	100.0%
MUD Utility Relocation		\$3,166,560							\$3,166,560						\$3,166,560	
Construction Performance Incentive		\$97,260									\$97,260				\$97,260	
Rev Capital Cost		\$19,506,000	\$257,739	1.3%	\$719,724	3.7%	\$1,638,830	8.4%	\$3,448,614	#####	\$12,872,353	66.0%	\$568,971	2.9%	\$19,506,230	100.0%
Program Contengency	30%	\$5,851,800														
Total Capital Cost		\$25,357,800														

Task 1 - Additional Study	\$258,000	1.3%
Task 2 - Prelim Design	\$720,000	3.7%
Task 3 - Final Design	\$1,639,000	8.4%
Task 4 - Utility Relocations	\$3,449,000	17.7%
Task 5 - Construction	\$12,872,000	66.0%
Task 6 - Start-up and Close-out	\$569,000	2.9%
Total Capital Cost	\$19,506,000	100.0%
Program Contengency	\$5,851,800	30%
Total Capital Cost	\$25,357,800	

Direct Entry Cells from Cost Tool

Burt-Izard Basin Sewer Separation Cost Breakdown (Project SA 108 8) - Category 4

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$3,535,995									\$3,359,195	95%	\$176,800	5%	\$3,535,995	100%
Eng, Legal, Admin	5%	\$176,800	\$8,840	5%	\$17,680	10%	\$53,040	30%	\$35,360	20%	\$53,040	30%	\$8,840	5%	\$176,800	100%
Contingencies	25%	\$883,999					\$44,200	5%			\$839,799	95%			\$883,999	100%
Interest	5%	\$176,800									\$176,800	100%			\$176,800	100%
PTI, Test Bore, ECI	4%	\$141,440	\$28,288	20%	\$113,152	80%									\$141,440	100%
Field Eng/Inspection	5%	\$176,800									\$159,120	90%	\$17,680	10%	\$176,800	100%
Design & Eng. Services	15%	\$530,399					\$477,359	90%	\$53,040	10%					\$530,399	100%
Program Management	2%	\$70,720	\$3,536	5%	\$7,072	10%	\$21,216	30%	\$14,144	20%	\$21,216	30%	\$3,536	5%	\$70,720	100%
Planning & Prelim Design	5%	\$176,800	\$53,040	30%	\$123,760	70%									\$176,800	100%
Performance Bond	1%	\$35,360									\$35,360	100%			\$35,360	100%
Capital Cost		\$5,905,112	\$93,704	1.6%	\$261,664	4.4%	\$595,815	10.1%	\$102,544	1.7%	\$4,644,529	78.7%	\$206,856	3.5%	\$5,905,112	100.0%
MUD Utility Relocation		\$1,216,800							\$3,166,560						\$1,216,800	
Construction Performance Incentive		\$35,360									\$35,360				\$35,360	
Rev Capital Cost		\$7,157,000	\$93,704	1.3%	\$261,664	3.7%	\$595,815	8.3%	\$3,269,104	###	\$4,679,889	65.4%	\$206,856	2.9%	\$7,157,272	100.0%
Program Contengency	30%	\$2,147,100														
Total Capital Cost		\$9,304,100														

Task 1 - Additional Study	\$94,000	1.3%
Task 2 - Prelim Design	\$262,000	3.7%
Task 3 - Final Design	\$596,000	8.3%
Task 4 - Utility Relocations	\$3,269,000	45.7%
Task 5 - Construction	\$4,680,000	65.4%
Task 6 - Start-up and Close-out	\$207,000	2.9%
Total Capital Cost	\$7,157,000	100.0%
Program Contengency	\$2,147,100	30%
Total Capital Cost	\$9,304,100	

Direct Entry Cells from Cost Tool

Appendix B – Windshield Survey

Windshield survey for BI is distributed as a separate pdf package.

INTRODUCTION

This is a compilation of the windshield survey results for the B-I basin conducted for the Draft Task 7.1 Burt-Izard CSO Sewer Backup and Major Street Flooding Recommended Approach TM.

There are two (2) forms for each BU/SF reports. The first one is the Inspection Survey and the second is the additional documents. In general these consist of an aerial photo of the site, a ground level photo and a cut from the sewer 1/8 or 1/4 sheet of the area of concern.