

Task 7.1 Revised Draft Ohern/Monroe 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 sewer separation (RNC) program that is intended to specifically address SBs into basements.

An investigation was completed for the Ohern/Monroe (OM) basin to evaluate approaches to addressing SB and SF known problems 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 OM 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:

- 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 OM basin, the current work planned or programmed under the City's RNC Program in the OM basin, and additional costs that will be required to continue separation of more recently identified SB areas in the OM basin.

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

Type of Separation	Estimated Costs (Million)
SCLTCP Sewer Separation	\$32.17
Current RNC Program (less any overlap with the SCLTCP)	\$30.02
Additional Sewer Separation Areas (Categories 3 and 5)	\$ 9.43
TOTAL	\$71.62

Special Conditions

The sewer separation projects in the Monroe basin are based on the fundamental assumption that the south barrel can be converted to a stormwater pipe.

There were several reported street flooding problems in the OM basin and three new reports since the completion of the *Ohern/Monroe Basin Sewer Backup and Street Flooding Existing Conditions TM* (June 22, 2007). Two of these areas are not addressed by any RNC or CSO study areas. These areas include:

- 32nd Street and F Street: This site was identified by City staff as an area of flooding due to a dip in the street and area inlets that plug with debris. There were no previously reported SBs or SF issues in the vicinity.
- 35th Street and Vinton Street: This site was also identified by City staff as an area of street flooding. This site was noted during the field investigation as a low spot in the street with clogged inlets. There were multiple SBs reported in this area in the past, and RNC 5841 provided separation in the vicinity. No SBs have been reported since the RNC project completion.

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 is comprised of over 1,950 miles of sanitary 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 Papillion Creek watersheds. The entire CSS area has been divided into ten basins for evaluation as part of the Omaha CSO Control Program. The OM basin is one of these basins that are being simultaneously evaluated by various engineering firms. The overall goal of data analysis is to develop a Final Basin Plan, which will be incorporated into the Program Long Term Control Plan (LTCP) for the City's CSS.

OM 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. From the *Ohern/Monroe Basin Sewer Backup and Street Flooding Existing Conditions TM* (June 22, 2007), multiple data resources were used to identify potential SB/SF areas. The data resources included the City's geographic information system (GIS) database, Monroe Street Watershed Study, Douglas County Flood Insurance Studies (FIS), community outreach efforts, Basin Advisory Panel (BAP) meetings, City records on sewer separation projects, baseline 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 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 identified by community outreach efforts are often vague in nature, but represent the extent of information received from the citizens.

The following are general summaries from the review and analysis in the *Ohern/Monroe Basin Sewer Backup and Street Flooding Existing Conditions TM*:

- The 1983 Monroe Watershed Study identified SB/SF problem areas. The City targeted local combined sewer separation projects to address some of these areas.
- The FIS study identifies flood hazard zones only along the Missouri River due to no open channels and streams within the basin.

SB/SF report locations were compiled in the *Ohern/Monroe Basin Sewer Backup and Street Flooding Existing Conditions TM* (dated June 22, 2007). Since completion of that TM, three additional sites of street flooding were reported through the CSO Hotline and from a meeting with City staff held on January 16, 2008.

Categorization for Addressing SB/SF Issues

The categories and identified costs for addressing the OM 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 projects already completed or currently under construction in the OM basin. SB/SF issues in this category have been addressed through 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 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 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 SBs and are not selected to provide water quality benefits for the receiving streams.

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 final CSO LTCP.

The remaining SB/SF reports that were not resolved are referred to as isolated SB/SF reports, or outliers. These isolated reports were investigated further through windshield surveys.

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. These costs were taken from the full separation alternatives prepared for the *Ohern/Monroe Alternatives Evaluation (In Basin) TM*, (May 31, 2007). The pipes from each area were taken out of the full separation cost estimate and tabulated. The costs include a) the construction cost, b) 67 percent soft cost markup per page 1 of the Cost Tool, c) 30 percent contingency and inflation factor and d) the addition of Metropolitan Utilities District costs for the length of sanitary sewer reconstruction included

in the study area. See Attachment 2 for the detailed cost tables. Summaries of each category's project costs are shown in Tables 2 through 5.

Category 1 – Completed RNC/Sewer Improvement Projects

The completed RNC/sewer improvement projects for the OM basin are listed in Table 1. The completed sewer improvement/RNC projects have already addressed some of the historical SB/SF problem areas in the OM basin. In some instances, it appears that sewer backups not located within the sewer improvement/RNC projects 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. Some general statistics regarding the areas where SBs were potentially addressed are also included. Figure 1 (Attachment 1) illustrates the watershed boundaries for the completed RNC projects.

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

RNC Project	Year	Separation/ Conveyance Relief	Street Length of Project (LF)	Street Length of Separation/ Conveyance Relief (LF)	Separated Watershed Area (Acres)	Construction Cost (Million)
RNC 4996	1991	Separation and Conveyance Relief	3,300	3,800	18.8	\$0.64
RNC 5027	1992	Conveyance Relief	10,400	12,500	63.5	\$2.4
RNC 5279	1997	Separation	2,700	11,100	7.3	\$0.74
RNC 5326	1997	Separation	4,500	12,000	13.9	\$1.27
RNC 5429	1998	Separation	4,000	12,200	14.3	\$0.84
RNC 5481	1998	Separation	1,800	6,100	14.4	\$0.33
RNC 5549	1999	Separation	2,600	6,800	7.2	\$0.50
RNC 5556	1999	Separation	2,000	8,700	8.4	\$0.25
RNC 5685	1999	Separation	1,900	4,500	5.7	\$0.24
RNC 5736	2000	Separation	900	1,400	1.8	\$0.32
RNC 5798	2002	Separation and Conveyance Relief	4,900	9,900	17.7	\$0.80
RNC 5841	2003	Separation	1,300	10,700	3.2	\$0.15
RNC 5907	2003	Separation	900	1,200	2.7	\$0.35
OPW 50687 ¹	--	Separation	86	0	--	\$0.02
SP 90-03A ²	2006	Separation	NA	NA	37.7	NA
Total Construction Costs						\$9.32

1. This is in the same watershed as RNC 5326 and did not provide additional separated watershed area.

2. This project shown here is only Phase 1. Total project length and costs for Phase 1 and Phase 2 are included under Category 4.

As part of the CSO fundamental projects for the OM basin, the south barrel was recommended to be converted from a combined sewer to a storm sewer. When this work is completed, several of these RNC projects in the Monroe basin may be considered to be separated areas. SB/SF reports identified since the project completion date may require more analysis and 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 study areas address several of the clustered SB/SF sites.

For this TM, the planned RNC projects 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 OM basin, CSO 118 is the Ohern Street Outfall and CSO 119 is the Monroe Street outfall. Y is used to identify the specific study area number.

Four planned RNC study areas to address SB problems have been identified for the OM basin as summarized in Table 2 and shown on Figure 2 and 3 (Attachment 1). Figure 2 also shows the SB problems that may potentially be addressed by the planned RNC study areas. Table 2 identifies the length of new storm and sanitary sewers, street length of separation, and estimated project cost.

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

ID	General Location	Length of New Storm Sewer (LF)	Length of New Sanitary Sewer (LF)	Street Length of Project (LF)	Project Cost (Million)
SA-119-1	Gilmore Avenue – Phase 2	12,500	NA	12,500	NA ²
SA-118-1	OPW 51318 - 36 th and Francis (formerly 35 th Street and Walnut St.) ¹	50	85	85	\$0.125
SA-118-2	38 th Street and D Street	7,300	3,700	6,600	\$6.69
SA-118-3	26 th Street and J Street	12,000	2,100	9,800	\$12.9
SA-118-5	Trunk capacity or storm sewer extension downstream of 37 th and Francis to possibly Hascall.	4,500	4,400	6,100	\$10.3
Total Project Cost					\$30.02

1. Analysis of 35th and Walnut area resulted in a small amount of sewer at 36th and Francis to address validated sewer backup problems in this area. Project will be bid in 2008. Project cost was provided by City.

2. Project moved to Category 5 as it would be completed after the SCLTP Gilmore Phase 1 project and would then separate storm loading from the combined system.

During the meeting with City staff on January 16, 2008, one new planned RNC study area was identified, SA-118-5. SA-118-5 is not clearly defined, but is intended to either extend a separated storm sewer or increase interceptor capacity to relieve trunk line overload during

heavy rain events so that existing separated projects connecting to the trunk sewer can function without surcharge causing sewer backups, and address any sewer backups occurring along the project. For this TM, the project area addresses the neighborhood south-east of 37th and Francis back to the trunk sewer and further south to Hascall. The area for SA-118-5 does connect to the projects RNC 5481 and RNC 5279. These areas are not included in SA-118-5.

City staff provided a layout for SA-118-1 only. For this TM, preliminary layouts for the remaining study areas were investigated using the previously completed sewer separation layouts developed earlier for the *Ohern/Monroe Alternatives Evaluation (In-Basin) TM* (dated May 31, 2007).

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

Category 3 addresses the remaining SB clustered problem areas that were not included in a planned RNC project area (Category 2) or covered by a completed RNC/sewer separation project (Category 1). There is one area identified by the BC. This area is indicated on Figures 2 and 3 (Attachment 1), listed below in Table 3 and referred to as “Additional Sewer Separation Projects.”

- SA-118-4 – This study area is along 39th Street between O and P Streets. There were reported SBs in this area that may be alleviated by installing backflow preventers or completing a partial sewer separation in the vicinity and routing the stormwater downstream. The proposed area would affect approximately 4.5 blocks or 23 acres of property.

Table 3 – Category 3 (Additional Sewer Separation Projects)

ID	General Location	Length of New Storm Sewer (LF)	Length of New Sanitary Sewer (LF)	Street Length of Project (LF)	Project Cost (Million)
SA-118-4	39 th Street and O Street	5,700	500	5,700	\$2.40

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.

Category 4 – Sewer Separation Included in the SCLTCP

The SCLTCP identified two baseline and four fundamental in-basin projects that are included in the combined recommended alternative, as shown on Figure 2 (Attachment 1).

- Wilson Packing Plant (baseline)
- Gibson Road Storm Sewer (baseline)
- Industrial Force Main (FM) and Lift Station (LS) (fundamental)
- Conversion of south barrel to Stormwater-Only (fundamental)

- Sewer Separation of Region 5 (industrial area) (fundamental)
- Gilmore Avenue Phase 1 Storm Sewer (fundamental)

Wilson Packing Plant - The area between 27th Street and 30th Street is currently being redeveloped by the Salvation Army as a community center. This project will construct a new storm sewer across the Wilson Packing Plant site that will connect to the south barrel extension. This project will transfer storm water runoff from the north to the south barrel. There will be no immediate reduction of CSO volume as a result of this project because the south barrel is part of the combined sewer separation (CSS) in the baseline condition. However, this baseline project will reduce CSO volume when combined with the fundamental project to separate the south barrel.

Gibson Road Storm Sewer - There are two phases to the Gibson Road storm sewer project, which provides for future separation of the area near the Missouri River Wastewater Treatment Plant (MRWWTP). Phase I, which is complete, included a new storm sewer for future separation and a new stormwater outfall that discharges to the Missouri River. Phase II includes additional storm sewer along 13th Street and Missouri Avenue which will allow for future sewer separation in the area. The construction work, scheduled for 2008 and 2009, will be completed as part of multiple contracts associated with the South Omaha Veteran's Memorial Bridge replacement.

Fundamental Projects - There are four fundamental projects that are interconnected and need to be considered together for CSO reduction and conveyance to the Missouri River. The recommended project sequencing is to construct the Industrial FM and LS first to remove the high strength waste from the CSS and pump it directly to the MRWWTP for treatment. Next, the four diversion structures at 15th and 17th and Monroe should be eliminated, followed by closure of the hydraulic windows connecting the north and south barrels. This will convert the south barrel to a stormwater-only pipe.

The third fundamental project, identified as SA-119-2, would provide separation of the industrial area (Region 5), which will discharge stormwater flows to the south barrel. With the proposed sequencing, the south barrel would already be converted to stormwater only and would thus remove CSO loading from the system. Further, these improvements may potentially address several SB complaints in this area as illustrated on Figure A.4. Costs and general information for this project are included in Table 4.

Finally, the fourth fundamental project is the Gilmore Avenue Phase 1 stormwater pipe, which will also discharge to the south barrel, when constructed. As proposed in SCLTCP, this stormwater pipe does not include any separation, but is in the same area as the project SA-119-1 (Gilmore Avenue Phase 2 included in Category 5). After construction of Phase 1, a determination will need to be made as to whether Phase 1 addresses the SBs reported in the area as well as providing CSO benefit. Information about SA-119-1 is included in Table 6 below.

Table 4 – Category 4 (Sewer Separation in the SCLTCP)

ID	General Location	Length of New Storm Sewer (LF)	Length of New Sanitary Sewer (LF)	Street Length of Separation (LF)	Project Cost (Million)
OPW 51293	Wilson Packing Plant	970	NA	970	\$1.50
SP 90-03A	Gibson Storm Sewer Phase 1 and Phase 2	9,600	NA	9,600	\$1.23 ²
SA-119-2	Region 5 Separation ¹	15,000	1,700	15,800	\$12.0
SA-119-4	Industrial FM and LS ¹	100	5,100	NA	\$7.34
SA-119-5	South Barrel Conversion ¹	NA	1,620	NA	\$3.03
SA-119-6	Gilmore Ave. Phase 1	3,100	NA	NA	\$7.07
Total Project Cost					\$32.17

1. The costs of these three projects should be considered together for separation of Region 5.

2. SP 90-03A is listed as a completed RNC project for Phase 1 only. Totals for Phase 1 and Phase 2 are included here. Project costs were provided by the City.

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

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

- Additional CSO sewer separation projects, identified by the BC, beyond the areas identified in the SCLTCP. 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 SCLTCP, that have been determined to provide water quality benefits for the receiving stream.

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

RNC Number	General Location	Length of New Storm Sewer (LF)	Length of New Sanitary Sewer (LF)	Street Length of Project (LF)	Project Cost (Million)
SA-119-3	20 th Street and U Street	3,100	N/A	3,100	\$1.32
SA-119-1	Gilmore Avenue (Phase 2)	12,500	N/A	12,500	\$5.71
Total Project Cost					\$7.03

Once the CSO fundamental projects are completed, (south barrel conversion to stormwater only and the Gilmore Avenue Phase 1) separation in these areas would remove storm

loading from the combined system and would positively affect water quality. Each project is described in detail below.

SA-119-3 – This study area is located near the intersection of U and 20th Streets. Sewer overloading and sewer backups were reported in this area. A sewer separation project could be constructed to alleviate some of the capacity issues in this area. This project could include construction of new storm sewer along 21st Street from S Street to Y Street, disconnecting some street inlets to the east, and conveying this stormwater to the south barrel. This project would affect approximately 8 blocks or 39 acres of property.

SA-119-1 – Is in the area near Gilmore Avenue, but would include separation in this area tying into the new trunk storm sewer constructed during Phase 1. This project may not be needed after Phase 1 construction, but an evaluation should be made at that time before disregarding the project in full.

Known Areas of Major Street Flooding

There were several reported street flooding problems in the OM basin and three new reports since the completion of the *Ohern/Monroe Basin Sewer Backup and Street Flooding Existing Conditions TM* (June 22, 2007). Two of these areas are not addressed by any RNC or CSO study areas. These areas include:

- 32nd Street and F Street: This site was identified by City staff as an area of flooding due to a dip in the street and area inlets that plug with debris. There were no previously reported SBs or SF issues in the vicinity.
- 35th Street and Vinton Street: This site was also identified by City staff as an area of street flooding. This site was noted during the field investigation as a low spot in the street with clogged inlets. There were multiple SBs reported in this area in the past, and RNC 5841 provided separation in the vicinity. No SBs have been reported since the RNC project completion. .

The third new reported street flooding area that is anticipated to be addressed with project SA-118-2 is:

- 38th Street and D Street: A call to the CSO Hotline reported street flooding in this area “every time it rains more than 1 inch.” There were also three previous SBs reported in the area between 1990 and 2005.

Isolated Problem Areas (Outliers)

Outliers are any problems reported in the City database that are not grouped and/or are unique problems. These can be a single complaint or a few scattered complaints. The isolated problem areas in the OM basin are illustrated on Figure 4 (Attachment 1).

Four isolated problem areas were identified, and the field investigation results figure from the *Ohern/Monroe Basin Sewer Backup and Street Flooding Existing Conditions TM* (June 22, 2007) was revised. Figure 4 (Attachment 1) reflects the site visits to each of the four problem areas. The notes and photo summary from the windshield survey update conducted January 24, 2008, are included for reference (Attachment 3).

Table A.1 (Attachment 2) shows the summary of the outliers and notes from the windshield surveys.

Summary of Project Designations for Additional Sewer Separation Projects versus 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 CSO Control Program in the Final LTCP. CSO sewer separation projects are defined as projects that result in a reduction in the magnitude, frequency or duration of CSOs. To accomplish this, the CSO sewer separation projects will have to result in the direct conveyance of separated storm flows to a receiving water body.

RNC projects are those projects that do not directly benefit the CSO program but serve only to reduce SB/SF. In most cases an RNC project will construct a storm or sanitary sewer that ties back into the combined sewer system upstream of the CSO diversion for the basin. In addition, SF projects are projects that do not directly benefit the CSO program and do not reduce SB problems but serve only to reduce SF. Preliminary recommendations for each project are made in this section; however, the final determination will be made by the City.

Table 6 shows each planned and additional study area and the recommendation:

Table 6 - Study Area Classification

Study Area	RNC, CSO or SF Project	Notes
SA-118-1	RNC	Sewers in this project area (36 th and Francis) will allow for specific area separation and relief, but they will eventually reconnect to the combined trunk sewer to CSO 118, making this an RNC project.
SA-118-2	RNC	Sewers in this project area (38 th Street and D Street) will allow for specific area separation and relief, but they will eventually reconnect to the combined trunk sewer to CSO 118, making this an RNC project.
SA-118-3	RNC	Sewers in this project area (26 th Street and J Street) will allow for specific area separation and relief, but they will eventually reconnect to the combined trunk sewer to CSO 118, making this an RNC project.
SA-118-4	RNC	Similar to the other SAs for the Ohern Basin, this would provide local relief only and would reconnect to the combined system downstream of the area, making this an RNC project. There would be no reduction in CSO loading.
SA-118-5	RNC	Additional trunk sewer capacity downstream of 37 th and Francis. Sewers in this project area (39 th Street and O Street) will allow for specific area separation and relief, but they will eventually reconnect to the combined trunk sewer to CSO 118, making this an RNC project.
SA-119-1	CSO	This is a proposed CSO project for the Gilmore Avenue area (Gilmore Avenue Phase 2), that will include separation along Gilmore Avenue, tying into the new storm sewer (fundamental project).
SA-119-3	CSO	This project would construct a new storm sewer along 21st Street, as it would tie back into the south barrel. Once the south barrel is converted to a stormwater-only pipe, as part of the fundamental improvements, then this project would reduce stormwater loading to the combined system.

Green Solutions

This section discusses which sewer backup areas, if any, could benefit from Green Solutions in the OM 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 OM 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 Flow Rates

This section estimates the impacts that the recommended projects might have on CSO volumes and rates. These impacts are in addition to the CSO controls already identified in the SCLTCP. The impacts to the CSO volumes would include any flow that is separated into the south barrel once it is converted to stormwater only.

Estimates for reduction in volume have not been made at this time. **Refined estimates of the reductions in volume and flow rate will be calculated in late 2008 using the updated IW Model.**

Study Area Priorities

This section presents a list of priorities for each study area within the OM basin. The study areas identified to be 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 have been listed in order of their significance. Some of the projects could be designed and constructed at the same time. The project sequence will be evaluated further by the City and PMT.

CSO Sewer Separation Projects (Category 4 and Category 5)

1. Wilson Packing Plant is currently under design as part of the Salvation Army redevelopment and is scheduled for construction completion in 2008.

2. Gibson Phase 1 improvements are currently under construction with Phase 2 to follow.
3. Region 5 Separation/Industrial LS and FM – These two projects are considered together for completion. While they would reduce loading to the CSO system, they would also provide a significant improvement in water quality from CSO discharges and is therefore given a higher priority to address the industrial area wastewater from Region 5 and directing it to the Missouri River WWTP for treatment.
4. Separation of the south barrel would convert the south barrel to a stormwater only discharge to a pipe discharging to the Missouri River. This will allow for significant stormwater separation upstream, or along the south barrel. SA-119-3 and Gilmore Avenue projects would also tie into the newly separated south barrel allowing for further CSO volume reduction.
5. Gilmore Avenue Phase 1 is proposed to divert an open creek out of the CSS and into the south barrel. This project does not include any sewer separation within the Gilmore Avenue subcatchment. However, by removing such a large stormwater load from the CSS, this project may remove enough loading to address the SBs reported in the area. It may also be prudent to consider connecting area and street inlets into the new stormwater pipe to further reduce CSS loading. It is recommended that the PMT consider either combining SA-119-1, or a portion thereof, with the CSO fundamental project for this area, or completing the fundamental project and re-evaluating the priority for the SA-119-1 improvements at that time.
6. SA-119-3 is another project that would address an area with reported SBs and allow for separation once the south barrel is isolated. This would also allow for reduced CSO volumes.
7. SA-119-1 (Gilmore Avenue Phase 2) – As previously stated in reference to the Gilmore Avenue CSO project, it is recommended that this project be delayed until after the completion of the CSO work to determine if the reduced loading to the area was adequate for addressing reported SBs in the vicinity. If the CSO project is inadequate, then further separation may be considered under this project.

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

1. SA-118-1 (36th and Francis) is currently at 90-percent design phase and is anticipated to bid in 2008 and complete construction in 2009.
2. SA-118-4 (39th and O Street) this project would address several reported SBs with relatively low construction cost and complexity. The completed project would provide area separation, but it would still tie back into the CSS system and would not decrease CSO volume.
3. SA-118-3 (26th Street and J Street) – The construction complexity of this project is rather high in comparison to some of the other projects, but multiple SBs have been reported in the area. This is also one of the largest study areas identified as a RNC project.

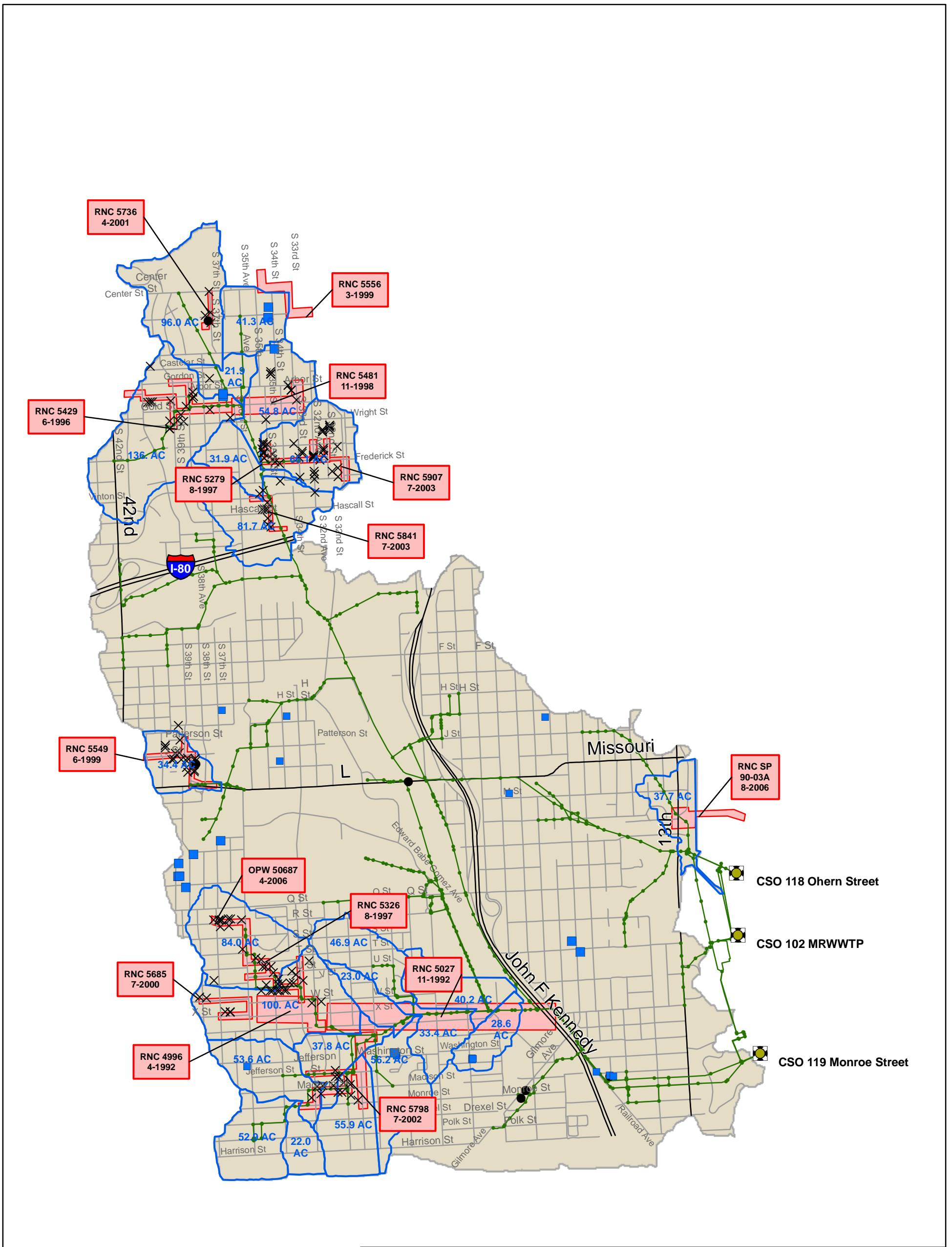
4. SA-118-2 (38th and D Street) – The cost of this project is the highest of all RNC projects and addresses an area smaller than SA-118-3, but larger than the others previously identified.
5. SA-118-5 (Trunk Sewer from 37th and Francis) – There have been two completed RNC projects upstream of this proposed RNC project. However, the effectiveness of the improvements is limited by the trunk sewer capacity downstream. This project would include neighborhood separation in the northern portion of the project and trunk sewer improvements towards the south to provide for area separation and trunk sewer relief.

Acronym/Term	Definition
BAP	Basin Advisory Panel
BC	Basin Consultant
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
MRWWTP	Missouri River Wastewater Treatment Plant
OM	Ohern/Monroe
RNC	City Sewer Separation Project
SCLTCP	Substantively Complete Long Term Control Plan
SF	Street Flooding
SB	Sewer Backup
TM	Technical Memorandum

References

- Camp Dresser & McKee Inc. (CDM). *Ohern/Monroe Basin Sewer Backup and Street Flooding Existing Conditions TM* (June 22, 2007)
- CDM. *Ohern/Monroe Alternatives Evaluation (In Basin) TM* (May 31, 2007)
- CDM. *Ohern/Monroe Basin Model Review TM* (November 28, 2007)

Attachment 1 – Figures



LEGEND

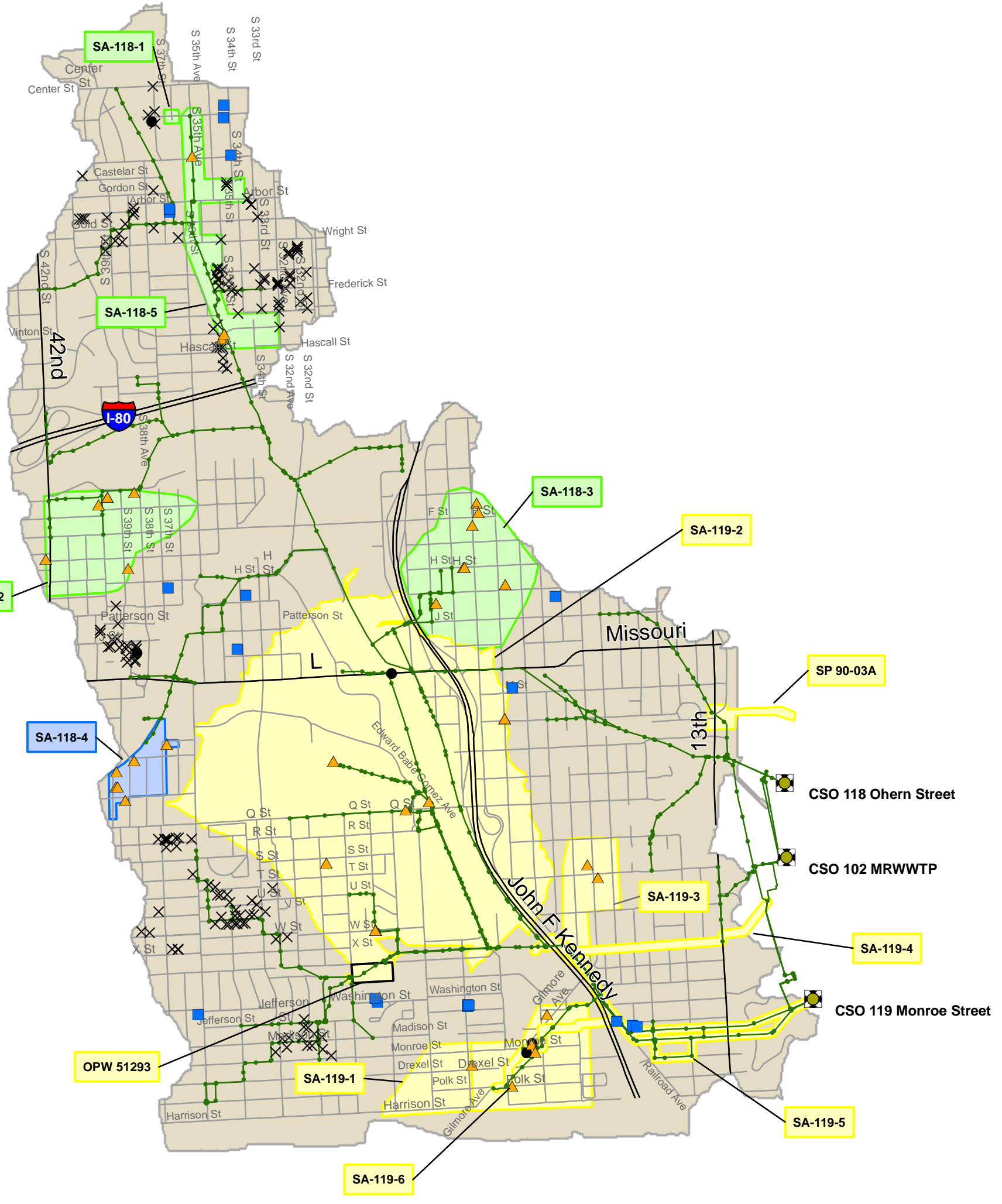
- 1999 Flood
- Reports Not Addressed to Date
- ✕ Reports Addressed to Date
- CSO Outfalls
- Modeled Manholes
- Modeled CSO Sewers
- Major Streets
- Streets

RNC Projects

- Completed RNC Projects (Category 1)
- Completed RNC Watershed Areas
- CSO Boundary

Scale
1" = 2000'

0 1,000 2,000 4,000
Feet



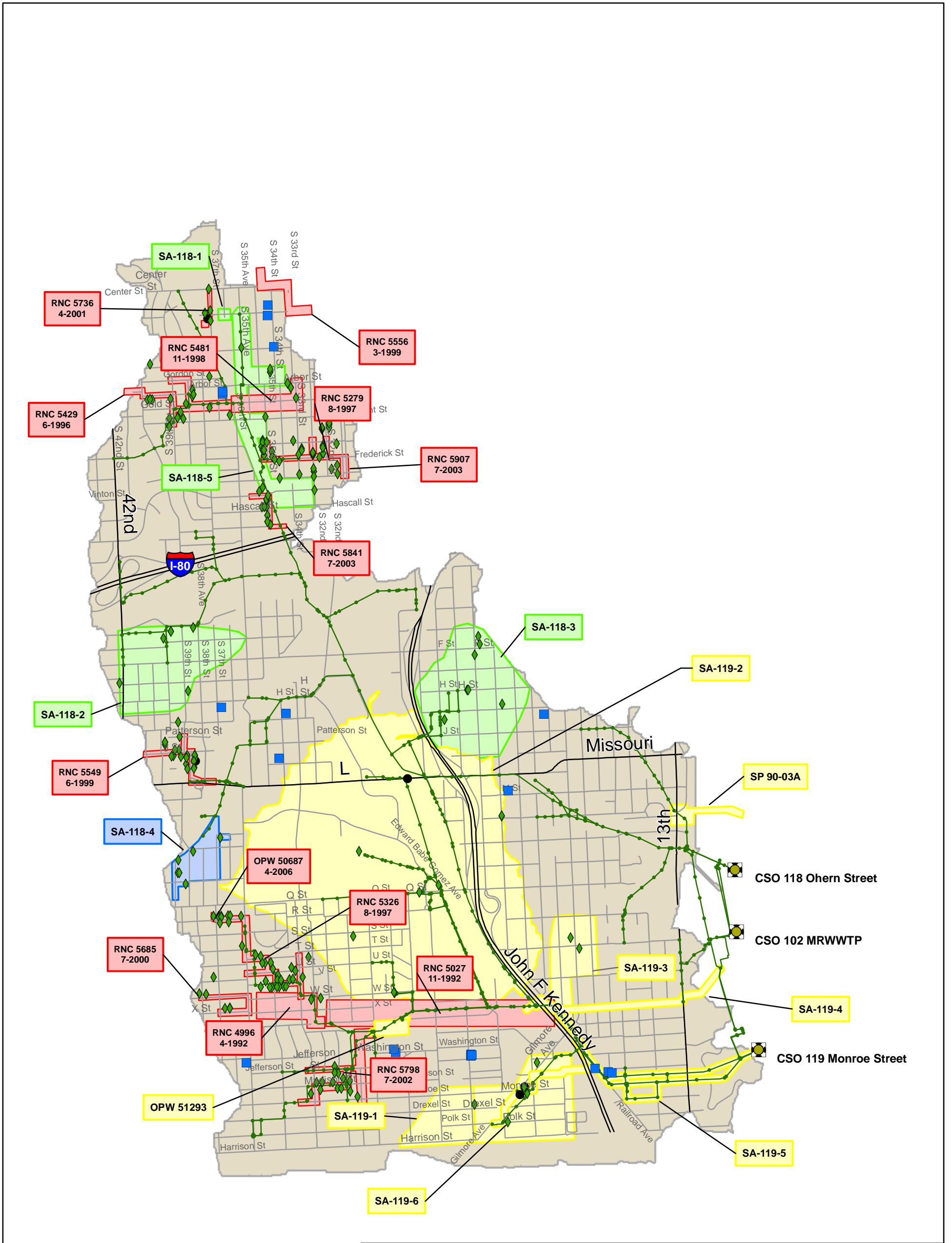
LEGEND

■ Isolated Reports	CSO Outfalls
▲ Reports Addressed by Sewer Separation Projects	● Modeled Manholes
× Reports Addressed to Date	— Modeled CSO Sewers
● Flood of 99	— Major Streets
 City Planned Study Areas (Category 2)	— Streets
 BC Recommended Study Areas (Category 3)	 CSO Boundary
 LTCP CSO Study Areas (Categories 4 and 5)	

Scale
1" = 2000'

0 1,000 2,000 4,000
 Feet

**Ohern/Monroe Basin - Figure 2
 Proposed Future Separation**

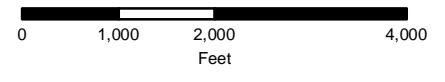


LEGEND

- Isolated Reports
- ◆ Reports Addressed by Sewer Separation Projects
- Flood of 99
- Completed RNC Projects (Category 1)
- City Planned Study Areas (Category 2)
- BC Recommended Study Areas (Category 3)
- LTCP CSO Study Areas (Categories 4 and 5)
- ⊗ CSO Outfalls
- Modeled Manholes
- Modeled CSO Sewers
- Major Streets
- Streets
- CSO Boundary



Scale
1" = 2000'



Attachment 2 – Tables

Table A.1 - Outlier Data and Windshield Survey Notes

OBJECT ID	DATE	ADDRESS	FULL ADDRESS	LABEL	WINDSHIELD SURVEY NOTES
124	5/26/1987	S 34TH ST	2336 S 34TH ST	UNKNOWN	NA
243	6/26/1989	S 26TH ST	6221 S 26TH ST	SEWER BACKUP	NA
258	3/14/1990	S 34TH ST	4524 S 34TH ST	SEWER BACKUP	Clogged/No inlets
382	7/26/1993	S 34 ST	4321 S 34 ST	SEWER BACKUP	Ponding and Clogged/No inlets
489	8/24/1979	HARRISON ST	2700 HARRISON ST	UNKNOWN	NA
738	8/7/1992	RAILROAD AV	6300 RAILROAD AV	SEWER OVERLOAD	NA
650	6/26/1989	S 24TH ST	4838 S 24TH ST	GROUND FLOODING	Ponding
879	6/22/1994	S 42 ST	4212 S 42 ST	SEWER BACKUP	NA
1357*	6/20/1991	S 34 ST	2104 S 34 ST	UNKNOWN	Low spot in street
1517	7/30/1996	S 39 ST	4213 S 39 ST	POSTCARD	NA
1088	9/1/1996	M	2314 M	POSTCARD	NA
1341	5/31/1991	S 36TH	6208 S 36TH	UNKNOWN	Ponding
1369	7/28/1996	S 21 ST	4410 S 21 ST	SEWER OVERLOAD	Ponding
1653	1/20/1997	S 34 ST	1928 S 34 ST	POSTCARD	Low spot in street
1658*	1/20/1997	S 34 ST	2104 S 34 ST	POSTCARD	Low spot in street
1706	1/20/1997	WASHINGTON ST	2892 WASHINGTON ST	SEWER OVERLOAD	Ponding
1725	3/8/1997	MADISON ST	1721 MADISON ST	SEWER OVERLOAD	Ponding
1736	3/8/1997	MADISON ST	1719 MADISON ST	SEWER OVERLOAD	Ponding
2787	10/10/2000	DREXEL ST	2530 DREXEL ST	POSTCARD	NA
2866	7/28/96	S 26TH ST	6221 S 26TH ST	SEWER BACKUP	NA
2867	1/20/97	S 26TH ST	6221 S 26TH ST	SEWER BACKUP	NA
3163	5/24/2004	WASHINGTON ST	2868 WASHINGTON ST	SEWER OVERLOAD	Ponding
3166	5/24/2004	S ST	3027 S ST	SEWER OVERLOAD	NA
3271	8/10/2005	3503 VINTON ST		STORM BACKUP	Ponding and Clogged/No inlets
3278	8/10/2005	29TH & W		MH LID BLOWN OFF	Ponding
3282	8/10/2005	4309 S 37TH ST		STORM BACKUP	Ponding
3286	8/10/2005	35TH & VINTON ST		GROUND FLOODING	Ponding around single area inlet
0	7/22/2004	29TH AND W		MH LID BLOWN OFF	Ponding

*Note: According to address input in database, either 1357 or 1658 is in the shown in the wrong location in GIS database.

SA-118-2 Sewer Separation Costs

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$3,307,000									\$3,141,650	95%	\$165,350	5%	\$3,307,000	100%
Eng, Legal, Admin	5%	\$165,350	\$8,268	5%	\$16,535	10%	\$49,605	30%	\$33,070	20%	\$49,605	30%	\$8,268	5%	\$165,350	100%
Contingencies	25%	\$826,750					\$41,338	5%			\$785,413	95%			\$826,750	100%
Interest	5%	\$165,350									\$165,350	100%			\$165,350	100%
PTI, Test Bore, ECI	4%	\$132,280	\$26,456	20%	\$105,824	80%									\$132,280	100%
Field Eng/Inspection	5%	\$165,350									\$148,815	90%	\$16,535	10%	\$165,350	100%
Design & Eng. Services	15%	\$496,050					\$446,445	90%	\$49,605	10%					\$496,050	100%
Program Management	2%	\$66,140	\$3,307	5%	\$6,614	10%	\$19,842	30%	\$13,228	20%	\$19,842	30%	\$3,307	5%	\$66,140	100%
Planning & Prelim Design	5%	\$165,350	\$49,605	30%	\$115,745	70%									\$165,350	100%
Performance Bond	1%	\$33,070									\$33,070	100%			\$33,070	100%
Capital Cost		\$5,522,690	\$87,636	1.6%	\$244,718	4.4%	\$557,230	10.1%	\$95,903	1.7%	\$4,343,745	78.7%	\$193,460	3.5%	\$5,522,690	100.0%
MUD Utility Relocation		\$1,138,000							\$1,138,000						\$1,138,000	
Construction Performance Incentive		\$33,000									\$33,000				\$33,000	
TOTAL Capital Cost		\$6,694,000	\$87,636	1.3%	\$244,718	3.7%	\$557,230	8.3%	\$1,233,903	18.4%	\$4,376,745	65.4%	\$193,460	2.9%	\$6,693,690	100.0%

Task 1 - Additional Study	\$88,000	1.3%
Task 2 - Prelim Design	\$245,000	3.7%
Task 3 - Final Design	\$557,000	8.3%
Task 4 - Utility Relocations	\$1,234,000	18.4%
Task 5 - Construction	\$4,377,000	65.4%
Task 6 - Start-up and Close-out	\$193,000	2.9%
Total Capital Cost	\$6,694,000	100.0%

Direct Entry Cells from Cost Tool

SA-118-3 Sewer Separation Costs

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$7,422,000									\$7,050,900	95%	\$371,100	5%	\$7,422,000	100%
Eng, Legal, Admin	5%	\$371,100	\$18,555	5%	\$37,110	10%	\$111,330	30%	\$74,220	20%	\$111,330	30%	\$18,555	5%	\$371,100	100%
Contingencies	25%	\$1,855,500					\$92,775	5%			\$1,762,725	95%			\$1,855,500	100%
Interest	5%	\$371,100									\$371,100	100%			\$371,100	100%
PTI, Test Bore, ECI	4%	\$296,880	\$59,376	20%	\$237,504	80%									\$296,880	100%
Field Eng/Inspection	5%	\$371,100									\$333,990	90%	\$37,110	10%	\$371,100	100%
Design & Eng. Services	15%	\$1,113,300					\$1,001,970	90%	\$111,330	10%					\$1,113,300	100%
Program Management	2%	\$148,440	\$7,422	5%	\$14,844	10%	\$44,532	30%	\$29,688	20%	\$44,532	30%	\$7,422	5%	\$148,440	100%
Planning & Prelim Design	5%	\$371,100	\$111,330	30%	\$259,770	70%									\$371,100	100%
Performance Bond	1%	\$74,220									\$74,220	100%			\$74,220	100%
Capital Cost		\$12,394,740	\$196,683	1.6%	\$549,228	4.4%	\$1,250,607	10.1%	\$215,238	1.7%	\$9,748,797	78.7%	\$434,187	3.5%	\$12,394,740	100.0%
MUD Utility Relocation		\$442,000							\$442,000						\$442,000	
Construction Performance Incentive		\$74,000									\$74,000				\$74,000	
TOTAL Capital Cost		\$12,911,000	\$196,683	1.5%	\$549,228	4.3%	\$1,250,607	9.7%	\$657,238	5.1%	\$9,822,797	76.1%	\$434,187	3.4%	\$12,910,740	100.0%

Task 1 - Additional Study	\$197,000	1.5%
Task 2 - Prelim Design	\$549,000	4.3%
Task 3 - Final Design	\$1,251,000	9.7%
Task 4 - Utility Relocations	\$657,000	5.1%
Task 5 - Construction	\$9,823,000	76.1%
Task 6 - Start-up and Close-out	\$434,000	3.4%
Total Capital Cost	\$12,911,000	100.0%

Direct Entry Cells from Cost Tool

SA-118-4 Sewer Separation Costs

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$1,340,000									\$1,273,000	95%	\$67,000	5%	\$1,340,000	100%
Eng, Legal, Admin	5%	\$67,000	\$3,350	5%	\$6,700	10%	\$20,100	30%	\$13,400	20%	\$20,100	30%	\$3,350	5%	\$67,000	100%
Contingencies	25%	\$335,000					\$16,750	5%			\$318,250	95%			\$335,000	100%
Interest	5%	\$67,000									\$67,000	100%			\$67,000	100%
PTI, Test Bore, ECI	4%	\$53,600	\$10,720	20%	\$42,880	80%									\$53,600	100%
Field Eng/Inspection	5%	\$67,000									\$60,300	90%	\$6,700	10%	\$67,000	100%
Design & Eng. Services	15%	\$201,000					\$180,900	90%	\$20,100	10%					\$201,000	100%
Program Management	2%	\$26,800	\$1,340	5%	\$2,680	10%	\$8,040	30%	\$5,360	20%	\$8,040	30%	\$1,340	5%	\$26,800	100%
Planning & Prelim Design	5%	\$67,000	\$20,100	30%	\$46,900	70%									\$67,000	100%
Performance Bond	1%	\$13,400									\$13,400	100%			\$13,400	100%
Capital Cost		\$2,237,800	\$35,510	1.6%	\$99,160	4.4%	\$225,790	10.1%	\$38,860	1.7%	\$1,760,090	78.7%	\$78,390	3.5%	\$2,237,800	100.0%
MUD Utility Relocation		\$146,000							\$146,000						\$146,000	
Construction Performance Incentive		\$13,000									\$13,000				\$13,000	
TOTAL Capital Cost		\$2,397,000	\$35,510	1.5%	\$99,160	4.1%	\$225,790	9.4%	\$184,860	7.7%	\$1,773,090	74.0%	\$78,390	3.3%	\$2,396,800	100.0%

Task 1 - Additional Study	\$36,000	1.5%
Task 2 - Prelim Design	\$99,000	4.1%
Task 3 - Final Design	\$226,000	9.4%
Task 4 - Utility Relocations	\$185,000	7.7%
Task 5 - Construction	\$1,773,000	74.0%
Task 6 - Start-up and Close-out	\$78,000	3.3%
Total Capital Cost	\$2,397,000	100.0%

Direct Entry Cells from Cost Tool

SA-118-5 Sewer Separation Costs

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$5,340,000									\$5,073,000	95%	\$267,000	5%	\$5,340,000	100%
Eng, Legal, Admin	5%	\$267,000	\$13,350	5%	\$26,700	10%	\$80,100	30%	\$53,400	20%	\$80,100	30%	\$13,350	5%	\$267,000	100%
Contingencies	25%	\$1,335,000					\$66,750	5%			\$1,268,250	95%			\$1,335,000	100%
Interest	5%	\$267,000									\$267,000	100%			\$267,000	100%
PTI, Test Bore, ECI	4%	\$213,600	\$42,720	20%	\$170,880	80%									\$213,600	100%
Field Eng/Inspection	5%	\$267,000									\$240,300	90%	\$26,700	10%	\$267,000	100%
Design & Eng. Services	15%	\$801,000					\$720,900	90%	\$80,100	10%					\$801,000	100%
Program Management	2%	\$106,800	\$5,340	5%	\$10,680	10%	\$32,040	30%	\$21,360	20%	\$32,040	30%	\$5,340	5%	\$106,800	100%
Planning & Prelim Design	5%	\$267,000	\$80,100	30%	\$186,900	70%									\$267,000	100%
Performance Bond	1%	\$53,400									\$53,400	100%			\$53,400	100%
Capital Cost		\$8,917,800	\$141,510	1.6%	\$395,160	4.4%	\$899,790	10.1%	\$154,860	1.7%	\$7,014,090	78.7%	\$312,390	3.5%	\$8,917,800	100.0%
MUD Utility Relocation		\$1,354,000							\$1,354,000						\$1,354,000	
Construction Performance Incentive		\$53,000									\$53,000				\$53,000	
TOTAL Capital Cost		\$10,325,000	\$141,510	1.4%	\$395,160	3.8%	\$899,790	8.7%	\$1,508,860	#####	\$7,067,090	68.4%	\$312,390	3.0%	\$10,324,800	100.0%

Task 1 - Additional Study	\$142,000	1.4%
Task 2 - Prelim Design	\$395,000	3.8%
Task 3 - Final Design	\$900,000	8.7%
Task 4 - Utility Relocations	\$1,509,000	14.6%
Task 5 - Construction	\$7,067,000	68.4%
Task 6 - Start-up and Close-out	\$312,000	3.0%
Total Capital Cost	\$10,325,000	100.0%

Direct Entry Cells from Cost Tool

Baseline - Wilson Packing Plant Costs

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$900,000									\$855,000	95%	\$45,000	5%	\$900,000	100%
Eng, Legal, Admin	5%	\$45,000	\$2,250	5%	\$4,500	10%	\$13,500	30%	\$9,000	20%	\$13,500	30%	\$2,250	5%	\$45,000	100%
Contingencies	25%	\$225,000					\$11,250	5%			\$213,750	95%			\$225,000	100%
Interest	5%	\$45,000									\$45,000	100%			\$45,000	100%
PTI, Test Bore, ECI	4%	\$36,000	\$7,200	20%	\$28,800	80%									\$36,000	100%
Field Eng/Inspection	5%	\$45,000									\$40,500	90%	\$4,500	10%	\$45,000	100%
Design & Eng. Services	15%	\$135,000					\$121,500	90%	\$13,500	10%					\$135,000	100%
Program Management	2%	\$18,000	\$900	5%	\$1,800	10%	\$5,400	30%	\$3,600	20%	\$5,400	30%	\$900	5%	\$18,000	100%
Planning & Prelim Design	5%	\$45,000	\$13,500	30%	\$31,500	70%									\$45,000	100%
Performance Bond	1%	\$9,000									\$9,000	100%			\$9,000	100%
Capital Cost		\$1,503,000	\$23,850	1.6%	\$66,600	4.4%	\$151,650	10.1%	\$26,100	1.7%	\$1,182,150	78.7%	\$52,650	3.5%	\$1,503,000	100.0%
MUD Utility Relocation		\$0													\$0	
Construction Performance Incentive		\$0													\$0	
TOTAL Capital Cost		\$1,503,000	\$23,850	1.6%	\$66,600	4.4%	\$151,650	10.1%	\$26,100	1.7%	\$1,182,150	78.7%	\$52,650	3.5%	\$1,503,000	100.0%

Task 1 - Additional Study	\$24,000	1.6%
Task 2 - Prelim Design	\$67,000	4.5%
Task 3 - Final Design	\$152,000	10.1%
Task 4 - Utility Relocations	\$26,000	1.7%
Task 5 - Construction	\$1,182,000	78.6%
Task 6 - Start-up and Close-out	\$53,000	3.5%
Total Capital Cost	\$1,503,000	100.0%

Direct Entry Cells from Cost Tool

Construction Costs from Cost Tool submitted in Ohern/Monroe Basin Implementation Plan.

Gibson Road Project

Reference: Email Susan Marino to Andrew Sauer, August 1, 2007

Phase I (2006/2007)

Completed as part of Gibson Road Viaduct Project SP 90-03A

Storm Sewer Cost (reference Bid Sheet)	\$1,168,653	
City Share	40%	\$467,462
Design % of City Share	15%	\$70,119
Total City Cost Phase I		\$537,581

Phase II (2008/2009)

Completed as part of South Omaha Veteran's Memorial Bridge Replacement

Verbal storm sewer construction cost (reference Sue email)	\$1,500,000	
City Share	40%	\$600,000
Design % of City Share	15%	\$90,000
Total City Cost Phase II		\$690,000

Total Gibson Road Storm Sewer City Cost (I +II)	\$1,228,000
--	--------------------

O&M Estimated with Cost Tool and Quantities **\$11,906**

Ohern/Monroe Implementation Plan Project 1 Industrial Force Main and Lift Station

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$4,076,000									\$3,872,200	95%	\$203,800	5%	\$4,076,000	100%
Eng, Legal, Admin	5%	\$203,800	\$10,190	5%	\$20,380	10%	\$61,140	30%	\$40,760	20%	\$61,140	30%	\$10,190	5%	\$203,800	100%
Contingencies (CT Cell I39)	25%	\$1,019,000	\$0		\$0		\$50,950	5%	\$0		\$968,050	95%	\$0		\$1,019,000	100%
Interest	5%	\$203,800	\$0		\$0		\$0		\$0		\$203,800	100%	\$0		\$203,800	100%
PTI, Test Bore, ECI	4%	\$163,040	\$32,608	20%	\$130,432	80%	\$0		\$0		\$0		\$0		\$163,040	100%
Field Eng/Inspection	5%	\$203,800	\$0		\$0		\$0		\$0		\$183,420	90%	\$20,380	10%	\$203,800	100%
Design & Eng. Services	15%	\$611,400	\$0		\$0		\$550,260	90%	\$61,140	10%	\$0		\$0		\$611,400	100%
Program Management	2%	\$81,520	\$4,076	5%	\$8,152	10%	\$24,456	30%	\$16,304	20%	\$24,456	30%	\$4,076	5%	\$81,520	100%
Planning & Prelim Design	5%	\$203,800	\$61,140	30%	\$142,660	70%	\$0		\$0		\$0		\$0		\$203,800	100%
Performance Bond	1%	\$40,760	\$0		\$0		\$0		\$0		\$40,760	100%	\$0		\$40,760	100%
Capital Cost	67%	\$6,807,000	\$108,014	1.6%	\$301,624	4.4%	\$686,806	10.1%	\$118,204	1.7%	\$5,353,826	78.7%	\$238,446	3.5%	\$6,806,920	100.0%
CT Construction Performance Incentive		\$41,000									\$41,000				\$41,000	100.0%
CT MUD Utility Relocation		\$489,000							\$489,000						\$489,000	
Additional Cost	0%	\$0	\$0												\$0	
Total Project Capital Cost		\$7,337,000	\$108,000		\$301,600		\$686,800		\$607,200		\$5,394,800		\$238,400		\$7,337,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	1.5%	\$108,000
Task 2 - Prelim Design	4.1%	\$301,600
Task 3 - Final Design	9.4%	\$686,800
Task 4 - Utility Relocations	8.3%	\$607,200
Task 5 - Construction	73.5%	\$5,394,800
Task 6 - Start-Up and Close-Out	3.2%	\$238,400
Total	100.0%	\$7,337,000

Fixed Values	
MRWWTP 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 MRWWTP (MG):	0

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$4,076,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$41,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$489,000
Additional Cost	\$0
Total Construction Cost (including MUD & incentive)	\$4,606,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$6,807,000
CT Construction Performance Incentive	\$41,000
CT MUD Utility Relocation	\$489,000
Additional Cost (if recommended)	\$0
Total Project Capital Cost	\$7,337,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$80,806
MRWWTP	\$0
Total Annual O&M Cost	\$80,806
50-Year Present Worth	
Project 50-Year Present Worth (Project \$ Summary Cell I58)	\$8,256,000
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$41,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$489,000
Additional Cost	\$0
Total 50-Year Present Worth Cost	\$8,786,000

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 does not include Cost Tool (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 > Project Capital Cost (Cell I57). The cost tool 50-YR PW Cell I58 includes equipment replacement cost and annual O&M cost. The Cost Tool value is used for this Pump Station Cost Evaluation.

Ohern/Monroe Implementation Plan Project 2 South Barrel to Stormwater Only - Cost Summary

Task Cost Summary Breakdown	Diversion Structures Closure	Hydraulic Window Closure	South Barrel Project 2
Task 1 - Additional Study	\$36,900	\$77,200	\$114,100
Task 2 - Prelim Design	\$103,100	\$6,100	\$109,200
Task 3 - Final Design	\$234,700	\$14,200	\$248,900
Task 4 - Utility Relocations	\$506,400	\$2,400	\$508,800
Task 5 - Construction	\$1,843,700	\$119,500	\$1,963,200
Task 6 - Start-Up and Close-Out	\$81,500	\$4,800	\$86,300
Total Project Capital Cost	\$2,806,300	\$224,200	\$3,030,500
Total Construction Cost (including MUD & incentive)	\$1,873,000	\$161,000	\$2,034,000
Total Annual O&M	\$2,012	\$0	\$2,012
50-Year PW Total Annual O&M	\$31,713	\$0	\$31,713
Total 50-Year Present Worth Cost	\$2,838,000	\$224,000	\$3,062,000

Ohern/Monroe Implementation Plan Project 2 South Barrel to Stormwater Only - Hydraulic Windows Closure

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$82,000									\$77,900	95%	\$4,100	5%	\$82,000	100%
Eng, Legal, Admin	5%	\$4,100	\$205	5%	\$410	10%	\$1,230	30%	\$820	20%	\$1,230	30%	\$205	5%	\$4,100	100%
Contingencies (CT Cell I39)	35%	\$28,700	\$0		\$0		\$1,435	5%	\$0		\$27,265	95%	\$0		\$28,700	100%
Interest	5%	\$4,100	\$0		\$0		\$0		\$0		\$4,100	100%	\$0		\$4,100	100%
PTI, Test Bore, ECI	4%	\$3,280	\$656	20%	\$2,624	80%	\$0		\$0		\$0		\$0		\$3,280	100%
Field Eng/Inspection	5%	\$4,100	\$0		\$0		\$0		\$0		\$3,690	90%	\$410	10%	\$4,100	100%
Design & Eng. Services	15%	\$12,300	\$0		\$0		\$11,070	90%	\$1,230	10%	\$0		\$0		\$12,300	100%
Program Management	2%	\$1,640	\$82	5%	\$164	10%	\$492	30%	\$328	20%	\$492	30%	\$82	5%	\$1,640	100%
Planning & Prelim Design	5%	\$4,100	\$1,230	30%	\$2,870	70%	\$0		\$0		\$0		\$0		\$4,100	100%
Performance Bond	1%	\$820	\$0		\$0		\$0		\$0		\$820	100%	\$0		\$820	100%
Capital Cost	77%	\$145,000	\$2,173	1.5%	\$6,068	4.2%	\$14,227	9.8%	\$2,378	1.6%	\$115,497	79.7%	\$4,797	3.3%	\$145,140	100.1%
CT Construction Performance Incentive		\$4,000									\$4,000				\$4,000	100.0%
CT MUD Utility Relocation		\$0							\$0						\$0	
Additional Cost		\$75,000	\$75,000												\$75,000	
Total Project Capital Cost		\$224,000	\$77,200		\$6,100		\$14,200		\$2,400		\$119,500		\$4,800		\$224,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	34.5%	\$77,200
Task 2 - Prelim Design	2.7%	\$6,100
Task 3 - Final Design	6.3%	\$14,200
Task 4 - Utility Relocations	1.1%	\$2,400
Task 5 - Construction	53.3%	\$119,500
Task 6 - Start-Up and Close-Out	2.1%	\$4,800
Total Project Capital Cost	100.1%	\$224,000

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):	77%

Calculated Values	
Annual Volume to MRWWTP (MG):	0

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$82,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$4,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$0
Additional Cost	\$75,000
Total Construction Cost (including MUD & incentive)	\$161,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$145,000
CT Construction Performance Incentive	\$4,000
CT MUD Utility Relocation	\$0
Additional Cost (if recommended)	\$75,000
Total Project Capital Cost	\$224,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$0
MRWWTP	\$0
Total Annual O&M Cost	\$0
50-Year Present Worth	
Total Project Capital Cost	\$224,000
50-Year Present Worth Total Annual O&M	\$0
Total 50-Year Present Worth Cost	\$224,000

- 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 does not include Cost Tool (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: Closure of Hydraulic Windows has no annual O&M cost

Ohern/Monroe Implementation Plan Project 2 South Barrel to Stormwater Only - Diversion Structure Closure

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$1,393,000									\$1,323,350	95%	\$69,650	5%	\$1,393,000	100%
Eng, Legal, Admin	5%	\$69,650	\$3,483	5%	\$6,965	10%	\$20,895	30%	\$13,930	20%	\$20,895	30%	\$3,483	5%	\$69,650	100%
Contingencies (CT Cell I39)	25%	\$348,250	\$0		\$0		\$17,413	5%	\$0		\$330,838	95%	\$0		\$348,250	100%
Interest	5%	\$69,650	\$0		\$0		\$0		\$0		\$69,650	100%	\$0		\$69,650	100%
PTI, Test Bore, ECI	4%	\$55,720	\$11,144	20%	\$44,576	80%	\$0		\$0		\$0		\$0		\$55,720	100%
Field Eng/Inspection	5%	\$69,650	\$0		\$0		\$0		\$0		\$62,685	90%	\$6,965	10%	\$69,650	100%
Design & Eng. Services	15%	\$208,950	\$0		\$0		\$188,055	90%	\$20,895	10%	\$0		\$0		\$208,950	100%
Program Management	2%	\$27,860	\$1,393	5%	\$2,786	10%	\$8,358	30%	\$5,572	20%	\$8,358	30%	\$1,393	5%	\$27,860	100%
Planning & Prelim Design	5%	\$69,650	\$20,895	30%	\$48,755	70%	\$0		\$0		\$0		\$0		\$69,650	100%
Performance Bond	1%	\$13,930	\$0		\$0		\$0		\$0		\$13,930	100%	\$0		\$13,930	100%
Capital Cost	67%	\$2,326,000	\$36,915	1.6%	\$103,082	4.4%	\$234,721	10.1%	\$40,397	1.7%	\$1,829,706	78.7%	\$81,491	3.5%	\$2,326,310	100.0%
CT Construction Performance Incentive		\$14,000									\$14,000				\$14,000	100.0%
CT MUD Utility Relocation		\$466,000							\$466,000						\$466,000	
Additional Cost	0%	\$0	\$0												\$0	
Total Project Capital Cost		\$2,806,000	\$36,900		\$103,100		\$234,700		\$506,400		\$1,843,700		\$81,500		\$2,806,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	1.3%	\$36,900
Task 2 - Prelim Design	3.7%	\$103,100
Task 3 - Final Design	8.4%	\$234,700
Task 4 - Utility Relocations	18.0%	\$506,400
Task 5 - Construction	65.7%	\$1,843,700
Task 6 - Start-Up and Close-Out	2.9%	\$81,500
Total	100.0%	\$2,806,000

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 MRWWTP (MG):	0

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$1,393,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$14,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$466,000
Additional Cost	\$0
Total Construction Cost (including MUD & incentive)	\$1,873,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$2,326,000
CT Construction Performance Incentive	\$14,000
CT MUD Utility Relocation	\$466,000
Additional Cost (if recommended)	\$0
Total Project Capital Cost	\$2,806,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$2,012
MRWWTP	\$0
Total Annual O&M Cost	\$2,012
50-Year Present Worth	
Total Project Capital Cost	\$2,806,000
50-Year Present Worth Total Annual O&M	\$31,713
Total 50-Year Present Worth Cost	\$2,838,000

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 does not include Cost Tool (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

Ohern/Monroe Implementation Plan Project 3 Region 5 Sewer Separation Cost Breakdown

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$6,733,000									\$6,396,350	95%	\$336,650	5%	\$6,733,000	100%
Eng, Legal, Admin	5%	\$336,650	\$16,833	5%	\$33,665	10%	\$100,995	30%	\$67,330	20%	\$100,995	30%	\$16,833	5%	\$336,650	100%
Contingencies (CT Cell I39)	25%	\$1,683,250	\$0		\$0		\$84,163	5%	\$0		\$1,599,088	95%	\$0		\$1,683,250	100%
Interest	5%	\$336,650	\$0		\$0		\$0		\$0		\$336,650	100%	\$0		\$336,650	100%
PTI, Test Bore, ECI	4%	\$269,320	\$53,864	20%	\$215,456	80%	\$0		\$0		\$0		\$0		\$269,320	100%
Field Eng/Inspection	5%	\$336,650	\$0		\$0		\$0		\$0		\$302,985	90%	\$33,665	10%	\$336,650	100%
Design & Eng. Services	15%	\$1,009,950	\$0		\$0		\$908,955	90%	\$100,995	10%	\$0		\$0		\$1,009,950	100%
Program Management	2%	\$134,660	\$6,733	5%	\$13,466	10%	\$40,398	30%	\$26,932	20%	\$40,398	30%	\$6,733	5%	\$134,660	100%
Planning & Prelim Design	5%	\$336,650	\$100,995	30%	\$235,655	70%	\$0		\$0		\$0		\$0		\$336,650	100%
Performance Bond	1%	\$67,330	\$0		\$0		\$0		\$0		\$67,330	100%	\$0		\$67,330	100%
Capital Cost	67%	\$11,244,000	\$178,425	1.6%	\$498,242	4.4%	\$1,134,511	10.1%	\$195,257	1.7%	\$8,843,796	78.7%	\$393,881	3.5%	\$11,244,110	100.0%
CT Construction Performance Incentive		\$67,000									\$67,000				\$67,000	100.0%
CT MUD Utility Relocation		\$496,000							\$496,000						\$496,000	
Additional Cost	3%	\$201,990	\$201,990												\$201,990	
Total Project Capital Cost		\$12,009,000	\$380,400		\$498,200		\$1,134,500		\$691,300		\$8,910,800		\$393,900		\$12,009,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	3.2%	\$380,400
Task 2 - Prelim Design	4.1%	\$498,200
Task 3 - Final Design	9.4%	\$1,134,500
Task 4 - Utility Relocations	5.8%	\$691,300
Task 5 - Construction	74.2%	\$8,910,800
Task 6 - Start-Up and Close-Out	3.3%	\$393,900
Total	100.0%	\$12,009,000

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 MRWWTP (MG):	0

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$6,733,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$67,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$496,000
Additional Cost	\$201,990
Total Construction Cost (including MUD & incentive)	\$7,498,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$11,244,000
CT Construction Performance Incentive	\$67,000
CT MUD Utility Relocation	\$496,000
Additional Cost (if recommended)	\$201,990
Total Project Capital Cost	\$12,009,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$20,746
MRWWTP	\$0
Total Annual O&M Cost	\$20,746
50-Year Present Worth	
Total Project Capital Cost	\$12,009,000
50-Year Present Worth Total Annual O&M	\$326,996
Total 50-Year Present Worth Cost	\$12,336,000

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 does not include Cost Tool (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

Ohern/Monroe Implementation Plan Project 4 Gilmore Avenue Storm Sewer

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost ⁽¹⁾		\$4,208,000									\$3,997,600	95%	\$210,400	5%	\$4,208,000	100%
Eng, Legal, Admin	5%	\$210,400	\$10,520	5%	\$21,040	10%	\$63,120	30%	\$42,080	20%	\$63,120	30%	\$10,520	5%	\$210,400	100%
Contingencies (CT Cell I39)	25%	\$1,052,000	\$0		\$0		\$52,600	5%	\$0		\$999,400	95%	\$0		\$1,052,000	100%
Interest	5%	\$210,400	\$0		\$0		\$0		\$0		\$210,400	100%	\$0		\$210,400	100%
PTI, Test Bore, ECI	4%	\$168,320	\$33,664	20%	\$134,656	80%	\$0		\$0		\$0		\$0		\$168,320	100%
Field Eng/Inspection	5%	\$210,400	\$0		\$0		\$0		\$0		\$189,360	90%	\$21,040	10%	\$210,400	100%
Design & Eng. Services	15%	\$631,200	\$0		\$0		\$568,080	90%	\$63,120	10%	\$0		\$0		\$631,200	100%
Program Management	2%	\$84,160	\$4,208	5%	\$8,416	10%	\$25,248	30%	\$16,832	20%	\$25,248	30%	\$4,208	5%	\$84,160	100%
Planning & Prelim Design	5%	\$210,400	\$63,120	30%	\$147,280	70%	\$0		\$0		\$0		\$0		\$210,400	100%
Performance Bond	1%	\$42,080	\$0		\$0		\$0		\$0		\$42,080	100%	\$0		\$42,080	100%
Capital Cost	67%	\$7,027,000	\$111,512	1.6%	\$311,392	4.4%	\$709,048	10.1%	\$122,032	1.7%	\$5,527,208	78.7%	\$246,168	3.5%	\$7,027,360	100.0%
CT Construction Performance Incentive		\$42,000									\$42,000				\$42,000	100.0%
CT MUD Utility Relocation		\$0							\$0						\$0	
Additional Cost	0%	\$0	\$0												\$0	
Total Project Capital Cost		\$7,069,000	\$111,500		\$311,400		\$709,000		\$122,000		\$5,569,200		\$246,200		\$7,069,000	

Task Cost Summary Breakdown		
Task 1 - Additional Study	1.6%	\$111,500
Task 2 - Prelim Design	4.4%	\$311,400
Task 3 - Final Design	10.0%	\$709,000
Task 4 - Utility Relocations	1.7%	\$122,000
Task 5 - Construction	78.8%	\$5,569,200
Task 6 - Start-Up and Close-Out	3.5%	\$246,200
Total	100.0%	\$7,069,000

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 MRWWTP (MG):	0

Construction Costs	
CT Total Estimated Construction Cost (Project \$ Summary Cell I27)	\$4,208,000
CT Real Estate Costs (Project \$ Summary Cell I35)	\$0
CT Construction Performance Incentive (Project \$ Summary Cell I28)	\$42,000
CT MUD Utility Relocation (Project \$ Summary Cell I29)	\$0
Additional Cost	\$0
Total Construction Cost (including MUD & incentive)	\$4,250,000
Project Capital Costs	
CT Construction Cost to Capital Cost Conversion (I27+I35)*(1+I52)	\$7,027,000
CT Construction Performance Incentive	\$42,000
CT MUD Utility Relocation	\$0
Additional Cost (if recommended)	\$0
Total Project Capital Cost	\$7,069,000
Annual O&M Costs	
Cost Tool (Life Cycle Analysis Cell F107)	\$3,851
MRWWTP	\$0
Total Annual O&M Cost	\$3,851
50-Year Present Worth	
Total Project Capital Cost	\$7,069,000
50-Year Present Worth Total Annual O&M	\$60,699
Total 50-Year Present Worth Cost	\$7,130,000

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 does not include Cost Tool (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: Stormwater construction only, therefore no MUD Utility Relocation Cost

SA-119-1 Sewer Separation Costs

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$3,401,000									\$3,230,950	95%	\$170,050	5%	\$3,401,000	100%
Eng, Legal, Admin	5%	\$170,050	\$8,503	5%	\$17,005	10%	\$51,015	30%	\$34,010	20%	\$51,015	30%	\$8,503	5%	\$170,050	100%
Contingencies	25%	\$850,250					\$42,513	5%			\$807,738	95%			\$850,250	100%
Interest	5%	\$170,050									\$170,050	100%			\$170,050	100%
PTI, Test Bore, ECI	4%	\$136,040	\$27,208	20%	\$108,832	80%									\$136,040	100%
Field Eng/Inspection	5%	\$170,050									\$153,045	90%	\$17,005	10%	\$170,050	100%
Design & Eng. Services	15%	\$510,150					\$459,135	90%	\$51,015	10%					\$510,150	100%
Program Management	2%	\$68,020	\$3,401	5%	\$6,802	10%	\$20,406	30%	\$13,604	20%	\$20,406	30%	\$3,401	5%	\$68,020	100%
Planning & Prelim Design	5%	\$170,050	\$51,015	30%	\$119,035	70%									\$170,050	100%
Performance Bond	1%	\$34,010									\$34,010	100%			\$34,010	100%
Capital Cost		\$5,679,670	\$90,127	1.6%	\$251,674	4.4%	\$573,069	10.1%	\$98,629	1.7%	\$4,467,214	78.7%	\$198,959	3.5%	\$5,679,670	100.0%
MUD Utility Relocation		\$0													\$0	
Construction Performance Incentive		\$34,000									\$34,000				\$34,000	
TOTAL Capital Cost		\$5,714,000	\$90,127	1.6%	\$251,674	4.4%	\$573,069	10.0%	\$98,629	1.7%	\$4,501,214	78.8%	\$198,959	3.5%	\$5,713,670	100.0%

Task 1 - Additional Study	\$90,000	1.6%
Task 2 - Prelim Design	\$252,000	4.4%
Task 3 - Final Design	\$573,000	10.0%
Task 4 - Utility Relocations	\$99,000	1.7%
Task 5 - Construction	\$4,501,000	78.8%
Task 6 - Start-up and Close-out	\$199,000	3.5%
Total Capital Cost	\$5,714,000	100.0%

Direct Entry Cells from Cost Tool

SA-119-3 Sewer Separation Costs

Activity	Percentage	Cost	Task 1	%	Task 2	%	Task 3	%	Task 4	%	Task 5	%	Task 6	%	Total \$	Total %
Construction Cost (Cost Tool)		\$786,000									\$746,700	95%	\$39,300	5%	\$786,000	100%
Eng, Legal, Admin	5%	\$39,300	\$1,965	5%	\$3,930	10%	\$11,790	30%	\$7,860	20%	\$11,790	30%	\$1,965	5%	\$39,300	100%
Contingencies	25%	\$196,500					\$9,825	5%			\$186,675	95%			\$196,500	100%
Interest	5%	\$39,300									\$39,300	100%			\$39,300	100%
PTI, Test Bore, ECI	4%	\$31,440	\$6,288	20%	\$25,152	80%									\$31,440	100%
Field Eng/Inspection	5%	\$39,300									\$35,370	90%	\$3,930	10%	\$39,300	100%
Design & Eng. Services	15%	\$117,900					\$106,110	90%	\$11,790	10%					\$117,900	100%
Program Management	2%	\$15,720	\$786	5%	\$1,572	10%	\$4,716	30%	\$3,144	20%	\$4,716	30%	\$786	5%	\$15,720	100%
Planning & Prelim Design	5%	\$39,300	\$11,790	30%	\$27,510	70%									\$39,300	100%
Performance Bond	1%	\$7,860									\$7,860	100%			\$7,860	100%
Capital Cost		\$1,312,620	\$20,829	1.6%	\$58,164	4.4%	\$132,441	10.1%	\$22,794	1.7%	\$1,032,411	78.7%	\$45,981	3.5%	\$1,312,620	100.0%
MUD Utility Relocation		\$0													\$0	
Construction Performance Incentive		\$8,000									\$8,000				\$8,000	
TOTAL Capital Cost		\$1,321,000	\$20,829	1.6%	\$58,164	4.4%	\$132,441	10.0%	\$22,794	1.7%	\$1,040,411	78.8%	\$45,981	3.5%	\$1,320,620	100.0%

Task 1 - Additional Study	\$21,000	1.6%
Task 2 - Prelim Design	\$58,000	4.4%
Task 3 - Final Design	\$132,000	10.0%
Task 4 - Utility Relocations	\$23,000	1.7%
Task 5 - Construction	\$1,040,000	78.7%
Task 6 - Start-up and Close-out	\$46,000	3.5%
Total Capital Cost	\$1,321,000	100.0%

Direct Entry Cells from Cost Tool

Attachment 3 – Field Survey Summary Sheet

Omaha CSO
WIB/Street Flooding – Field Survey Summary

Site #: 1

Site Location (Street Intersection): 32nd & "F" Street

Basin (Circle one): Cole Creek

Ohern/Monroe

Area from Map: ✓

Date/Time: 1/24/08 12:00 pm (noon)

Field Notes/Observations:

(Comment on street slope/possible ponding areas/storm inlet conditions etc)

Intersection is raised; Business to the North/South much lower in grade. Sumping area to the North of intersection

Picture Log:

- | # | Description |
|---------|--|
| 1. 1136 | → Looking South at intersection |
| 2. 1139 | → Looking Northeast at intersection |
| 3. 1140 | → Looking North through intersection down 32 nd |
| 4. 1141 | → Looking West on "F" Street |
| 5. 1145 | → Looking East on "F" Street |
| 6. 1150 | → Looking North from intersection down 32 nd |

Field Crew Initials (Circle one):

AS/HD

BB/JR

Omaha CSO
WIB/Street Flooding – Field Survey Summary

Site #: 2

Site Location (Street Intersection): 39th + O/P Streets

Basin (Circle one): Cole Creek

Ohern/Monroe

Area from Map: ✓

Date/Time: 1/24/08

12:15 pm

Field Notes/Observations:

(Comment on street slope/possible ponding areas/storm inlet conditions etc)

Sump Area
Creek Nearby

Picture Log:

- | # | Description |
|---------|--|
| 1. 1161 | - Looking South down 39 th St. |
| 2. 1167 | - Looking South east down 39 th St |
| 3. 1170 | - Looking @ street inlet (free of debris) |
| 4. 1180 | - Looking West down P street at intersection w/ 39 th |
| 5. 1187 | - Looking South down 39 th St. On "P" street |
| 6. | |

Field Crew Initials (Circle one):

AS/HD

BB/JR

Omaha CSO
WIB/Street Flooding – Field Survey Summary

Site #: 3

Site Location (Street Intersection): Edward Babe + "X" St

Basin (Circle one): Cole Creek

Ohern/Monroe

Area from Map: ✓

Date/Time: 1/24/08 12:25 pm

Field Notes/Observations:

(Comment on street slope/possible ponding areas/storm inlet conditions etc)

Sump Area

Inlets have some debris in them.

Picture Log:

- | # | Description |
|---------|--|
| 1. 1197 | - Looking South down Edward Babe |
| 2. 1207 | - Inlet located @ intersection of Edward Babe + "X" |
| 3. 1213 | - Looking North down Edward Babe from "X" St. |
| 4. 1201 | - Looking East down "X" St. from Edward Babe |
| 5. 1217 | - Looking West down "X" St @ Intersection w/ Edward Babe |
| 6. | |

Field Crew Initials (Circle one):

AS/HD

BB/JR

Omaha CSO
WIB/Street Flooding – Field Survey Summary

Site #: 41

Site Location (Street Intersection): 20/21 St + "U" St

Basin (Circle one): Cole Creek

Ohern/Monroe

Area from Map: ✓

Date/Time: 1/24/08 12:35 pm

Field Notes/Observations:

(Comment on street slope/possible ponding areas/storm inlet conditions etc)

Low Spot

Area Inlets have debris in them.

Picture Log:

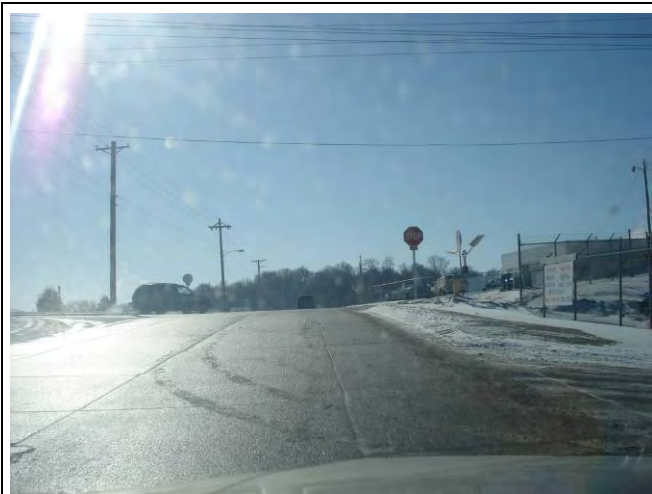
- | # | Description |
|----|--|
| 1. | 1230 - Looking South down "U" Street |
| 2. | 1234 - Looking West @ house b/w 21 st + 22 nd St on "U." |
| 3. | 1235 - Looking East @ house b/w 21 st + 20 th St on "U" |
| 4. | 1237 - Looking East down alley b/w 21 st / 20 th + "U"/"T" St. |
| 5. | 1240 - Looking East @ intersection of 21 st + U |
| 6. | 1246 - Inlet on SE corner of intersection of 20 th + U. |

Field Crew Initials (Circle one):

AS/HD

BB/JR

Attachment 4 – Field Investigation Photo Log



1136 – Looking south at intersection



1139 – Looking northeast at intersection



1140 – Looking north through intersection down 32nd Street



1141 – Looking west on "F" Street



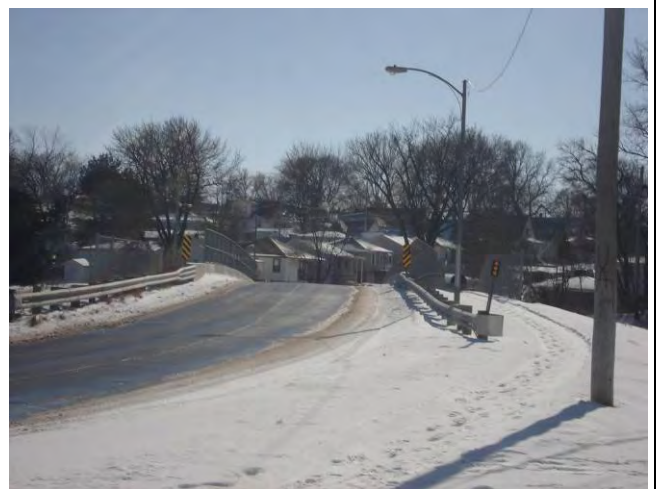
1145 – Looking east on "F" Street



1150 – Looking north from intersection down 32nd Street



1161 – Looking south down 39th Street



1167 – Looking southeast down 39th Street



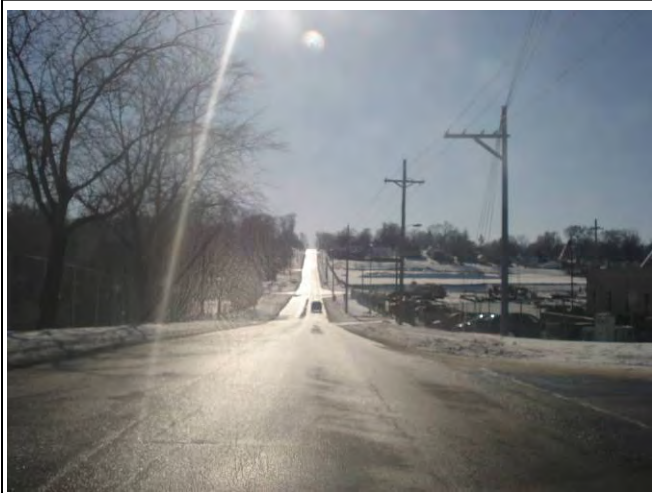
1170 – Looking at street inlet (free of debris)



1180 – Looking west down "P" Street at intersection with 39th Street



1187 – Looking south down 39th Street from "P" Street



1197 - Looking south down Edward Babe Street



1207 - Inlet located at intersection of Edward Babe and "X" Streets



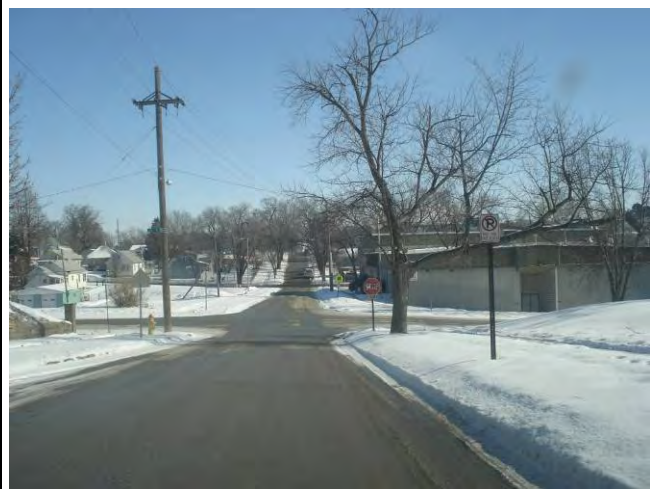
1213 - Looking north down Edward Babe from "X" Street



1201 - Looking east down "X" Street from Edward Babe Street



1217 - Looking west down "X" Street at intersection with Edward Babe Street



1230 – Looking east down “U” Street



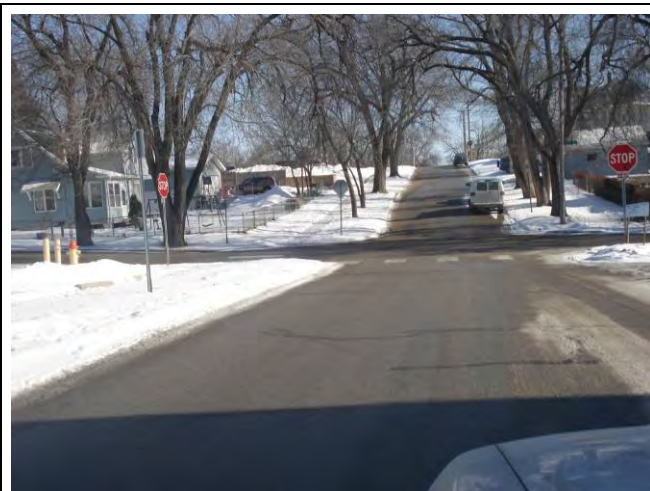
1234 – Looking south at house b/w 21st and 22nd Street on “U” Street



1235 – Looking north at house b/w 21st and 20th Street on “U” Street



Looking North down ally b/w 21st and 20th Street on “U” Street



1240 – Looking east at intersection of 20th and “U” Street



1246 – Inlet on southeast corner of intersection of 20th and U Street