

**ROUGE RIVER NATIONAL WET WEATHER DEMONSTRATION PROJECT
ROUGE RIVER GENERAL PERMIT PROJECTS
GRANT AGREEMENT
BETWEEN THE COUNTY OF WAYNE AND
THE CITY OF ROCHESTER HILLS**

THIS AGREEMENT is entered into this _____ day of _____, _____, between the County of Wayne, Michigan, a body corporate and Charter County ("County") and the City of Rochester Hills ("*Entity*").

RECITALS

WHEREAS, the County is the recipient of, and is responsible for the administration of certain federal grant funds referred to as the Rouge River National Wet Weather Demonstration Project Grant ("Grant").

WHEREAS, the United States Environmental Protection Agency ("USEPA") has established Grant conditions and regulations that require the County to act as the responsible party with respect to the Grant, including those provisions described within 40 CFR § 31.

WHEREAS, the USEPA will supervise the Grant and Grant conditions in order that the Grant be used in accordance with the requirements of the law.

WHEREAS, the parties have agreed to follow certain administrative procedures and cooperate on the various tasks to be undertaken in order for the County to comply with the Grant's requirements and objectives.

WHEREAS, the Rouge River National Wet Weather Demonstration Project ("Rouge Project") is a comprehensive watershed-wide program addressing wet weather pollution problems ranging from controlling combined sewer overflows ("CSO") to storm water runoff in the Rouge River.

WHEREAS, one of the purposes of the Grant is to enable the County and local units of government within the Rouge River Watershed to evaluate alternative approaches for controlling sources of water pollution.

WHEREAS, implementing the activities and projects for investigating and controlling CSOs and sanitary sewer overflows will further the Grant's goal to protect public health and improve water quality in the Rouge River.

WHEREAS, implementing the National Pollutant Discharge Elimination System (NPDES) Wastewater Discharge General Permit for Storm Water Discharges from Municipal Separate Storm Water Drainage Systems (MS4s) – Watershed General Permit (Permit No. MIG619000) or the NPDES Wastewater Discharge General Permit for Storm Water Discharges from MS4s –

Jurisdictional General Permit (Permit No. MIS049000) (“Storm Water General Permits”) issued by the Michigan Department of Environmental Quality (“MDEQ”) for the local unit will further the Grant’s goal to improve water quality and recreational use of the Rouge River.

WHEREAS, illicit discharge elimination, public education and subwatershed management plan implementation are considered examples of the types of activities included in the Storm Water General Permits which will assist in restoring the water quality of the Rouge River.

WHEREAS, the *Rochester Hills Rouge District Sanitary Sewer Rehabilitation Project* set forth in this Agreement would further the goals of the Grant.

NOW, THEREFORE, IN CONSIDERATION OF THE MUTUAL COVENANTS CONTAINED HEREIN, the parties hereby agree as follows:

**ARTICLE I
SCOPE OF PROJECT**

1.1 The County will provide a portion of the Grant to *Entity* to enable the *Entity* to do the activities described in Attachment “A.”

1.2 The budget presented in Attachment “A” along with the scope of work presented in Attachment “A” specify the performance of the work as anticipated at the time the contract is signed.

1.3 The *Entity* agrees to submit a Final Project Summary Report at the project end to assist the County in the grant close-out process. The Final Project Summary Report should generally include:

- A. A summarized clear description of the project. In addition to the project description, the report should include the following: project objectives; major elements of the project; project products completed (project products are listed in Attachment “A”); and project highlights.
- B. Comments on how the completion of this project benefited or is projected to improve the Rouge River.
- C. A written set of recommendations to other local governments and agencies that evaluates the benefits and cost effectiveness of the project. The evaluation should consider the total project cost. The recommendations should also summarize how the project was evaluated and the evaluation results of the effectiveness of the project.
- D. Comments on how the results of this project are transferable to other communities or agencies.
- E. List of all task products completed. The list should include the official name of the products.

**ARTICLE II
SCHEDULE OF WORK**

2.1 The time frame for completion of the project milestones is contained in Attachment “A.”

**ARTICLE III
FINANCIAL PROVISIONS AND BUDGET**

3.1 The detailed budget is contained in Attachment “A” and will be considered an approximation based on the best information available at the time of this Agreement. The internal distribution of the monies allocated among project elements may be modified by the *Entity* up to a total cumulative transfer among direct cost categories not to exceed 10% of the total budget without written approval by the County. Other modifications to the budget will be only upon written Agreement between the County and the *Entity*.

3.2 The County will provide funds from the Grant to partially fund the approved, allowed, and eligible costs for activities outlined in Attachment “A.” The total amount to be provided by the County from the Grant for this project shall not exceed \$36,240.00. The *Entity* shall provide a minimum match of \$54,360.00 or 60 percent of approved costs, which may be satisfied by demonstrating either cash or in-kind services from non-federal sources.

3.3 The County will hold the final 10 to 20 percent of the total federal funds allowable to the *Entity* until the completion of the project as identified in Attachment “A” by the *Entity*. Upon completion of all the tasks by the *Entity*, the approval of the *Entity*’s task products by the County, and the approval of the *Entity*’s submittal of the documentation of the final project cost by the County, the remaining 10 to 20 percent of the federal funds will be reimbursed to the *Entity*.

**ARTICLE IV
CONTRACT ADMINISTRATION AND PAYMENT**

4.1 This Agreement will be administered on a cost reimbursement basis. The *Entity* shall submit to the County project status reports and invoices on standard forms provided by the County.

4.2 All reports and invoices shall be submitted at least quarterly, no more than forty (40) days after each quarter end date. Reimbursements shall not be allowed without a status report submission.

4.3 Invoices must clearly identify:

- A. Total program outlays to the date of the invoice;
- B. The non-federal share of amount expended;
- C. The federal share of amount expended;
- D. The federal payments previously received;
- E. The reimbursements requested for the billing period;
- F. Project work element detail;
- G. Project direct costs and outside services;
- H. Time sheets for hourly employees and labor distribution sheets for salaried employees; and
- I. Documentation of all contractor costs.

4.4 The invoices must be certified for completeness and correctness by an appropriate *Entity* official.

4.5 All invoices will be paid by the County within thirty (30) days of receipt of funds from the USEPA.

4.6 The **Entity** will provide documentation to the County that demonstrates compliance with federal and state regulations before payments will be processed. The **Entity** will prepare all cost estimates for implementation of the planned activities, including a breakdown of eligible and ineligible cost items, with respect to grant funding. These cost estimates will be provided in a format to be established by the County.

4.7 The **Entity** will exercise the necessary contract oversight and administration of any subcontracts. These duties include, but are not limited to construction inspection and negotiating and executing change orders (where construction is to occur), monitoring project progress, responding to subcontractor or citizen complaints, coordinating between different subcontracts, and overseeing subcontractors' compliance with the approved project plans and specifications. These activities are to be done in accordance with procedures established by the Grant and by 40 CFR § 31.1, *et seq.*

4.8 All reports, invoices, and work products required under this Agreement will be transmitted to the Director of Water Quality Management Division, Department of Public Services, Wayne County, care of Mr. Razik Alsaigh, 400 Monroe Suite 400, Detroit, Michigan 48226.

ARTICLE V AUDIT AND ACCESS TO RECORDS

5.1 The **Entity** will maintain and retain financial records and supporting documentation in accordance with generally accepted accounting procedures and in accordance with the requirements of federal and state regulations.

5.2 The **Entity** will cooperate with and assist the County with respect to federal or state audit review related to the use of Grant funds. This cooperation shall include preservation of the necessary documentation and access to the records until federal and/or state audit resolution processes have been completed and notification of records disposal has been received by the County. The **Entity** will cooperate with the County with respect to evaluating audit findings of this Agreement.

5.3 The **Entity** will be responsible for the reimbursement of any funds required to be returned to the USEPA due to **Entity** actions or omissions, as determined by audit findings, and hold the County harmless from any repayment therefrom.

ARTICLE VI GENERAL PROVISIONS

6.1 This Agreement is expected to be funded in part with funds from the USEPA. The **Entity** will not enter into any agreements with either the United States or any of its departments, agencies, or employees, which are or will be a party to this Agreement or any lower tier sub-agreement for

monies related to this specific project. This Agreement is subject to regulations contained in 40 CFR. § 31 in effect on the date of the assistance award for this project.

6.2 The **Entity** understands that the County has no funds other than the Grant funds to pay for the project costs. All costs other than the Grant funds associated with the activities which are the subject matter of this Agreement will be the responsibility of the **Entity**.

6.3 The **Entity** will cooperate with the County to ensure timely completion of the tasks undertaken as part of the project. Cooperation includes, but is not limited to sharing information and records, participation in applicable committees, and assisting in development and evaluation of water quality improvement alternatives.

6.4 The **Entity** warrants that it will comply with the provisions of 40 CFR § 31 and, as applicable, all provisions contained in the Grant. In the event there are any conflicts between the provisions of this Agreement and the terms of the Grant, the Grant terms will prevail. The fair share goals for the Grant as identified in that letter are as follows:

3% Minority Business Enterprise (MBE) 5% Woman Business Enterprise (WBE)

6.5 The **Entity** is responsible for securing all necessary permits from regulatory agencies and is responsible for obtaining any professional services necessary for the project activities. The **Entity** will act at all times in accordance with applicable federal, state, and local regulations, and will secure any permits and negotiate the terms of agreements in accordance with those requirements.

6.6 If the **Entity** secures any interest in lands, including easements, these acquisitions will be in accordance with applicable federal law and regulations including 49 CFR § 24 and state statutes related to the taking of interests in land.

6.7 With respect to construction projects, the **Entity** is responsible for conducting post-project evaluation and certifying that any construction meets the approved design criteria. These certifications will be submitted to Wayne County and the USEPA and MDNRE, where appropriate, in accordance with the Grant requirements and applicable regulations. If the project does not meet the design criteria, the **Entity** will be responsible for taking the necessary corrective measures.

6.8 The ownership of any facilities and/or infrastructure constructed and/or improved under this Agreement will remain with the **Entity**. The **Entity** agrees to operate and maintain the facility and/or infrastructure constructed and/or improved under this Agreement consistent with the Grant project goals and in accordance with the Grant conditions and requirements of applicable federal, state, and local ordinances, statutes and regulations.

6.9 The **Entity** warrants that it will comply with the provisions of 40 CFR § 31.32 relating to any equipment including computers and peripheral computer equipment purchased as part of this Grant assistance project.

6.10 Any amendment to this Agreement must be in writing, and signed and acknowledged by a duly authorized representative of each party.

6.11 The **Entity** warrants that it will comply with the provisions of 40 CFR § 31.36(d) relating to procurement of services as part of this Grant assistance project. For construction contracts the **Entity** shall use bid type contracts. For consulting contracts, the **Entity** shall use any of the four procurement procedures in the 40 CFR § 31. For most of the consulting contracts, the RFQ or RFP procurement procedure is the applicable one. The selection of the consultant can be based on qualification or on qualification and cost proposal. Upon consultant selection, procurement documentation must be submitted to the County. The procurement documentation should include:

- a. Rationale for method of procurement;
- b. Copy of advertisement, where it was published and for how long;
- c. Number of proposals received;
- d. Description of selection process (e.g., pre-established criteria of qualification, cost, or both); and
- e. Selection of type of contract to be used.

6.12 The **Entity** warrants that it will comply with the provisions of 40 CFR § 31.36(f) relating to contract cost or price of services as part of this Grant assistance project. Price/cost analysis must be performed by the **Entity** prior to award of any type of contract. The selected contractor must submit a cost proposal to the **Entity**, with cost identified by task. The cost proposal should consist of the following categories:

- a. Direct labor (with backup that establish this cost (hours and personnel));
- b. Overhead (backup to establish this rate);
- c. Other Direct Expenses (backup to establish this item);
- d. Subconsultant;
- e. Subconsultant Administrative Charge (if applicable);
- f. Total; and
- g. Fee (Fixed for a fixed fee contract).

The cost analysis consists of the **Entity** determining the reasonableness of the selected contractor's proposed cost (i.e., is the allowable overhead rate used, are correct pay rates used for employees, are expense charges accurate). Price analysis consists of the **Entity** comparing proposed prices received with other proposals submitted for this job, an independent estimate from the **Entity's** experience or cost estimate from existing master plan. Copies of price/cost analysis documentation should be submitted to the County. After completing the price/cost analysis, any type of the contracts indicated below can be executed:

- a. Cost plus fixed fee contract;
- b. Fixed price (lump sum) contract;
- c. Catalog price contracts (e.g., geotechnical investigations where the price of the tests are established in the market); or
- d. For certain contracts where the above types are not applicable, the County will allow

contracts with proscribed billing rates (per diem contracts), which establishes pay rates for professional categories (e.g., Engineer I, Engineer II, Project Engineer, Field Technical Help, etc.).

These above types of contracts are applicable for the main contractor and for sub-contractors. “Cost plus a percentage of cost” and “percentage of construction cost” methods of contracting shall not be used.

ARTICLE VII WAIVER OF BREACH

7.1 No failure by a party to insist upon the strict performance of any term of this Agreement or to exercise any term after a breach, constitutes a waiver of any breach of the term. No waiver of any breach affects or alters this Agreement, but every term of this Agreement remains effective with respect to any other existing or subsequent breach.

ARTICLE VIII TERMINATION

8.1 This Agreement will terminate after the final audit and final resolution of any issues related thereto as described within 40 CFR §104.1, *et seq.*

8.2 This Agreement may be terminated in whole or in part in writing by the County for its convenience and/or if the **Entity** does not remain a Member in good standing (if eligible) or Cooperating Partner of the Alliance of Rouge Communities (ARC), for any reason for the duration of this Agreement. The **Entity** must be given: (1) not less than thirty (30) calendar days written notice of intent to terminate; and (2) an opportunity for consultation with the County prior to termination.

8.3 This Agreement may be terminated in whole or in part in writing by the **Entity** for its convenience. The County must be given: (1) not less than thirty (30) calendar days written notice of intent to terminate; and (2) an opportunity for consultation with the **Entity** prior to termination.

8.4 If termination is effected by the County or the **Entity**, an equitable adjustment in the Agreement price will be made. The equitable adjustment for any termination will provide for payment to the **Entity** for services rendered and expenses incurred prior to termination. Equitable adjustment also will include termination settlement costs reasonably incurred by the **Entity** and approved by the County, relating to personnel hired specifically for activities related to this Agreement, provided such costs are eligible and allowable under the terms of the Grant.

8.5 Upon receipt of a termination notice pursuant paragraphs 8.2 or 8.3, above, the **Entity** will: (1) promptly discontinue all services affected (unless the notice directs otherwise), and (2) deliver or otherwise make available to the County all data, drawings, specifications, reports, estimates, summaries, and such other information and materials as may be accumulated by the **Entity** in performing this Agreement, whether completed or in process.

8.6 Upon termination pursuant to paragraphs 8.2 or 8.3, above, the County may take over the work and prosecute the same to completion by Agreement with another party or otherwise.

8.7 All notices of termination will be sent certified mail, postage prepaid and return receipt requested as follows:

If to the County:

Attn.: Director, Water Quality Management Division
Wayne County Department of Public Services
400 Monroe Suite 400
Detroit Michigan 48226

If to the *Entity*:

Attn: Public Utilities Engineer
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, MI 48309

ARTICLE IX LIABILITY

9.1 All liability, loss, or damage as a result of claims, demands, costs, or judgments arising out of activities of the *Entity* will be the sole responsibility of the *Entity* and not the responsibility of the County. Nothing herein will be construed as a waiver of any governmental immunity by the *Entity*, its agencies, or employees have as provided by statute or modified by court decisions.

9.2 All liability, loss, or damage as a result of claims, demands, costs, or judgments arising out of activities of the County will be the sole responsibility of the County and not the responsibility of the *Entity*. Nothing herein will be construed as a waiver of any governmental immunity by the County, its agencies, or employees have as provided by statute or modified by court decisions.

9.3 The provisions of Article IX shall survive the expiration or any termination of this Agreement for a period of three (3) years.

ARTICLE X INSURANCE

10.1 The *Entity* or its contractors', at its expense, must maintain during the term of this Agreement the following insurance:

- A. Professional Liability/Errors and Omissions coverage with minimum limits of One Million Dollars (\$1,000,000.00) on a claims made basis and Two Million Dollars (\$2,000,000.00) aggregate with three year tail insurance coverage.

- B. Workers' Compensation Insurance which meets Michigan statutory requirements.
- C. Commercial General Liability Insurance with minimum limits of One Million Dollars (\$1,000,000.00) per occurrence and One Million Dollars (\$1,000,000.00) aggregate for bodily injury and property damage.
- D. Commercial Automobile Liability Insurance (including hired and non-owned vehicles) with minimum limits for bodily injury of One Million Dollars (\$1,000,000.00) per occurrence and with minimum limits for property damage of Five Hundred Thousand Dollars (\$500,000.00) per occurrence.

10.2 The insurance must be effected under valid and enforceable policies, issued by recognized, responsible Michigan insurers which are well-rated by national rating organizations. Commercial General Liability and Commercial Automobile Liability Insurance policies must name the County as an additional named insured. The additional insured coverage shall be primary, non-contributory coverage and must not be canceled or materially changed without at least thirty (30) days prior notice from the *Entity* to the County. The *Entity* must submit certificates evidencing the insurance to County prior to commencing project services, and at least thirty (30) days prior to the expiration dates of expiring policies.

ARTICLE XI NON-DISCRIMINATION

11.1 In connection with the performance of project services under this Agreement, the *Entity* must comply with:

- A. Titles VI and VII of the Civil Rights Act (42 U.S.C. §§ 2000d et. seq.) and the United States Department of Justice Regulations (28 C.F.R. Part 42) issued pursuant to those Titles.
- B. The Age Discrimination Act of 1985 (42 U.S.C. §6101-07).
- C. Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. §794).
- D. The Americans with Disabilities Act of 1990 (42 U.S.C. §12101 et. seq.) and its associated regulations.
- E. The Michigan Civil Rights Act (P.A. 1976 No. 453) and the Persons With Disabilities Civil Rights Act (P.A. 1976 No. 220).
- F. The anti-discrimination provisions of the Wayne County Code governing “Ethics in Public Contracting.”

11.2 *Entity* must notify any contractor of the obligations relative to non-discrimination under this Agreement when soliciting the contractor. *Entity* will include the provisions of this Article in any subcontract agreement.

11.3 The *Entity* is responsible for complying with all federal and state laws and regulations regarding competitive bidding.

**ARTICLE XII
ASSIGNABILITY**

12.1 This Agreement will be binding upon and inure to the benefit of the parties hereto and their respective heirs and assigns.

12.2 Neither of the parties hereto may assign this Agreement without the prior written consent of the other.

**ARTICLE XIII
VALIDITY**

13.1 If any provision of this Agreement or the application to any person or circumstance is, to any extent, judicially determined to be invalid or unenforceable, the remainder of the Agreement, or the application of the provision to persons or circumstances other than those as to which it is invalid or unenforceable, is not affected and is enforceable, provided the invalid provision does not substantially alter the Agreement or make execution impractical.

**ARTICLE XIV
ENTIRE AGREEMENT**

14.1 This document, including any attachments, contains the entire Agreement between the parties.

14.2 Neither party has made any representations except those expressly set forth herein.

14.3 No rights or remedies are, or will be acquired, by either party by implication or otherwise unless set forth herein.

**ARTICLE XV
PATENTS, COPYRIGHTS, AND RIGHTS IN DATA**

15.1 If this Agreement involves research, developmental, experimental, or demonstration work and any discovery or invention arises or is developed in the course of, or under this Agreement, the *Entity* and the County shall retain joint authority to patent or license.

15.2 The parties agree that any plans, drawings, specifications, computer programs, technical reports, operating manuals, and other work submitted, or which are specified to be delivered under this Agreement, or which are developed or produced and paid for under this Agreement are subject to the rights of both parties and both parties shall retain an irrevocable license to reproduce, publish and

use in whole or in part and to authorize others to do so.

15.3 This Agreement is funded in part by the USEPA and is therefore subject to the reporting and rights provisions of 40 CFR § 30 Subpart D including Appendix B and Appendix C.

15.4 This clause shall be included in all subcontracts.

**ARTICLE XVI
JURISDICTION AND GOVERNING LAW**

16.1 This Agreement, and all actions arising from it, must be governed by, subject to, and construed according to the law of the State of Michigan.

**ARTICLE XVII
EFFECTIVE DATES**

17.1 This Agreement becomes effective and shall allow for billing of costs incurred immediately upon signing by both parties. This Agreement, unless extended by mutual written agreement, expires on January 30, 2014. Should the USEPA require reimbursement by the County of funds transferred to the *Entity* for costs incurred prior to this Agreement, the *Entity* shall be responsible for any such reimbursement.

17.2 This Agreement may be executed in counterparts, each of which will be deemed an original but all of which together will constitute one Agreement.

**ARTICLE XVIII
PARTY REPRESENTATIVES**

18.1 The County's representative for this Agreement is the Director of Water Quality Management Division, Department of Public Services, Wayne County. The *Entity* representative for this Agreement is the Public Utilities Engineer for the City of Rochester hills. Either party may assign alternate representatives upon written notification of the other party.

IN WITNESS WHEREOF, the parties have caused this Agreement to be signed on the date first above written.

COUNTY OF WAYNE, MICHIGAN

CITY OF ROCHESTER HILLS,
MICHIGAN

By: _____
ROBERT A. FICANO

Its: Wayne County Executive

By: _____

Its: _____

ATTACHMENT “A”

Rouge River National Wet Weather Demonstration Project Round XI, Part A Funding

City of Rochester Hills Rochester Hills Rouge District Sanitary Sewer Rehabilitation Project (Subgrant RXIA-07)

Project Scope

The City of Rochester Hills operates separated storm drain and sanitary sewer systems. The sanitary sewer system in the southwest corner of the City of Rochester Hills is located in the Rouge Main 1-2 subwatershed (see location map provided in Appendix A). In 2010 Rochester Hills obtained a Round X Part A grant from the Rouge River National Wet Weather Demonstration Project to undertake an inflow and infiltration study for this area. The study was completed in 2011 and the report identified needed rehabilitation work. This Round XI subgrant will provide funding for Rochester Hills to implement the sewer rehabilitation work in the City’s Rouge District as identified in the Round X Final Report. This rehabilitation work will help prevent sanitary sewer overflows (SSOs) to the Rouge River and sewer backups into basements.

Task Description

- Task #1:** Prepare scope of work and construction bid documents to contract the sanitary sewer system improvements. The rehabilitation improvements are identified in the Round X Final Report (attached as Appendix B here) and shown on project area map (attached as Appendix B here).
- Task #2:** Contractor to remove sources of infiltration in the sanitary sewer system per the construction contract documents.
- Task #3:** Contractor to correct property owners plumbing defects, and repair other infiltration defects identified in the smoke tested area as shown on the map presented in Appendix C.
- Task #4:** Submit Final Report with documentation for project closeout.

Project Schedule

| Task Number & Description | Anticipated Start Date | Anticipated Completion Date |
|---|-------------------------------|------------------------------------|
| #1 – Prepare Contract Documents & Award | January 2013 | July 2013 |
| #2 – Sewer Rehab in TV Inspected area | August 2013 | November 2013 |
| #3 – Sewer Rehab in Smoke Tested area | August 2013 | November 2013 |
| #4 – Final Report | January 2014 | January 2014 |

Project Cost

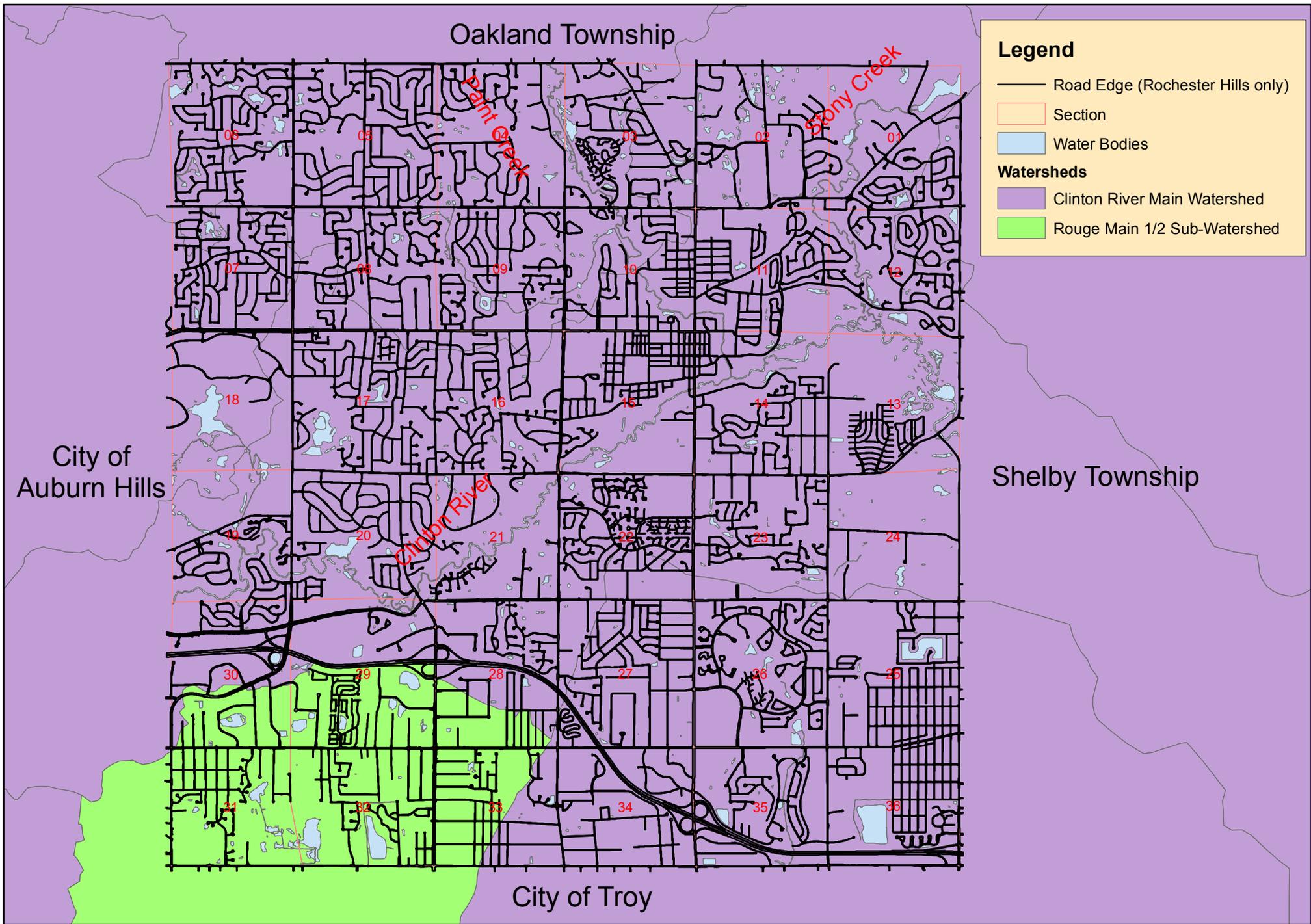
Project Cost Summary Table

| Task Number & Description | Total Cost per Task |
|--|----------------------------|
| #1 – Prepare Contract Documents & Award | In-house |
| #2 – Sewer Rehabilitation in TV Inspected area | \$84,000 |
| #3 – Sewer Rehabilitation in Smoke Tested area | \$6,600 |
| #4 – Final Report | In-house |
| TOTAL PROJECT COST | \$90,600 |

Maximum federal grant funding under this Agreement = \$36,240.00

Federal Grant Funding Percentage = 40%

Construction contractor costs for sewer rehabilitation are the only costs eligible for Rouge Project grant funding under the interagency agreement for this project



City of Rochester Hills
 Rouge District Sanitary Sewer Rehabilitation Project - Location Map

APPENDIX B

Rehab Work Report (*excerpts from November 30, 2011 Round X Final Report*):

DEVELOPMENT OF REHABILITATION PROGRAM

Review Inspection Reports

A spreadsheet listing the smoke testing results is included in the Attachments at the end of this report. A total of twenty one locations with I/I issues were discovered. A sump pump cross-connection was found at one home. Another homeowner replaced the cleanout cap on his sanitary lead with a grate cover to drain a large and relatively flat area (approximately 100 feet x 130 feet) of his front yard that would pond water by his driveway after rain events or snow melts. Other than that, the only problems were broken or missing sanitary lead cleanout caps at or near grade level (12 locations), or through manhole cover bolt holes (seven locations). Most of the manhole covers missing bolts are located in pavement. A new manhole installed for a school addition last Summer also had a below grade leak where smoke escaped through to the surface. Many sump pump cross-connections were expected in this area. One possible explanation for why they were not found is that there are a lot of older homes in this area that were built before Building Code and City Ordinance prohibited discharge of storm water and footing drains into sanitary sewers. These older homes may have footing drains tied directly into the sanitary leads that could not be detected by smoke testing.

Of the 193 manholes inspected in the NW Flow Meter Zone as part of this study, 48 were found to have defects, which is 25% of the total inspected. Eight more manholes with infiltration defects were detected by the TV inspection of the sanitary sewer lines. These combined 56 manholes account for 8% of the sanitary manholes located within the Rouge Main 1 / 2 Sub-Watershed. The inspection results are entered into a work management database (Lucity) which also calculates a leakage rate. The total inflow rate for these 56 manhole structures is calculated at 9.7 gpm during rain events, and the total infiltration rate is calculated at 6.1 gpm. A steady infiltration rate of 6.1 gpm will add up to 8,784 gallons per day, or 263,500 gallons per month. A list of these manhole locations, with types of defects found, and estimated leakage rate for each structure is included in the Attachments. Manhole inspections completed in the NW Flow Meter Zone in recent years prior to this grant project are as follows: eight inspections done in 2010 with no I/I defects found, 109 inspections done in 2009 with nine I/I defects found with a total infiltration rate of 1.4 gpm calculated (equivalent to 2,016 gpd), and three inspections done in 2008 with one I/I defect found (inflow calculated at 0.6 gpm).

The TV inspection of the sanitary sewer laterals in the NW Flow Meter Zone found 100 defects with infiltration, 11 locations with tree roots entering the sanitary sewer, and 19 locations with pipe sags. Some of these defects are in manholes, and were not picked up by the manhole inspections conducted from the ground surface. A detailed listing of these defects is included in the Attachments. Infiltration is rated by severity as either a weeper (slowest rate), dripper, runner, or gusher (highest rate). The defects are further ranked for repair as either High,

Medium, or Low Priority. Fourteen of the 100 infiltration sites are ranked as High repair priority, 44 are Medium repair priority, and 42 are Low repair priority. It should be noted here that two of the infiltration locations listed as High repair priority were repaired on October 11, 2011, after the TV inspection was conducted. They were part of the City's 2011 Sanitary Sewer Rehabilitation Project #E10-008, and were not part of this grant project. They were located at Repair Site 4B shown on Figure 19 in this report. Roots in the sanitary sewer pipe indicate infiltration locations, and could become line blockage points backing sewer flow up into basements and possibly even a surface overflow. Four tree root locations are ranked as High repair priority, one is Medium repair priority, and six are Low repair priority. The pipe sag locations could have solids building up in these low points that could eventually become line blockages. Twelve of these sag locations are ranked as Medium repair priority, and seven are Low repair priority.

Prepare Repair and Rehabilitation Plan

The City DPS Department will correct the manhole covers missing bolts. The Engineering Services Department will request Homeowners and business to cooperate by correcting the plumbing defects on their private property. Ordinance enforcement action can be implemented if they choose not cooperate. The preliminary cost estimate to repair the five public manholes in the East Zone is \$2,500, and the preliminary cost estimate to repair the 16 private localized sites in the East Zone is \$4,100.

A preliminary cost estimate was prepared for the rehabilitation plan, assuming the use of a private contractor to do the repair work identified by the field inspections that were part of this Study. These were the street-level manhole inspections and pipe lateral TV inspections performed in the NW Flow Meter Zone described earlier in this report. The manholes needing rehabilitation repairs are listed on a spreadsheet, and included in the Attachments. They are all included in the rehabilitation plan repair cost estimate. The TV inspection results are also listed on three spreadsheets included in the Attachments. They are listed for three separate categories: pipe with infiltration, pipe with roots (entering through cracks), and pipe sags. They are broken down further into high, medium, and low repair priority. Pipe sags are not included in the rehabilitation plan as further investigation is needed to determine if there are maintenance issues with them, or they are operating satisfactorily (i.e. have self-cleaning flow velocities through them). The preliminary cost estimate for the rehabilitation plan includes high and medium priority pipe locations with infiltration, and high and medium pipe locations with roots present.

The preliminary cost estimate for the rehabilitation plan, using a private contractor, is \$84,000. This plan is for making repairs to inflow and infiltration sources in sanitary manholes and pipe laterals located in the NW Zone of the Study Area. Spreadsheets with the cost estimate detail is included in the Attachments at the end of this report.

Attachments (*excerpts from November 30, 2011 Round X Final Report*):

Results of Sanitary Sewer Smoke Testing

(Smoke testing performed in field August 23 through September 8, 2011)

| Location | Defect | Repair Cost | |
|------------------------------------|--|---------------|-------------------|
| | | Public | Private |
| 1859 Alsdorf | Homeowner replaced lead cleanout cap with grate along edge of driveway to drain ponding area. This cleanout (3"-4" diameter) is by the east edge of HMA driveway 65' south of road pavement. | | \$200.00 |
| 1939 Alsdorf | Loose lead cleanout cap in flower bed 2' north and 15' west of NE corner of house. | | \$200.00 |
| 1865 June | Missing lead cleanout cap on west side of house. | | \$200.00 |
| 1890 June | Leak from lead cleanout cap below grade 5' west and 7' south of SW house corner. | | \$200.00 |
| 1864 Tamm | Broken lead cleanout cap at NE (rear) corner of house under edge of deck. | | \$200.00 |
| 1784 Tamm | Broken lead cleanout at SW (front) corner of house near gutter downspout. | | \$200.00 |
| 3030 Crooks | Lead cleanout cap sheared off at grade 5' west of pathway and 20' north of south lot line. | | \$200.00 |
| SMH15331653 (by 3253 Fantail) | Smoke exit MH cover bolt holes. Manhole located in greenbelt (lawn). | \$500.00 | |
| SMH15331634 (at 3292 Gilsam Ct) | Smoke exit MH bolt holes in concrete driveway. | \$500.00 | |
| SMH15331638 (by 3265 Davenport Ln) | Smoke exit MH bolt holes, MH located in greenbelt and sidewalk. | \$500.00 | |
| 3574 Alida | Lead cleanout cap sheared off on north side of house near lot line. | | \$200.00 |
| SMH15333643 (by 3946 Alida) | Smoke exit MH bolt holes. Manhole located in paved road (HMA). | \$500.00 | |
| 1905 Ruby | Lead cleanout cap is off by smaller west house (a 2-house lot). | | \$200.00 |
| 1860 Ruby | Missing lead cleanout cap (lead rises 2" above grade). | | \$200.00 |
| 3848 Samuel | Broken cleanout at grade on south side of house by fence. | | \$200.00 |
| SMH15333636 (by 3883 Samuel) | Leak around manhole cover. Manhole located in paved road (HMA). | \$500.00 | |
| SMH15332501 (at 1445 W Auburn) | Cracked adjustment ring (above grade) on MH at SE corner of school detention pond (lawn). | \$500.00 | |
| "MH1" (City File 04-012.2)(same) | Underground leak from cone section of new MH installed (in lawn) this summer for school additions. | \$500.00 | |
| 1468 Ruby | Sump lead cross-connection. | | \$200.00 |
| 3674 Mildred | Two broken lead cleanout caps (6" to 12" above grade) under fake rocks on north side of house. | | \$200.00 |
| 3742 Mildred | Two open 1-1/2" PVC pipes at grade against foundation at rear of house. | | \$200.00 |
| | | Total: | \$4,100.00 |

| | | | |
|--------------|---------------------------|----------|------|
| Assumptions: | Manhole (MH) Repair - | \$500.00 | Each |
| | Cleanout Cap Repair - | \$200.00 | Each |
| | Remove Cross-Connection - | \$500.00 | Each |

I:\Eng\Publ\E10022 Rouge District Sanitary Sewer Evaluation Study\Smoke Testing Results.xls

Rouge District Sanitary Sewer Evaluation Study (E10-022)

Results of Manhole Inspections in NW Flow Meter Zone

193 Manhole inspections were completed in 2011. 56 Manholes with inflow or infiltration defects.

Note: * = Added to manhole repair list from TV inspections.

| MH ID Number | Nearest Address | Calculated GPM | | Type of Defect |
|---------------|------------------------|----------------|--------------|--|
| | | Inflow | Infiltration | |
| SMH15312635 | 3063 Martell Ave | 0.0 | 0.2 | Infiltration in wall |
| SMH15311623 | 3401 Eastwood Dr | 0.0 | 0.1 | Infiltration at trough |
| SMH15321635 | 3083 Honor Dr | 0.2 | 0.0 | Inflow at grade adjustment |
| SMH15312632 | * 3189 Martell Ave | 0.0 | 0.6 | Manhole filled with roots |
| SMH15321622 | * 3086 Rockhaven Ave | 0.0 | 0.2 | Infiltration in wall at steps (weeper) |
| SMH15321646 | * 2564 Florence Dr | 0.0 | 0.2 | Infiltration in wall (minor) |
| SMH15321637 | * 3009 Richmond Dr | 0.0 | 0.6 | Infiltration in wall at bottom (runner) |
| SMH15321640 | * (none) | 0.0 | 0.4 | Infiltration in wall at pipe - 2 locations (dripper) |
| SMH15311620 | * 3305 Eastwood Dr | 0.0 | 0.2 | Infiltration in wall at bottom |
| SMH15312625 | * 3210 Willet Ave | 0.0 | 0.2 | Infiltration in wall at bottom |
| SMH15303614 | * 2831 York | 0.0 | 0.2 | Infiltration in wall (minor) |
| SMH15321656 | 3317 Empire Dr | 0.2 | 0.2 | Infiltration at casting, pipe covered with iron |
| SMH15312658 | 3087 Fairgrove Ter | 0.2 | 0.0 | Inflow at grade adjustment |
| SMH15312661 | 3087 Fairgrove Ter | 0.4 | 0.0 | Inflow at grade adjustment |
| SMH15312665 | 3087 Fairgrove Ter | 0.4 | 0.0 | Inflow at grade adjustment |
| SMH15303601 | 2998 Waterview Dr | 0.2 | 0.0 | Inflow at grade adjustment |
| SMH15304612 | 2965 Technology Dr | 0.2 | 0.0 | Inflow at grade adjustment |
| SMH15304613 | 2965 Technology Dr | 0.2 | 0.0 | Inflow at grade adjustment |
| SMH15304616 | 2993 Technology Dr | 0.2 | 0.0 | Inflow at grade adjustment |
| SMH15304617 | 2993 Technology Dr | 0.2 | 0.0 | Inflow at grade adjustment |
| SMH15312669 | 3087 Fairgrove Ter | 0.2 | 0.0 | Inflow at grade adjustment |
| SMH15313662 | 3617 S Adams Rd | 0.2 | 0.0 | Inflow and infiltration at grade adjustment |
| SMH15313663 | 3617 S Adams Rd | 0.4 | 0.0 | Inflow and infiltration at grade adjustment |
| SMH15321647 | 2516 Florence Dr | 0.2 | 0.0 | Inflow at broken grade adjustment |
| SMH15321645 | 3081 Florence Ct | 0.2 | 0.0 | Inflow at broken grade adjustment |
| SMH15321639 | 3033 Richmond Dr | 0.4 | 0.0 | Inflow and roots at grade adjustment |
| SMH15313668 | 3617 S Adams Rd | 0.2 | 0.0 | Inflow and roots at grade adjustment |
| SMH15323606 | 3424 Rockhaven | 0.4 | 0.0 | Inflow and roots at grade adjustment, raise 3" |
| SMH15321644 | 3073 Florence Ct | 1.0 | 0.0 | Inflow between cone and grade adjustment |
| SMH15321632 | 2547 Brilliance | 0.1 | 0.0 | Inflow at broken casting |
| SMH15321660 | 2548 Empire Ct | 0.1 | 0.0 | Inflow from broken casting and frame |
| SMH15321653 | (none) | 0.1 | 0.0 | Inflow from casting, broken frame |
| SMH15293640 | 2930 W Auburn Rd | 0.2 | 0.2 | Infiltration in wall and inflow at grade adjustment |
| SMH15312639 | 3395 W Auburn Rd | 0.2 | 0.2 | Infiltration in wall and inflow at grade adjustment |
| SMH15303618 | 2827 Saint Clair Dr | 0.3 | 0.0 | Infiltration at cone |
| SMH15321657 | 3293 Empire Dr | 0.0 | 0.4 | Infiltration at wall |
| SMH15323603 | 2526 Golf Crest Dr | 0.0 | 0.2 | Infiltration at wall |
| SMH15321655 | 3341 Empire Dr | 0.0 | 0.4 | Infiltration at wall |
| SMH15323605 | 3542 Walnut Brook | 0.0 | 0.6 | Infiltration between bench and wall |
| SMH15311617 | 3351 Greenwood Dr | 0.6 | 0.4 | Offset 3" with inflow |
| SMH15303611 | 3600 W Auburn Rd | 0.1 | 0.0 | Offset 4" with inflow at casting |
| SMH15303613 | 2864 York Rd | 0.1 | 0.4 | Offset 2" and wall inflow |
| SMH15311648 | 3254 Avalon Rd | 0.1 | 0.0 | Offset 3" |
| SMH15311646 | 3057 Avalon Rd | 0.1 | 0.0 | Offset 3" |
| SMH15311637 | (none) | 0.2 | 0.0 | Offset 4" |
| SMH15321611 | 2525 W Auburn Rd | 0.2 | 0.0 | Raise rim 12" |
| SMH15312629 | 3232 Willet Ave | 0.2 | 0.0 | Raise rim 7" |
| SMH15323601 | 3543 Cedar Brook Dr | 0.2 | 0.0 | Raise rim 4" |
| SMH15311682 | 3930 Dunning Rd | 0.2 | 0.0 | Raise rim 4" |
| SMH15311675 | 3862 Beechcrest | 0.2 | 0.0 | Raise rim 4" |
| SMH15311661 | 3098 York | 0.2 | 0.0 | Cracked adjustment ring |
| SMH15322624 | 3055 Devondale | 0.2 | 0.0 | Blown rubber gasket |
| SMH15324604 | 3845 Winding Brook Cir | 0.2 | 0.0 | Blown rubber gasket |
| SMH15324606 | 2477 Winding Brook Ct | 0.3 | 0.0 | Frame Broken, blown rubber gasket |
| SMH15321626 | (none) | 0.0 | 0.1 | Obstruction in channel |
| SMH15321623 | 3043 Bathurst Ave | 0.0 | 0.1 | Obstruction in channel |
| Total: | | 9.7 | 6.1 | GPM |

Rouge District Sanitary Sewer Evaluation Study (E10-022)

Results of TV Inspections in NW Flow Meter Zone

Fifty-five sewer pipe segments with infiltration defects.

| | |
|----------------|---------------------------------------|
| Severity Code: | #1 = Immediate repair (High priority) |
| | #2 = Repair soon (Medium priority) |
| | #3 = Future repair (Low priority) |

| U/S MH ID# | D/S MH ID# | Address | Calculated GPM | Infiltration | Type of Defect | Note: One defect per pipe segment unless otherwise noted. |
|-------------|-------------|------------------------|----------------|-------------------|--|---|
| SMH15312615 | SMH15312614 | 2955 W Auburn Rd | | Repaired 10/11/11 | Infiltration (gusher) - #1, and Infiltration (runner) - #1 | |
| SMH15321653 | SMH15321652 | 2479 Jackson Dr | | N.A. | Infiltration (gusher) in MH #653 at pipe bottom - #1 | |
| SMH15321609 | SMH15321637 | 3009 Richmond Dr | | N.A. | Infiltration (runner) in MH #637 - #1 | |
| SMH15321604 | SMH15321603 | 3359 Rockhaven Ave | | N.A. | Infiltration (runner) at lead - #1 | |
| SMH15321641 | SMH15321640 | 3038 Richmond Dr | | N.A. | Infiltration (runner) - #1, & 2 cracks with encrustation | |
| SMH15321622 | SMH15321620 | 3267 Bathurst Ave | | N.A. | Infiltration (multiple) - #1, 1 lead constant water - #2, 2 joints offset - #3, 1 joint encrustation | |
| SMH15312608 | SMH15312606 | 3295 Coolidge Hwy | | N.A. | Infiltration (at lead - hole in bottom of cut) - #1 | |
| SMH15304610 | SMH15304611 | 2965 Technology Dr | | N.A. | Infiltration (at lead) - #1 | |
| SMH15322609 | SMH15323608 | 2515 Elm Brook Ct | | N.A. | Crack/longitudinal (dripper) - #1 | |
| SMH15323613 | SMH15323612 | 3676 Cedar Brook Dr | | N.A. | Crack/longitudinal (2' long) - #1 | |
| SMH15321628 | SMH15321627 | 2943 W Auburn Rd | | N.A. | Crack/longitudinal (2' long) - #1 | |
| SMH15311648 | SMH15311642 | 3251 Avalon Rd | | N.A. | Broken pipe (void visible) - #1, sag (water level 25-30%) - #3 | |
| SMH15312609 | SMH15312608 | 3366 Willet Ave | | N.A. | Broken pipe - #1, and an offset joint - #2 | |
| SMH15303618 | SMH15303617 | 2881 Saint Claire Dr | | N.A. | Infiltration (dripper) - #2 | |
| SMH15321657 | SMH15321656 | 3317 Empire Dr | | N.A. | Infiltration (dripper) with encrustation at 2 locations - #2 | |
| SMH15321620 | SMH15321615 | 3341 Bathurst Ave | | N.A. | Infiltration (dripper) with encrustation - #2 | |
| SMH15312625 | SMH15312622 | 3185 Willet Ave | | N.A. | Infiltration (dripper) with encrustation - #2 | |
| SMH15304611 | SMH15304612 | 2965 Technology Dr | | N.A. | Infiltration (dripper at lead with mineral obstruction) - #2 | |
| SMH15321607 | SMH15321640 | 3060 Rockhaven Ave | | N.A. | Infiltration (dripper) - 2 locations at MH #640 - #2 | |
| SMH15321616 | SMH15321615 | 3341 Bathurst Ave | | N.A. | Joint/offset (open with medium infiltration) - #2 | |
| SMH15321623 | SMH15321622 | 3086 Rockhaven Ave | | N.A. | Infiltration (weeper) at MH steps - #2, & 2 encrusted pipe joints - #3 | |
| SMH15311609 | SMH15311608 | 3600 W Auburn Rd | | N.A. | Infiltration (weeper) at 2 locations - #2 | |
| SMH1532656 | SMH15321655 | 3341 Empire Dr | | N.A. | Infiltration in pipe (1 location) - #2 & steps of MH #656 - #2 | |
| SMH15322623 | SMH15322622 | 3177 Devondale Rd | | N.A. | Infiltration at crack - #2, & at open joint - #2, and encrusted joint - #3 | |
| SMH15311673 | SMH15311669 | 3798 Beechcrest | | N.A. | Open Joints at 11 locations - #2 | |
| SMH15311674 | SMH15311673 | 3814 Beechcrest | | N.A. | Open Joints at 8 locations - #2 | |
| SMH15311670 | SMH15311669 | 3798 Beechcrest | | N.A. | Open Joints at 2 locations - #2 | |
| SMH15311676 | SMH15311675 | 3862 Beechcrest | | N.A. | Open Joints at 2 locations - #2 | |
| SMH15311677 | SMH15311676 | (none) | | N.A. | Open Joints at 2 locations - #2 | |
| SMH15311627 | SMH15311626 | 3471 Dunning Rd | | N.A. | Crack (spiral) in pipe end at MH #626 - #2 | |
| SMH15321618 | SMH15321617 | 3385 Bathurst Ave | | N.A. | Lining failure (small) - #2 | |
| SMH15304617 | SMH15304618 | 2993 Technology Dr | | N.A. | Infiltration (dripper) at 2 locations - #3 | |
| SMH15304616 | SMH15304617 | 2993 Technology Dr | | N.A. | Infiltration (dripper) at 2 locations - #3 | |
| SMH15322621 | SMH15322620 | 3305 Devondale Rd | | N.A. | Infiltration (dripper) - #3, and deformed pipe in 2 locations | |
| SMH15321635 | SMH15321634 | 2493 Brilliance | | N.A. | Infiltration (dripper) - #3 | |
| SMH15312617 | SMH15312616 | 3105 W Auburn Rd | | N.A. | Infiltration (dripper) - #3 | |
| SMH15304615 | SMH15304616 | 2993 Technology Dr | | N.A. | Infiltration (dripper) - #3 | |
| SMH15303614 | SMH15303613 | 2864 York Rd | | N.A. | Infiltration (dripper) at 1 location with roots - #3 | |
| SMH15323605 | SMH15323604 | 2555 Golf Crest Dr | | N.A. | Infiltration (weeper) at lead - #3 | |
| SMH15311622 | SMH15311620 | 3305 Eastwood Dr | | N.A. | Infiltration (weeper) in MH #620 - #3 | |
| SMH15323604 | SMH15323603 | 2526 Golf Crest Dr | | N.A. | Infiltration/encrustation (minor) at 2 locations - #3 | |
| SMH15322619 | SMH15324604 | 3845 Winding Brook Cir | | N.A. | Infiltration/encrustation (minor) at 2 locations - #3 | |
| SMH15321637 | SMH15321608 | 3010 Rockhaven Ave | | N.A. | Infiltration/encrustation (minor) at 2 locations - #3 | |
| SMH15321610 | SMH15321609 | 3009 Richmond Dr | | N.A. | Infiltration/encrustation (minor) at 2 locations - #3 | |
| SMH15311614 | SMH15311615 | 3214 Greenwood Dr | | N.A. | Infiltration/encrustation (minor at joint) - #3 | |
| SMH15321603 | SMH15321602 | 3407 Rockhaven Ave | | N.A. | Infiltration/encrustation (minor) - #3 | |
| SMH15312619 | SMH15312616 | 3105 W Auburn Rd | | N.A. | Infiltration (minor) - #3 | |
| SMH15312624 | SMH15312623 | 3185 Willet Ave | | N.A. | Infiltration (minor) - #3 | |
| SMH15312626 | SMH15312625 | 3210 Willet Ave | | N.A. | Infiltration (minor) in wall of MH #625 - #3 | |
| SMH15321647 | SMH15321646 | 2564 Florence Dr | | N.A. | Infiltration (minor) at MH #646 - #3 | |
| SMH15303615 | SMH15303614 | 2831 York Rd | | N.A. | Infiltration in wall of MH #614 - #3 | |
| SMH15321630 | SMH15321629 | 3286 Rockhaven Ave | | N.A. | Joint/offset - #3, & open joint with minor infiltration | |
| SMH15304625 | SMH15304624 | 2691 Leach Rd | | N.A. | Broken pipe end at MH #624 (no sign of dirt or infiltration) - #3 | |
| SMH15311628 | SMH15311616 | 3311 Greenwood Dr | | N.A. | Broken pipe end at MH #616 (no sign of dirt or infiltration) - #3 | |
| SMH15311617 | SMH15311616 | 3311 Greenwood Dr | | N.A. | Broken pipe end at MH #616 (no sign of dirt or infiltration) - #3 | |
| | | | Total: | 0.0 | GPM | |

N.A. = data calculations not available

I:\Eng\Publ\E10022 Rouge District Sanitary Sewer Evaluation Study\TV Inspections\Sewer Line Infiltration Repair List.xls

Rouge District Sanitary Sewer Evaluation Study (E10-022)

Results of TV Inspections in NW Flow Meter Zone

Eight sewer pipe segments with roots or obstructions defects.

| | |
|----------------|---------------------------------------|
| Severity Code: | #1 = Immediate repair (High priority) |
| | #2 = Repair soon (Medium priority) |
| | #3 = Future repair (Low priority) |

| U/S MH ID# | D/S MH ID# | Address | Calculated GPM Infiltration | Type of Defect | Note: One defect per pipe segment unless otherwise noted. |
|---------------|-------------|---------------------|--------------------------------|--|---|
| SMH15312632 | SMH15312631 | 3262 Martell Ave | N.A. | Root ball at 1 joint - #1 | |
| SMH15312610 | SMH15312609 | 3366 Willet Ave | N.A. | Root ball (obstruction to camera) at 1 joint - #1 | |
| SMH15312633 | SMH15312632 | 3189 Martell Ave | N.A. | Root ball at 1 joint & MH #632 (water backing up) - #1 | |
| SMH15311639 | SMH15311638 | 3088 Saint Clair Dr | N.A. | Root ball (obstruction to camera) at 1 joint - #2 | |
| SMH15312619 | SMH15312616 | 3105 W Auburn Rd | N.A. | Roots (fine, minimal) at 1 joint - #3 | |
| SMH15303613 | SMH15303612 | 2932 York Rd | N.A. | Roots (fine) at 2 locations - #3 | |
| SMH15303614 | SMH15303613 | 2864 York Rd | N.A. | Roots (fine) at 1 joint & MH #613 (infiltration) - #3 | |
| SMH15303622 | SMH15303621 | 2900 Avalon Rd | N.A. | Roots (fine, minimal) at 1 joint - #3 | |
| Total: | | | 0.0 | GPM | |

N.A. = data calculations not available

I:\Eng\Publ\E10022 Rouge District Sanitary Sewer Evaluation Study\TV Inspections\Sewer Line Infiltration Repair List.xls

Rouge District Sanitary Sewer Evaluation Study (E10-022)

Total Preliminary Cost Estimate for Rehabilitation of Manholes & Pipe Inspected in NW Flow Meter Zone in 2011

| <u>Item</u> | <u>Cost</u> |
|--------------------------------|---------------------------|
| Manhole Repairs | \$31,850.00 |
| Pipe Infiltration Repairs | \$33,350.00 |
| Pipe Root Repairs | \$1,577.50 |
| Insurance, Bonds, Mobilization | \$2,000.00 |
| Traffic Control & Maintenance | \$4,000.00 |
| Sut-Total | <u>\$72,777.50</u> |
| Contingency (15%) | \$10,916.63 |
| Total | <u>\$83,694.13</u> |

Source is City Project #E10-008
 Source is City Project #E10-008

Rouge District Sanitary Sewer Evaluation Study (E10-022)

Preliminary Cost Estimate for Rehabilitation of Manholes Inspected in NW Flow Meter Zone in 2011

| MH ID Number | Nearest Address | MH in Pavement | Type of Defect | Manhole | Pavement |
|--------------|------------------------|----------------|---|---------------|---|
| | | | | Cost | Cost |
| SMH15312635 | 3063 Martell Ave | Yes | Infiltration in wall | \$500.00 | \$350.00 |
| SMH15311623 | 3401 Eastwood Dr | No | Infiltration at trough | \$500.00 | \$0.00 |
| SMH15321635 | 3083 Honor Dr | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15312632 | 3189 Martell Ave | Yes | Manhole filled with roots | \$500.00 | \$350.00 |
| SMH15321622 | 3086 Rockhaven Ave | No | Infiltration in wall at steps | \$500.00 | \$0.00 |
| SMH15321646 | 2564 Florence Dr | No | Infiltration in wall | \$500.00 | \$0.00 |
| SMH15321637 | 3009 Richmond Dr | Yes | Infiltration in wall at bottom | \$500.00 | \$350.00 |
| SMH15321640 | (none) | No | Infiltration in wall at pipe - 2 locations | \$500.00 | \$0.00 |
| SMH15311620 | 3305 Eastwood Dr | No | Infiltration in wall at bottom | \$500.00 | \$0.00 |
| SMH15312625 | 3210 Willet Ave | No | Infiltration in wall at bottom | \$500.00 | \$0.00 |
| SMH15303614 | 2831 York | No | Infiltration in wall | \$500.00 | \$0.00 |
| SMH15321656 | 3317 Empire Dr | No | Infiltration at casting, pipe covered with iron | \$500.00 | \$0.00 |
| SMH15312658 | 3087 Fairgrove Ter | Yes | Inflow at grade adjustment | \$500.00 | \$350.00 |
| SMH15312661 | 3087 Fairgrove Ter | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15312665 | 3087 Fairgrove Ter | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15303601 | 2998 Waterview Dr | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15304612 | 2965 Technology Dr | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15304613 | 2965 Technology Dr | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15304616 | 2993 Technology Dr | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15304617 | 2993 Technology Dr | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15312669 | 3087 Fairgrove Ter | No | Inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15313662 | 3617 S Adams Rd | No | Inflow and infiltration at grade adjustment | \$500.00 | \$0.00 |
| SMH15313663 | 3617 S Adams Rd | No | Inflow and infiltration at grade adjustment | \$500.00 | \$0.00 |
| SMH15321647 | 2516 Florence Dr | Yes | Inflow at broken grade adjustment | \$500.00 | \$350.00 |
| SMH15321645 | 3081 Florence Ct | Yes | Inflow at broken grade adjustment | \$500.00 | \$350.00 |
| SMH15321639 | 3033 Richmond Dr | No | Inflow and roots at grade adjustment | \$500.00 | \$0.00 |
| SMH15313668 | 3617 S Adams Rd | No | Inflow and roots at grade adjustment | \$500.00 | \$0.00 |
| SMH15323606 | 3424 Rockhaven | No | Inflow and roots at grade adjustment, raise 3" | \$500.00 | \$0.00 |
| SMH15321644 | 3073 Florence Ct | Yes | Inflow between cone and grade adjustment | \$500.00 | \$350.00 |
| SMH15321632 | 2547 Brilliance | No | Inflow at broken casting | \$500.00 | \$0.00 |
| SMH15321660 | 2548 Empire Ct. | No | Inflow from broken casting and frame | \$500.00 | \$0.00 |
| SMH15321653 | (none) | No | Inflow from casting, broken frame | \$500.00 | \$0.00 |
| SMH15293640 | 2930 W Auburn Rd | Yes | Infiltration in wall and inflow at grade adjustment | \$500.00 | \$350.00 |
| SMH15312639 | 3395 W Auburn Rd | No | infiltration in wall and inflow at grade adjustment | \$500.00 | \$0.00 |
| SMH15303618 | 2827 Saint Clair Dr | No | Infiltration at cone | \$500.00 | \$0.00 |
| SMH15321657 | 3293 Empire Dr | No | Infiltration at wall | \$500.00 | \$0.00 |
| SMH15323603 | 2526 Golf Crest Dr | Yes | Infiltration at wall | \$500.00 | \$350.00 |
| SMH15321655 | 3341 Empire Dr | No | Infiltration at wall | \$500.00 | \$0.00 |
| SMH15323605 | 3542 Walnut Brook | No | Infiltration between bench and wall | \$500.00 | \$0.00 |
| SMH15311617 | 3351 Greenwood Dr | No | Offset 3" with inflow | \$500.00 | \$0.00 |
| SMH15303611 | 3600 W Auburn Rd | Yes | Offset 4" with inflow at casting | \$500.00 | \$350.00 |
| SMH15303613 | 2864 York Rd | No | Offset 2" and wall inflow | \$500.00 | \$0.00 |
| SMH15311648 | 3254 Avalon Rd | No | Offset 3" | \$500.00 | \$0.00 |
| SMH15311646 | 3057 Avalon Rd | No | Offset 3" | \$500.00 | \$0.00 |
| SMH15311637 | (none) | No | Offset 4" | \$500.00 | \$0.00 |
| SMH15321611 | 2525 W Auburn Rd | No | Raise rim 12" | \$500.00 | \$0.00 |
| SMH15312629 | 3232 Willet Ave | No | Raise rim 7" | \$500.00 | \$0.00 |
| SMH15323601 | 3543 Cedar Brook Dr | No | Raise rim 4" | \$500.00 | \$0.00 |
| SMH15311682 | 3930 Dunning Rd | No | Raise rim 4" | \$500.00 | \$0.00 |
| SMH15311675 | 3862 Beechcrest | No | Raise rim 4" | \$500.00 | \$0.00 |
| SMH15311661 | 3098 York | No | Cracked adjustment ring | \$500.00 | \$0.00 |
| SMH15322624 | 3055 Devondale | No | Blown rubber gasket | \$500.00 | \$0.00 |
| SMH15324604 | 3845 Winding Brook Cir | No | Blown rubber gasket | \$500.00 | \$0.00 |
| SMH15324606 | 2477 Winding Brook Ct | No | Frame Broken, blown rubber gasket | \$500.00 | \$0.00 |
| SMH15321626 | (none) | No | Obstruction in channel | \$500.00 | \$0.00 |
| SMH15321623 | 3043 Bathurst Ave | Yes | Obstruction in channel | \$500.00 | \$350.00 |
| | | | | Total: | \$28,000.00 + \$3,850.00 = \$31,850.00 |

Assumptions: Manhole adjust & repair = \$500.00 Each Source is City Project #E10-008 bid tabulation
 Remove & replace pavement (10' x 10') = \$350.00 Each Source is City Project #E11-001

Rouge District Sanitary Sewer Evaluation Study (E10-022)

Priority Code: #1 = High
 #2 = Medium
 #3 = Low

Preliminary Cost Estimate for Rehabilitation of Infiltration in Pipe TV Inspected in NW Flow Meter Zone in 2011

| U/S MH ID# | D/S MH ID# | Address | Pipe Diameter | Type of Defect | Remarks | Grout Cost | Stent Cost |
|-------------------|-------------|----------------------|---------------|---|-------------------------------------|-------------|-------------|
| Priority 1 | | | | | | | |
| SMH15312615 | SMH15312614 | 2955 W Auburn Rd | 8" | Infiltration at 2 locations | Repaired on 10/11/11 | NA | NA |
| SMH15321653 | SMH15321652 | 2479 Jackson Dr | 8" | Infiltration in MH #653 at pipe bottom | | \$350.00 | \$0.00 |
| SMH15321609 | SMH15321637 | 3009 Richmond Dr | 8" | Infiltration in MH #637 | On MH Repair list | NA | NA |
| SMH15321604 | SMH15321603 | 3359 Rockhaven Ave | 8" | Infiltration at lead | May not be able to do inline repair | \$350.00 | \$0.00 |
| SMH15321641 | SMH15321640 | 3038 Richmond Dr | 8" | Infiltration - 3 locations | | \$1,050.00 | \$0.00 |
| SMH15321622 | SMH15321620 | 3227 Bathurst Ave | 8" | Infiltration (multiple), 1 lead constant water (private), 2 joints offset, 1 joint encrustation | May not be able to do inline repair | \$1,400.00 | \$0.00 |
| SMH15312608 | SMH15312606 | 3295 Coolidge Hwy | 8" | Infiltration at lead (hole in bottom of cut) | May not be able to do inline repair | \$350.00 | \$0.00 |
| SMH15304610 | SMH15304611 | 2965 Technology Dr | 8" | Infiltration at lead | May not be able to do inline repair | \$350.00 | \$0.00 |
| SMH15322609 | SMH15323608 | 2515 Elm Brook Ct | 8" | Crack (longitudinal) | | \$350.00 | \$1,800.00 |
| SMH15323613 | SMH15323612 | 3676 Cedar Brook Dr | 8" | Crack/longitudinal (2' long) | | \$350.00 | \$2,400.00 |
| SMH15321628 | SMH15321627 | 2943 W Auburn Rd | 8" | Crack/longitudinal (2' long) | | \$350.00 | \$2,400.00 |
| SMH15311648 | SMH15311642 | 3251 Avalon Rd | 8" | Broken pipe (void visible), sag | | \$350.00 | \$1,800.00 |
| SMH15312609 | SMH15312608 | 3366 Willet Ave | 8" | Broken pipe, and an offset joint | | \$700.00 | \$1,800.00 |
| Priority 2 | | | | | | | |
| SMH15303618 | SMH15303617 | 2881 Saint Claire Dr | 8" | Infiltration at 1 location | | \$350.00 | \$0.00 |
| SMH15321657 | SMH15321656 | 3317 Empire Dr | 8" | Infiltration with encrustation at 2 locations | | \$700.00 | \$0.00 |
| SMH15321620 | SMH15321615 | 3341 Bathurst Ave | 18" | Infiltration with encrustation | | \$350.00 | \$0.00 |
| SMH15312625 | SMH15312622 | 3185 Willet Ave | 15" | Infiltration with encrustation | | \$350.00 | \$0.00 |
| SMH15304611 | SMH15304612 | 2965 Technology Dr | 8" | Infiltration (at lead with mineral obstruction) | May not be able to do inline repair | \$350.00 | \$0.00 |
| SMH15321607 | SMH15321640 | 3060 Rockhaven Ave | 8" | Infiltration - 2 locations at MH #640 | On MH Repair list | NA | NA |
| SMH15321616 | SMH15321615 | 3341 Bathurst Ave | 8" | Joint/offset (open with infiltration) | | \$350.00 | \$0.00 |
| SMH15321623 | SMH15321622 | 3086 Rockhaven Ave | 8" | 2 encrusted pipe joints | | \$700.00 | \$0.00 |
| SMH15311609 | SMH15311608 | 3600 W Auburn Rd | 8" | Infiltration at 2 locations | | \$700.00 | \$0.00 |
| SMH15321656 | SMH15321655 | 3341 Empire Dr | 8" | Infiltration in pipe (1 location), & steps of MH #656 | | \$700.00 | \$0.00 |
| SMH15322623 | SMH15322622 | 3177 Devondale Rd | 8" | Infiltration at crack - 1 location, & at 1 open joint, and 1 encrusted joint | | \$1,050.00 | \$0.00 |
| SMH15311673 | SMH15311669 | 3798 Beechcrest | 8" | Open Joints at 11 locations | See Note 1 | \$3,850.00 | \$0.00 |
| SMH15311674 | SMH15311673 | 3814 Beechcrest | 8" | Open Joints at 8 locations | See Note 1 | \$2,800.00 | \$0.00 |
| SMH15311670 | SMH15311669 | 3798 Beechcrest | 8" | Open Joints at 2 locations | See Note 1 | \$700.00 | \$0.00 |
| SMH15311676 | SMH15311675 | 3862 Beechcrest | 8" | Open Joints at 2 locations | See Note 1 | \$700.00 | \$0.00 |
| SMH15311677 | SMH15311676 | (none) | 8" | Open Joints at 2 locations | See Note 1 | \$700.00 | \$0.00 |
| SMH15311627 | SMH15311626 | 3471 Dunning Rd | 8" | Crack (spiral) in 2 pipe end at MH #626 | | \$700.00 | \$0.00 |
| SMH15321618 | SMH15321617 | 3385 Bathurst Ave | 8" | Lining failure at 1 location | | \$350.00 | \$1,800.00 |
| Total: | | | | | | \$21,350.00 | \$33,350.00 |

Assumptions:
 Grout Joint repairs = \$350.00 Each Source is City Project #E10-008
 Sewer stent lining, 8" = \$600.00 per LFT Source is City Project #E10-008
 Sewer stent lining, 10" = \$625.00 per LFT Source is City Project #E10-008
 Sewer stent lining, 18" = \$750.00 per LFT Source is City Project #E10-008

Note 1: Assumed all have infiltration. Need to review video tapes as they may be okay and not need repairs.

Note: Some defects noted at manholes are already included in the MH Repairs tab.

Rouge District Sanitary Sewer Evaluation Study (E10-022)

Priority Code: #1 = High
 #2 = Medium
 #3 = Low

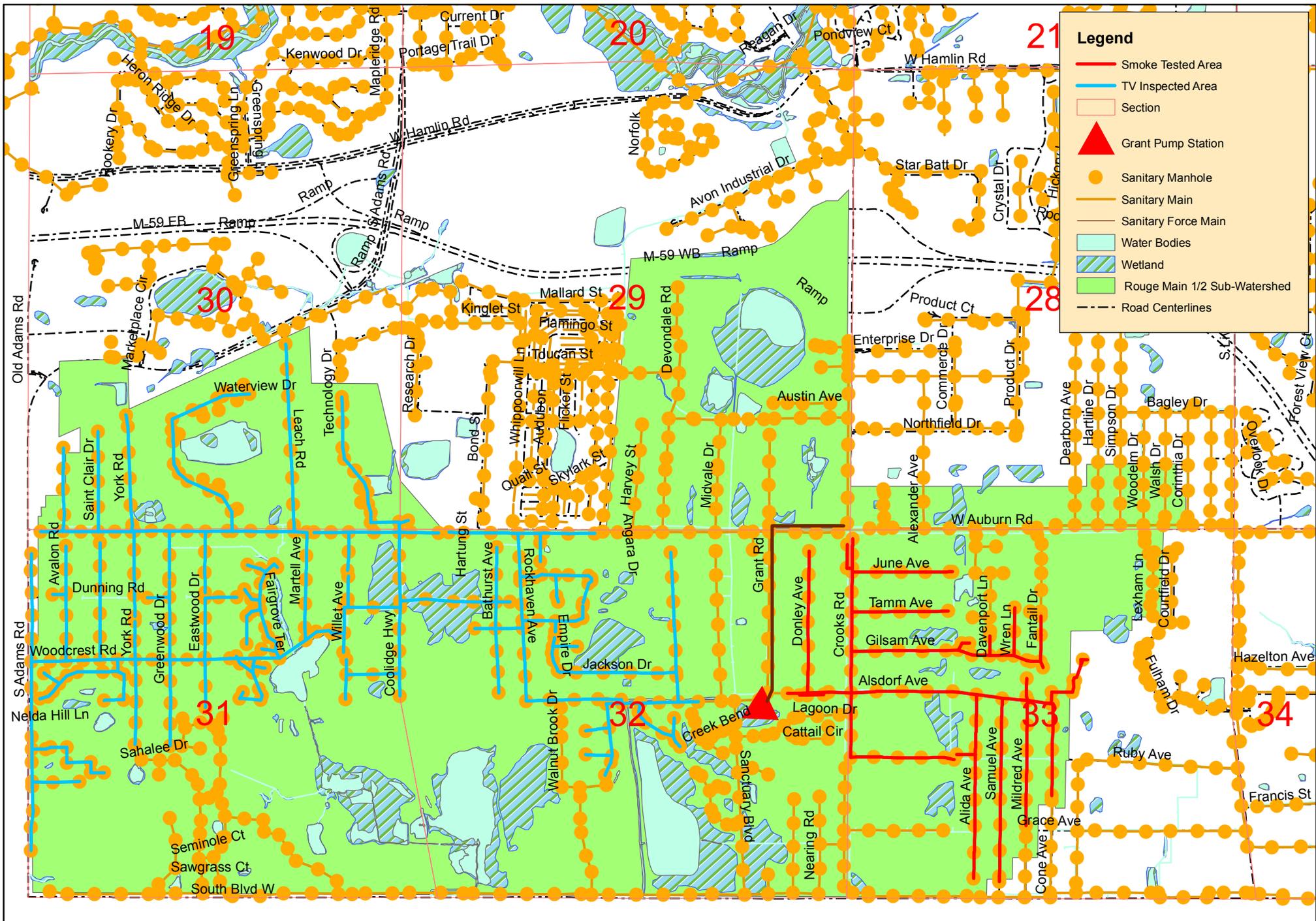
Preliminary Cost Estimate for Rehabilitation of Roots in Pipe TV Inspected in NW Flow Meter Zone in 2011

| U/S MH ID# | D/S MH ID# | Address | Pipe Diameter | Type of Defect | Root Cost | Grout Cost | |
|-------------------|-------------|---------------------|---------------|---|------------|--------------|------------|
| Priority 1 | | | | | | | |
| SMH15312632 | SMH15312631 | 3262 Martell Ave | 12" | Root ball at 1 joint | \$37.50 | \$350.00 | |
| SMH15312610 | SMH15312609 | 3366 Willet Ave | 8" | Root ball (obstruction to camera) at 1 joint | \$32.50 | \$350.00 | |
| SMH15312633 | SMH15312632 | 3189 Martell Ave | 12" | Root ball at 1 joint & MH #632 (water backing up) | \$75.00 | \$350.00 | |
| Priority 2 | | | | | | | |
| SMH15311639 | SMH15311638 | 3088 Saint Clair Dr | 8" | Root ball (obstruction to camera) at 1 joint | \$32.50 | \$350.00 | |
| Total: | | | | | \$177.50 + | \$1,400.00 = | \$1,577.50 |

Assumptions:
 Chemical root treatment, 8" pipe = \$3.25 per LFT Source is City Project #E10-008
 Chemical root treatment, 10" pipe = \$3.50 per LFT Source is City Project #E10-008
 Chemical root treatment, 12" pipe = \$3.75 per LFT Assumed
 Grout Joint repairs = \$350.00 Each Source is City Project #E10-008
 Assume 10 LFT per location

Note: Some defects noted at manholes are already included in the MH Repairs tab.

I:\Eng\Publ\E10022 Rouge District Sanitary Sewer Evaluation Study\Final Report\Rehab Cost Estimate.xls



Legend

- Smoke Tested Area
- TV Inspected Area
- Section
- ▲ Grant Pump Station
- Sanitary Manhole
- Sanitary Main
- Sanitary Force Main
- Water Bodies
- ▨ Wetland
- Rouge Main 1/2 Sub-Watershed
- - - Road Centerlines



City of Rochester Hills - Section 30, 31, 32, & 33
 Rouge District Sanitary Sewer Rehabilitation Project - Work Area