AMENDED JOINT AND COOPERATIVE AGREEMENT FOR THE ESTABLISHMENT OF A BASSETT CREEK WATERSHED MANAGEMENT ORGANIZATION TO PLAN, CONTROL AND PROVIDE FOR THE DEVELOPMENT OF BASSETT CREEK
(Showing Changes Effective August 29, 2014)

PREFACE

In1968, the nine cities with land in the Bassett Creek watershed entered into a joint powers agreement which established the Bassett Creek Flood Control Commission. For the past 25 years the Commission, consisting primarily of citizen volunteers and city staff members who have volunteered their time, have worked long and hard to achieve the goals set forth when the commission was established. An overall watershed management plan was prepared and approved after public hearings. The Commission has received technical advice from the United States Army Corps of Engineers in their planning and has obtained the support and aid of all United States Senators and Congressional Representatives representing the /member cities. In 1976 the Commission and the Corps of Engineers were successful in having Bassett Creek included in the 1976 Water Resources Development Act (Section 173 Public Law 94-587). The Board of Engineers for Rivers and Harbors submitted a favorable report to the Secretary of the Army on March 30,1977. The Secretary of the Army has by letter under date of June 19, 1978 notified the U. S. Congress of the approval of the Chief of Engineers.

The Bassett Creek Flood Control Commission has participated with the Minnesota Department of Transportation, the Federal Highway Administration, the City of Minneapolis and the Corps of Engineers in the planning and construction of a deep tunnel in Minneapolis which is designed to carry Bassett Creek under a portion of the City of Minneapolis. The Commission has held hearings and approved and ordered upstream construction in the cities of Golden Valley, Plymouth, Minneapolis, and Crystal. The local share of these costs is being paid by the nine member communities pursuant to an agreement consistent with the funding requirements set forth in Articles VII and VIII of the joint powers agreement which has been in effect from 1968 to 1993. The prior joint powers agreement contained the following "Statement of Intent":

STATEMENT OF INTENT REGARDING
AGREEMENT

"Bassett Creek leaves Medicine Lake and flows generally eastward through the Village of Medicine Lake, Plymouth, Golden Valley and into the City of Minneapolis. In Minneapolis, the creek is channeled into a conduit and runs underground to the Mississippi River to its eventual outfall. As the creek runs through the aforementioned communities it collects storm waters and in effect acts as the storm sewer for a large densely populated area and large unpopulated area. It also carries waters channeled to it or naturally flowing to it from the Villages of Minnetonka and New Hope and the Cities of Crystal, Robbinsdale, and St. Louis Park.

For a long time the improvement and development of this creek to carry the increased quantity of storm water has been needed to allow for the orderly planning and development of

the up-stream communities who must rely on the creek as the outfall for storm waters collected or naturally flowing from areas within these communities. As the communities contributing water to the creek have grown, and the lands naturally draining into the creek have been covered with buildings and hard surfaced areas, the ability of the creek and its appurtenant facilities to accommodate the water has diminished. Studies have been conducted by the municipalities both individually and collectively and a study has been made by the United States Army Corps of Engineers. The threat of flood damage increases each year with the increased use of land in the watershed area.

The nine member communities have been meeting over a number of years in an effort to solve the storm water problems in the watershed drained by Bassett Creek. Each year it becomes more apparent that solutions must be sought to allow for a more orderly and efficient planning of the area and to allow the individual communities to plan storm sewer facilities which must be constructed to serve lands within the individual communities. It is also apparent to all nine municipalities that planning and construction to control the Bassett Creek cannot be done on the basis of each community looking at its individual problems. The creek downstream must be improved to accommodate the waters which will eventually be channeled and diverted to the outfall. To determine the downstream improvements it is necessary to know how much water will be contributed by the individual communities upstream and how much storm water will be retained in ponding areas upstream and the area of lands within the watershed which will be controlled by the individual communities as "open lands" and which will not contribute as much storm water as lands which are developed residentially, commercially, or for industrial purposes.

All of the nine communities within the Bassett Creek watershed recognize the aforestated problems. In seeking solutions to the overall drainage problem it becomes apparent that the only way the problems can be solved is by joint planning, joint cooperation, joint financing and a sincere desire on the part of each community to solve the overall drainage problem within the watershed. This means that some agency, commission, district, corporation, political subdivision, or other vehicle must be found to plan and finance improvements to and to control the development of lands within the watershed. Chapter 112 of the Minnesota Statutes provides for the formation of a watershed district with the powers and duties of conserving and controlling water and watercourses within a watershed. The creation of such a district creates a new political subdivision with the power to sue or be sued, to incur debts, liabilities and obligations, to exercise the powers of eminent domain, to provide for assessments, to borrow money and issue bonds and to do all other acts necessary to carry out the powers vested in the district by said Chapter 112. The managers of the district would be appointed by the Minnesota Water Resources Board and subsequent appointments would be by the Board of County Commissioners of Hennepin County. It is the belief of the parties to this agreement that the creation of such a district would remove control one step further from the electorate and the residents of this watershed area who ultimately would pay the costs of the aforesaid improvements. It would also create another political subdivision which would have to plan and work with the individual parties to this agreement to solve the storm water and drainage problems within the watershed.

The purpose of this statement of intent regarding the agreement is to clarify and establish for any court of review or any arbitrator or for the elected successors to the representatives who have entered into this agreement, the reasons and purposes for this joint and cooperative agreement. The parties to this agreement realize that the success or failure of the Bassett Creek

Flood Control Commission created by this agreement is dependent upon the sincere desire of each member community to cooperate in the exercise of a joint power to solve a joint problem. Each party to this agreement pledges this cooperation."

It is the intent of this amended agreement to carry forward the same purposes as aforestated and to revise the Joint Powers Agreement to meet the mandates of Minnesota Statutes, Sections 103B. 201 through 103B. 251 and Minnesota Rules (Chapter 8410 relating to "Metropolitan Area Local Water Management". This amended agreement shall continue the existence of a Watershed Management Organization in accordance with the provisions of the Metropolitan Surface Water Management Act as set forth in Minnesota Statutes 1992 Sections 103B. 201 to and including 103B. 251. The organization hereby created shall have all of the powers and responsibilities set forth in said statutes for the Bassett Creek Watershed. The purpose of the organization shall be to assist the 9 member communities to preserve and use natural water storage and retention systems to:

1. Protect, preserve, and use natural surface and groundwater storage and retention systems;
2. Minimize public capital expenditures needed to correct flooding and water quality problems;
3. Identify and plan for means to effectively protect and improve surface water and groundwater quality;
4. Establish more uniform local policies and official controls for surface water and groundwater quality:
5. Prevent erosion of soil into surface water systems;
6. Promote groundwater recharge;
7. Protect and enhance fish and wildlife habitat and water recreational facilities;
8. To secure other benefits associated with the proper management of surface water.
9. To promote and encourage cooperation among member cities in coordinating local surface water and groundwater plans and to be aware of their neighbor's problems and to protect the public health, safety, and general welfare.
10. To continue the work of the Bassett Creek Water Management Commission and to carry out the plans, policies and programs developed by said Commission from1968 to 1993.

JOINT AND COOPERATIVE AGREEMENT

The parties to this Agreement are governmental units of the State of Minnesota, all of which have lands which drain surface water into Bassett Creek and all of which have power to construct, reconstruct, extend and maintain storm water management facilities. This agreement is made pursuant to the authority conferred upon the parties by Minnesota Statutes 1992, Sections 471.59 and 103B. 201 to and including Section 103B. 251.

NAME

I.

The parties hereto create and establish the Bassett Creek Watershed Management Commission.

GENERAL PURPOSE

II.

The general purpose of this agreement is to provide an organization which can investigate, study, plan and control the construction of facilities to drain or pond storm waters, to alleviate damage by flood waters; to improve the creek channel for drainage; to assist in planning for land use; to repair, improve, relocate, modify, consolidate or abandon, in whole or in part, drainage systems within the watershed area; and to do whatever is necessary to assist in water conservation and the abatement of surface water and groundwater contamination and water pollution. In addition to the aforestated purposes, the organization hereby created shall serve as the organization for the Bassett Creek watershed and shall carry out all of the duties and responsibilities outlined in Minnesota Statutes, Section 103B. 201 through 103B. 251, both inclusive.

DEFINITIONS

III.

For the purposes of this agreement, the terms used herein shall have the meanings as defined in this article.

Subdivision 1. "Commission" means the organization created by this agreement, the full name of which is "Bassett Creek Watershed Management Commission." It shall be a public agency of its members.

Subdivision 2. "Board" means the Board of commissioners of the Commission, consisting of one commissioner or one alternate commissioner from each of the governmental units which is a party to this agreement and which shall be the governing body of the Commission.

Subdivision 3. "Council" means the governing body of a governmental unit which is a member of this Commission.

Subdivision 4. "Governmental Unit" means any city, county, or town.

Subdivision 5. "Member" means a governmental unit which enters into this agreement.

Subdivision 6. "Bassett Creek Watershed" means the area contained within a line drawn around the extremities of all terrain whose surface drainage is tributary to Bassett Creek and within the mapped areas delineated on the map filed with the Board of Water and Soil Resources originally filed pursuant to Minnesota Statutes, 473.877, Subd. 2 and as now amended by Minnesota Statutes, Chapter 103B.

MEMBERSHIP

IV.

The membership of the Commission shall consist of all of the following governmental units as shall elect, through resolution or ordinance adopted by their respective Councils, to become members:

City of Crystal

City of Golden Valley

City of Medicine Lake

City of Minneapolis

City of Minnetonka

City of New Hope

City of Plymouth

City of Robbinsdale

City of St. Louis Park

(The foregoing list is intended to include all governmental units which are presently partially or entirely within the Bassett Creek Watershed.)

No change in governmental boundaries , structure or organizational status shall affect the eligibility of any governmental unit listed above to be represented on the Commission, so long as such governmental unit continues to exist as a separate political subdivision.

BOARD OF COMMISSIONERS

V.

Subdivision 1. The governing body of the Commission shall be its Board. Each member shall be entitled to appoint one representative on the Board, and one alternate who may sit when the representative is not in attendance and said representative or alternate representative shall be called a "Commissioner".

Subdivision 2. The council of each member shall determine the eligibility or qualification of its representative on the Commission but the terms of each Commissioner shall be as established by this agreement.

Subdivision 3. The term of each Commissioner and Alternate Commissioner appointed by each member shall be three years and until their successors are selected and qualify and shall

commence on February l, except that the terms of the Commissioners first appointed shall commence from the date of their appointment and shall terminate as follows:

a. The Commissioners appointed by the Cities of Crystal, Golden Valley, and Medicine Lake shall terminate on February 1, 1994.
b. The Commissioners appointed by the Cities of Minneapolis, Minnetonka, and New Hope shall terminate on February 1, 1995.
c. The Commissioners appointed by the Cities of Plymouth, Robbinsdale, and St. Louis Park shall terminate on February 1, 1996.

Any vacancy shall be filled for the unexpired term of any Commissioner by the council of the governmental unit of the member who appointed said Commissioner. The Commission shall notify the Board of Water and Soil Resources of member appointments and vacancies within 30 days after the Commission is notified by a member. Each member agrees to publish a notice of vacancies resulting from the expiration of a Commissioner's or Alternate Commissioner's term or where a vacancy exists for any reason. Publication and notice shall be in accordance with Minnesota Statutes, Section 103B.227, Subds. 1 and 2, as they now exist or as subsequently amended.

Subdivision 4. The council of each member agrees that its representative commissioner will not be removed from the Board prior to the expiration of the Commissioner's term, unless said Commissioner consents in writing or unless said council has presented the Commissioner with charges in writing and has held a public hearing after reasonable notice to the Commissioner. A member may remove a Commissioner or an Alternate Commissioner for just cause or for violation of a Code of Ethics established by the Commission or by the Member City or for malfeasance, nonfeasance, or misfeasance. Said hearing shall be held by the Member City Council who appointed the Commissioner. A Commissioner or Alternate Commissioner who is an elected officer of a Member City who is not reelected may be removed by the appointing Member City at the appointing Member's discretion. Any decision by a Member to remove a Commissioner or Alternate Commissioner may be appealed to the Board of Water and Soil Resources. A certified copy of the Council's Resolution removing said Commissioner shall be filed with the Secretary of the Board of Commissioners and shall show compliance with the terms of this section.

Subdivision 5. Each member shall within 30 days of appointment file with the Secretary of the Board of Commissioners a record of the appointment of its Commissioner and Alternate Commissioner. The Commission shall notify the Board of Water and Soil Resources of Member appointments and vacancies within 30 days after receiving notice from the Member. Members shall fill all vacancies within 90 days after the vacancy occurs.

Subdivision 6. Commissioners shall serve without compensation from the Commission, but this shall not prevent a governmental unit from providing compensation for its Commissioner for serving on the Board, if such compensation is authorized by such governmental unit and by law. Commission funds may be used to reimburse a Commissioner or Alternate Commissioner for expenses incurred in performing Commission business and if authorized by the Board.

Subdivision 7. At the first meeting of the Board and in February of each year thereafter, the Board shall elect from its Commissioners a Chair, a Vice Chair, a Secretary, a Treasurer , and such other officers as it deems necessary to conduct its meetings and affairs. At the organizational meeting or as soon thereafter as it may be reasonably done, the Commission shall adopt rules and regulations governing its meetings. Such rules and regulations may be amended from time to time at either a regular or a special meeting of the Commission provided that a ten day prior notice of the proposed amendment has been furnished to each person to whom notice of the Board meetings is required to be sent; a majority vote of all eligible votes of the then existing members of the Commission shall be sufficient to adopt any proposed amendment to such rules and regulations.

The Board shall notify each Member City of the location and time of regular and special meetings called by the Board. A meeting shall be held at least annually, and all meetings shall be called and open to the public pursuant to Minnesota Statutes, Section 471.705, or as amended.

POWERS AND DUTIES OF THE BOARD

VI.

Subdivision l. The Commission, acting by its duly appointed Board of Commissioners, shall as it relates to flood control, water quality, ground water recharge and water conservation or in its construction of facilities and other duties as set forth in Minnesota Laws have the powers and duties set out in this article.

Subdivision2. It may employ such persons as it deems necessary to accomplish its duties and powers. Any employee may be on a full time, part time or consulting basis as the Board determines.

Subdivision 3. It may contract for space and for material and supplies to carry on its activities either with a member or elsewhere.

Subdivision 4. It may acquire necessary personal property to carry out its powers and its duties.

Subdivision 5. It shall develop an overall plan containing a capital improvement program within a reasonable time after qualifying, and said plan shall meet all of the requirements as established in Minnesota Statutes, Chapter103B. Said overall plan shall establish a comprehensive goal for the development of Bassett Creek and shall establish a proposed procedure for accomplishing the purposes of the organization as set forth in Article II.

In preparing the overall plan, the Board may consult with the engineering and planning staff of each member governmental unit. It may consult with the Metropolitan Council and other public and private bodies to obtain and consider projections of land use, population growth, and other factors which are relevant to the improvement and development of the Bassett Creek watershed.

Said overall plan shall include the location and adequacy of the outlet or outfall of said Bassett Creek. The plan shall include the quantity of storage facilities and the sizing of an adequate outlet for all branch lateral storm sewers within the Bassett Creek watershed. The plan shall comply with state statutes and regulations promulgated and adopted by the Board of Water and Soil Resources.

Upon completion of the overall plan, or amendments thereto, the Board shall supply each member with a copy of the proposed plan and shall submit the plan for review and comment to Hennepin County, all soil and water conservation districts in Hennepin County and to all statutory and home rule charter cities having territory within the watershed. All governmental units which expect that substantial amendment of its local comprehensive plan will be necessary in order to bring their local water management into conformance with the Commission's watershed plan shall describe as specifically as possible, the amendments to the local plan which it expects will be necessary. The Commission shall hold a public hearing after 60 days mailed notice to the clerk of each member governmental unit. The mailed notice of the hearing shall be sent at the same time the plan is submitted to the members and to other governmental agencies. After such public hearing, the Board shall prescribe the overall plan which shall be the outline for future action by the Commission.

The Commission shall then submit the plan, any comments received and any appropriate amendments to the plan to the Board of Commissioners of Hennepin County. The County shall approve or disapprove projects in the capital improvement program which may require the provision of county funds pursuant to Minnesota Statutes Sections103B. 251or103D. 901. The County shall have 60 days to complete its review. If the County fails to complete its review within 60 days the plan and capital improvement programs shall be deemed approved.

After completion of the review by Hennepin County, the plan and capital improvement program shall be submitted to the Metropolitan Council for its review. After completion of the review by the Metropolitan Counci1 pursuant to Minnesota Statutes, Section103B. 231, Subd. 8, the Commission shall submit the plan to the Minnesota Commissioner of Natural Resources and the Minnesota Pollution Control Agency for review and comment on the consistency of the plan with state laws and rules relating to water and related land resources and to the Board of Water and Soil Resources for review as provided in Minnesota Statutes, Section 103B. 231, Subd. 9.

After return of the plan, the Commission shall submit to each of its members a copy of the plan and all comments of the reviewing authorities. The Commission shall wait for at least 30 days for comments from the members. The Commission shall adopt the overall plan within 120 days after approval of the plan by the Board of Water and Soil Resources. The Commission shall then implement the approved plan and approved capital improvement program by resolution of the Commission as hereinafter set forth. The adoption of said overall plan shall be only upon a favorable vote of a majority of all eligible votes of the then existing members of the Commission. A copy of the adopted plan shall be filed with the clerk of each member governmental unit. Upon notice and hearing as provided for in adopting the overall plan , said plan may be amended by the Board on its own initiative or on the petition of any member governmental unit.

The review provisions set forth in this section are those required by Minnesota Statutes, Section103B. 231. If the law is amended, approvals shall be as required by law and the provisions contained in this section shall be amended accordingly.

Subdivision 6. It shall make necessary surveys or utilize other reliable surveys and data and develop projects to accomplish the purposes for which the Commission is organized.

Subdivision 7. It may cooperate or contract with the State of Minnesota or any subdivision thereof or federal agency or private or public organization to accomplish the purposes for which it is organized.

Subdivision 8. It may order any member governmental unit or units to construct, clean, repair, alter, abandon, consolidate, reclaim or change the course or terminus of any ditch, drain, storm sewer, or water course, natural or artificial, within the Bassett Creek watershed.

Subdivision 9. It may order any member governmental unit or units to acquire, operate, construct or maintain dams, dikes, reservoirs and appurtenant works or other improvements necessary to implement the overall plan.

Subdivision 10. It shall regulate, conserve and control the use of storm and surface water and groundwater within the Bassett Creek watershed.

Subdivision 11. It may contract for or purchase such insurance as the Board deems necessary for the protection of the Commission.

Subdivision 12. It may establish and maintain devices for acquiring and recording hydrological and water quality data within the Bassett Creek watershed.

Subdivision 13. It may enter upon lands within or without the watershed to make surveys and investigations to accomplish the purposes of the Commission. The Commission shall be liable for actual damages resulting therefrom but every person who claims damages shall serve the Chairman or Secretary of the Board of Commissioners with a Notice of Claim as required by Chapter 466.05 of the Minnesota Statutes.

Subdivision 14. It shall provide any member governmental unit with technical data or any other information of which the Commission has knowledge which will assist the governmental unit in preparing land use classifications or local water management plans within the watershed.

Subdivision 15. It may provide legal and technical assistance in connection with litigation or other proceedings between one or more of its members and any other political subdivision, commission, Board or agency relating to the planning or construction of facilities to drain or pond storm waters or relating to water quality within the Bassett Creek watershed. The use of commission funds for litigation shall be only upon a favorable vote of a majority of the eligible votes of the then existing members of the Commission.

Subdivision 16. It may accumulate reserve funds for the purposes herein mentioned and may invest funds of the Commission not currently needed for its operations, in the manner and subject to the laws of Minnesota applicable to statutory cities.

Subdivision 17. It may collect monies, subject to the provisions of this agreement, from its members, Hennepin County and from any other source approved by a majority of its Board.

Subdivision 18. It may make contracts, incur expenses and make expenditures necessary and incidental to the effectuation of these purposes and powers and may disburse therefor in the manner hereinafter provided.

Subdivision 19. It shall cause to be made an annual audit by a certified public accountant or the state auditor of the books and accounts of the Commission and shall make and file a report to its members at least once each year including the following information:

a. the approved budget;

b. a reporting of revenues;

c. a reporting of expenditures;

d. a financial audit report or section that includes a balance sheet, a classification of revenues and expenditures, an analysis of changes in final balances, and any additional statements considered necessary for full financial disclosure;

e. the status of all Commission projects and work within the watershed; and

f. the business transacted by the commission and other matters which affect the interests of the commission.

Copies of said report shall be transmitted to the clerk of each member governmental unit.

Subdivision 20. Its books, reports and records shall be available for and open to inspection by its members at all reasonable times.

Subdivision 21. It may recommend changes in this agreement to its members.

Subdivision 22. It may exercise all other powers necessary and incidental to the implementation of the purposes and powers set forth herein and as outlined and authorized by Minnesota Statutes, Sections 103B. 201 through 103B. 251.

Subdivision 23. It shall cooperate with the State of Minnesota, the Commissioner of Natural Resources and the Director of the Division of Waters, Soils and Minerals of the Department of Natural Resources in obtaining permits and complying with the requirements of Chapter 103G of the Minnesota Statutes.

Subdivision 24. Each member reserves the right to conduct separate or concurrent studies on any matter under study by the Commission.

Subdivision 25. It shall establish a procedure for establishing citizen or technical advisory committees and to provide other means for public participation.

METHOD OF PROCEEDING

VII.

Subdivision 1. The procedures to be followed by the Board in carrying out the powers and duties set forth in Article VI, Subdivisions 5, 6, 7, 8, 9, and 10, shall be as set forth in this article.

Subdivision 2. The Commissioners shall be the same as those serving as Commissioners and Alternate Commissioners for the predecessor Bassett Creek Water Management Commission. The Board shall immediately proceed to revise the overall plan as set forth in Article VI, Subdivision 5 or as required by state statute. Upon adoption of said overall plan, the Board shall proceed to implement said plan, and this implementation may be ordered by stages.

Subdivision 3. The Bassett Creek Watershed Management Commission shall be the successor to the Bassett Creek Water Management Commission as constituted under the prior Joint Powers Agreement. All personal property, money, bank accounts, records or any other thing of value and on hand with the Bassett Creek Water Management Commission shall be transferred to the Bassett Creek Watershed Management Commission.

Subdivision 4. The location and adequacy of the outlet for Bassett Creek shall be determined and the Commission shall then prepare plans which will provide capacity to outlet the surface waters which will be collected within the Bassett Creek watershed. In determining the necessary capacity for said outlet, the Commission shall take into consideration the quantity of land within the watershed which each member governmental unit has to pond or act as a reservoir for surface waters. It shall consider only lands which are under public ownership or under public control and that will be perpetually dedicated to acting as a reservoir for surface waters. The Commission may require from each member governmental unit a commitment in writing of the lands which shall be so dedicated, including a legal description of the gross area and the capacity in acre feet of water storage. No project which will channel or divert additional waters to Bassett Creek shall be commenced by any member governmental unit prior to approval of the Board of the design of an adequate outlet or of adequate storage facilities. The adequacy of said outlet shall be determined by the Board after consultations with its professional engineers.

Subdivision 5. All construction, reconstruction, extension or maintenance of Bassett Creek including outlets, lift stations, dams, reservoirs, or other appurtenances of a surface water or storm sewer system which involve construction by or assessment against any member governmental unit or against privately or publicly owned land within the watershed shall follow the statutory procedures outlined in Chapter 429 of the Minnesota Statutes except as herein modified. The Board shall secure from its engineers or some other competent persona report advising it in a preliminary way as to whether the proposed improvement is feasible and as to whether it shall best be made as proposed or in connection with some other improvement and the estimated cost of the improvement as recommended and the proposed allocation of costs between members.

The Board shall then hold a public hearing on the proposed improvement after mailed notice to the clerk of each member governmental unit within the watershed. The Commission

shall not be required to mail or publish notice except by said notice to the clerk. Said notice shall be mailed not less than 45 days before the hearing , shall state the time and place of the hearing, the general nature of the improvement, the estimated total cost and the estimated cost to each member governmental unit. The Board may adjourn said hearing to obtain further information, may continue said hearing pending action of the member governmental units or may take such other action as it deems necessary to carry out the purposes of this Commission.

To order the improvement, in accordance with the powers and duties established in Article VI, Subdivisions 7, 8 and 9, a resolution setting forth the order for a capital improvement project shall require a favorable vote by two-thirds of all eligible votes of then existing Board of the Commission. In all cases other than for capital improvement projects, a majority vote of all eligible members of the Board shall be sufficient to order the work. The order shall describe the improvement, shall allocate in percentages the cost allocation between the member governmental units, shall designate the engineers to prepare plans and specifications, and shall designate the member who will contract for the improvement in accordance with Subdivision 7 of this Article.

After the Board has ordered an improvement or if the hearing is continued while the member governmental units act on said proposal, it shall forward said preliminary report to all member governmental units with an estimated time schedule for the construction of said improvement. The Board shall allow an adequate amount of time , and in no event less than 45 days, for each member governmental unit to conduct hearings, in accordance with the provisions of the aforestated Chapter 429 or the charter requirements of any city, or to ascertain the method of financing which said member governmental unit will utilize to pay its proportionate share of the costs of the improvement. Each member governmental unit shall ascertain within a period of 90 days the method it shall use to pay its proportionate share of the costs.

If the Commission proposes to utilize Hennepin County’s bonding authority as set forth in Minnesota Statutes, Section 103B. 251, or if the Commission proposes to certify all or any part of a capital improvement to Hennepin County for payment, then and in that event all proceedings shall be carried out in accordance with the provisions set forth in said Section 1038.251.

The Board shall not order and no engineer shall prepare plans and specifications before the Board has adopted a resolution ordering the improvement. The Board may order the advertising for bids upon receipt of notice from each member governmental unit who will be assessed that it has completed its hearing or determined its method of payment or upon expiration of 90 days after the mailing of the preliminary report to the members.

Subdivision 6. Any member governmental unit being aggrieved by the determination of the Board as to the allocation of the costs of said improvement shall have 30 days after the commission resolution ordering the improvement to appeal said determination. Said appeal shall be in writing and shall be addressed to the Board asking for arbitration. The determination of the member's appeal shall be referred to a Board of Arbitration. The Board of Arbitration shall consist of three persons; one to be appointed by the Board of Commissioners, one to be appointed by the appealing member governmental unit, and the third to be appointed by the two so selected. In the event the two persons so selected do not appoint the third person within 15 days after their appointment, then the Chief Judge of the District Court of Hennepin County shall

have jurisdiction to appoint, upon application of either or both of the two earlier selected, the third person to the Board of Arbitration. The third person selected shall not be a resident of any member governmental unit and if appointed by the Chief Judge said person shall be a registered professional engineer. The arbitrators' expenses and fees, together with the other expenses, not including counsel fees, incurred in the conduct of the arbitration shall be divided equally between the Commission and the appealing member.

Arbitration shall be conducted in accordance with the Uniform Arbitration Act, Chapter 572 of the Minnesota Statutes.

Subdivision 7. Contracts for Improvements. All contracts which are to be let as a result of the Board's order to construct, repair, alter, reclaim or change the course or terminus of any ditch, drain, storm sewer, or watercourse, or to acquire, operate, construct or maintain dams, dikes, reservoirs or their appurtenances or to carry out any of the other provisions of the plan as authorized by Minnesota Statutes, and for which two or more member governmental units shall be responsible for the costs, shall be let in accordance with the provisions of Section 429.041 of the Minnesota Statutes. The bidding and contracting of said work shall be let by any one of the member governmental units, as ordered by the Board of Commissioners, after compliance with the statutes. All contracts and bidding procedures shall comply with all the requirements of law applicable to contracts let by a statutory city in the State of Minnesota.

The Commission shall not have the authority to contract in its own name for any improvement work for which a special assessment will be levied against any private or public property under the provisions of Chapter 429 or under the provisions of any City charter. These contracts shall be awarded by action of the council of a member and shall be in the name of a member governmental unit. This section shall not preclude the Commission from proceeding under Minnesota Statutes, Section 103B. 251.

Subdivision 8. Contracts with Other Governmental Bodies. The Commission may exercise the powers set forth inArticleV1, Subdivision 7, but said contracts for a capital improvement shall require a favorable vote of two-thirds majority of the eligible votes of the then existing members of the Commission.

Subdivision 9. Supervision. All improvement contracts awarded under the provisions of Subdivision 7of this Article shall be supervised by the member governmental unit awarding said contract or said member governmental unit may contract or appoint any qualified staff member or members of the Commission to carry out said supervision, but each member agrees that the staff of this Commission shall be authorized to observe and review the work in progress and the members agree to cooperate with the Commission staff in accomplishing the purposes of this Commission.

Representatives of the Commission shall have the right to enter upon the place or places where the improvement work is in progress for the purpose of making reasonable tests and inspections. The staff of this Commission shall report and advise and recommend to the Board on the progress of said work.

Subdivision 10. Land Acquisition. The Commission shall not have the power of eminent domain. The member governmental units agree that any and all easements or interest in land which are necessary will be negotiated or condemned in accordance with Chapter 117 of the Minnesota Statutes by the unit wherein said lands are located, and each member agrees to acquire the necessary easements or right of way or partial or complete interest in land upon order of the Board of Commissioners to accomplish the purposes of this agreement. All reasonable costs of said acquisition shall be considered as a cost of the improvement. If a member governmental unit determines it is in the best interests of that member to acquire additional lands, in conjunction with the taking of lands for storm and surface drainage or storage, for some other purposes, the costs of said acquisition will not be included in the improvement costs of the ordered project. The Board in determining the amount of the improvement costs to be assessed to each member governmental unit may take into consideration the land use for which said additional lands are being acquired and may credit the acquiring municipality for said land acquisition to the extent that it benefits the other members of this agreement. Any credits may be applied to the cost allocation of the improvement project under construction or the Board if feasible and necessary may defer said credits to a future project.

If any member unit refuses to negotiate or condemn lands as ordered by the Board, any other member may negotiate or condemn outside its corporate limits in accordance with the aforesaid Chapter 117. All members agree that they will not condemn or negotiate for land acquisition to pond or drain storm and surface waters within the corporate boundaries of another member within the Bassett Creek watershed except upon order of the Board of this Commission.

The Commission shall have authority to establish land acquisition policies as a part of the overall plan. The policies shall be designed to equalize costs of land throughout the watershed. Said policy is contained in the existing watershed management plan and may be continued in any revised overall plan required by Minnesota Statutes.

Subdivision 11. Pollution Control and Water Quality. The Commission shall have the authority and responsibility to protect and improve water quality in the watershed as this is one of the main purposes set forth in the Surface Water Management Act. All member governmental units agree that they will refuse to allow the drainage of sanitary sewage or industrial wastes onto any land or into any watercourse or storm sewer draining into Bassett Creek. The Board may investigate on its own initiative and shall investigate upon petition of any member all complaints relating to pollution of surface water or groundwater draining into or affecting Bassett Creek or its tributaries. Upon a finding that the creek or surface waters or groundwater are being polluted, the Board shall order the member governmental unit to abate this nuisance and each member agrees that it will take all reasonable action available to it under the law to alleviate the pollution and to assist in protecting and improving the water quality of surface water and groundwater in the watershed.

Subdivision 12. Local Water Management Plans. The Commission shall have power and authority to review the members' local water management plans, capital improvement programs and official controls required by Minnesota Statutes Section 103B. 235 and/or by rules promulgated and adopted by the Board of Water and Soil Resources. The members also understand that the overall plan and capital improvement program required for the entire watershed must consist of the local parts in the plan and therefore every effort shall be made by

the Commission to coordinate the local plans with the watershed's overall plan. The members further understand and agree that upon completion and approval of the overall plan required by Minnesota Statutes 103B. 231, each member will be required to present their local management plan to the Commission as required by Minnesota Statutes, Section 103B. 235. It is therefore important that each member provide the Commission with their best effort to coordinate and plan for the individual member's local plan at the same time the watershed overall plan is being assembled.

FINANCES

VIII.

Subdivision 1. The Commission funds may be expended by the Board in accordance with this agreement and in accordance with the procedures as established by law and in the manner as may be determined by the Board. The Board shall designate one or more national or state bank or trust companies, authorized by Chapters 118 and 427 of the Minnesota Statutes to receive deposits of public moneys and to act as depositories for the Commission funds. In no event shall there be a disbursement of Commission funds without the signature of at 1east two Board members, one of whom shall be the Treasurer or his Authorized Deputy Treasurer. The Treasurer shall be required to file with the Secretary of the Board a bond in the sum of at least $10,000 or such higher amount as shall be determined by the Board. The Commission shall pay the premium on said bond.

Subdivision 2. The members agree to contribute all cash, bank deposits, and other assets held by the Bassett Creek Water Management Commission to the new Bassett Creek Watershed Management Commission to carry out the purposes of the Commission. Each member governmental unit has contributed its proportionate share of said funds based on the net tax capacity and area of all taxable property within the Bassett Creek watershed.

Subdivision 3. Each member agrees to contribute each year to a general fund, said fund to be used for general administration purposes including, but not limited to: salaries, rent, supplies, development of an overall plan, insurance, and bonds, and to purchase and maintain devices to measure hydrological and water quality data. Said funds may also be used for normal maintenance of the facilities, but any extraordinary maintenance or repair expense shall be treated as an improvement cost and processed in accordance with Subdivision 4 of this Article. The annual contribution by each member shall be based fifty percent (50%)on the net tax capacity of all property within the watershed and fifty percent (50%) on the basis of the total area of each member within the boundaries of the Watershed each year to the total area in the Bassett Creek watershed. In no event shall any assessment require a contribution to exceed one-half of one percent of the net tax capacity within the watershed.

Subdivision 4.

(a) An improvement fund shall be established for each improvement project instituted under Article VII, Subdivision 3. Each member agrees to contribute to said fund its proportionate share of the engineering, legal and administrative costs as determined by the amount to be assessed against each member as a cost of the improvement. The Board shall submit in writing a

statement to each member, setting forth in detail the expenses incurred by the Commission for each project.

Each member further agrees to pay to or contract with the member governmental unit awarding said contract for the improvement, its proportionate share of the cost of the improvement in accordance with the determination of the Board under Article VII, Subdivision 5. The member awarding the contract shall submit in writing copies of the engineer's certificate authorizing payment during construction and the member being billed agrees to pay its proportionate share of said improvement costs within 30 days after receipt of the statement. The member awarding the contract shall advise other contributing members of the tentative time schedule of the work and the estimated times when the contributions shall be necessary.

(b) Notwithstanding the provisions of paragraph (a) of this subdivision, the Commission may by a vote of 2/3rds of all eligible votes of the then existing members of the Commission decide to proceed to fund all or any part of the cost of a capital improvement contained in the capital improvement program of the plan pursuant to the authority and subject to the provisions set forth in Minnesota Statutes, Section 103B. 251. The Commission and Hennepin County may establish a maintenance fund to be used for normal and routine maintenance of an improvement constructed in whole or in part with money provided by Hennepin County pursuant to Minnesota Statutes, Section103B. 251. The levy and collection of an ad valorem tax levy for maintenance shall be by Hennepin County based upon a tax levy resolution adopted by a majority vote of all eligible members of the Commission and remitted to the County on or before the date prescribed by law each year. If it is determined to levy for maintenance, the Commission shall be required to follow the hearing process established by Minnesota Statutes, Section103D. 915 and103D. 921and acts amendatory thereof and in addition thereto. Mailed notice shall be sent to the Clerk of each member municipality at least 30 days prior to the hearing.

Subdivision 5. On or before July1 of each year, the Board shall adopt a detailed budget for the ensuing year and decide upon the total amount necessary for the general fund. Budget approval shall require a favorable vote by a majority of all eligible votes of the then existing members of the Board.

The Secretary of the Board shall certify the budget on or before July 1 to the clerk of each member governmental unit together with a statement of the proportion of the budget to be provided by each member. The Council of each member agrees to review the budget, and the Board shall upon notice from any member received prior to August 1, hear objections to the budget, and may, upon notice to all members and after a hearing, modify or amend the budget, and then give notice to the members of any and all modifications or amendments.

Each member agrees to provide the funds required by the budget and said determination shall be conclusive if no member enters objections in writing on or before August 1. If no objections are submitted to the Board, each member agrees to provide the funds approved by the Board, after the Board has conducted the aforementioned hearing. Modifications or amendments to the original budget require a favorable vote by a majority of all eligible voters of then existing members of the Board.

The budget shall not in any event require any member to contribute in excess of one-half of one percent of the net tax capacity of all taxable property within the watershed and within said members corporate boundaries.

The schedule of payments by the members shall be determined by the Board in such a manner as to provide for an orderly collection of the funds needed.

Upon notice and hearing, the Board by a favorable vote of a majority of all eligible votes of then existing members may adopt a supplemental budget requiring additional payments by the members within 60 days of its adoption but in no event shall the budget require any member to contribute in excess of one-half of one percent of the net tax capacity of all taxable property within the watershed or within any member's corporate boundaries in any one calendar year.

Members' attention is drawn to Minnesota Statutes, Section 103B. 245, which authorizes a Watershed Management Tax District to be created within each member City to pay the costs of planning and for the purpose of paying capital costs and/or normal and routine maintenance of facilities.

Subdivision 5. Cost Allocation. All capital costs incurred by the Commission shall be apportioned to the respective members on either (l), (2), or (3) of the following bases:

(1) A negotiated amount to be arrived at by the members who have lands in the subdistrict responsible for the capital improvement.

(2) (a) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the real property valuation net tax capacity of each member within the boundaries of the watershed each year to the total real property valuation net tax capacity in the Bassett Creek watershed area governed by this Agreement.

(b) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the total area of each member within the boundaries of the watershed each year to the total area in the Bassett Creek watershed area governed by this Agreement.

(c) Capital costs allocated under the 50% area/50% net tax capacity formula herein set forth may be varied by the Commission by a 2/3rds vote if:

(1) any member community receives a direct benefit from the capital improvement which benefit can be defined as a lateral as well as a trunk benefit, or

(2) the capital improvement provides a direct benefit to one or more members which benefit is so disproportionate as to require in a sense of fairness a modification in the 50/50 formula.

(d) Credits to any member for lands acquired by said member to pond or store storm and surface water shall be allowed against costs set forth in Subsections (a), (b), and (c) of this Section.

(3) If the project is constructed and financed pursuant to Minnesota Statutes, Section 103B. 251, the members understand and agree that said costs will be levied on all taxable property in the watershed as set forth in the statute.

MISCELLANEOUS PROVISIONS

IX.

Subdivision 1. The Commission shall not have the power to issue certificates, warrants or bonds.

Subdivision 2. The Commission shall not have the power of eminent domain and shall not own any interest in real property. All interests in lands shall be held in the name of the corporate member wherein said lands are located.

Subdivision 3. The Commission shall not have the power to levy a special assessment upon any privately or publicly owned land. All such assessments shall be levied by the member wherein said lands are located. It shall have the power to require any member to contribute the costs allocated or assessed according to the other provisions of this agreement.

Subdivision 4. Each member agrees that it will not directly or indirectly collect or divert any additional surface water to the Mississippi River or its tributaries from any subdistrict or subtrunk without a permit from the Board of Commissioners. Permits may be granted by the Board for a member to proceed with the construction or reconstruction of improvements within the individual corporate members' boundaries and at its sole cost upon a finding:

(a) that there is an adequate outlet; and
(b) that said construction is in conformance with the overall plan; and
(c) that the construction will not adversely affect other members of this agreement.

Subdivision 5. Any member who is more than 60 days in default in contributing its share to the general fund shall have the vote of its Board member suspended pending the payment of its proportionate share.

Any member who is more than 60 days in default in contributing its proportionate share of the cost of any improvement to the contracting member shall upon application of the contracting member have the vote of its Board member suspended, pending the payment of its proportionate share.

Any Board member whose vote is under suspension shall not be considered as an eligible member as such membership affects the number of votes required to proceed on any matter under consideration by the Board.

DURATION

X.

Subdivision l. Each member agrees to be bound by the terms of this agreement until January 1, 2025, and it may be continued thereafter at the option of the parties.

Subdivision 2. This agreement may be terminated prior to January 1, 2025, by the unanimous consent of the parties. If the agreement is to be terminated, a notice of the intent to

dissolve the Commission shall be sent to the Board of Water and Soil Resources and to Hennepin County at least 90 days prior to the date of dissolution.

Subdivision 3. In addition to the manner provided in Subdivision 2 for termination, any member may petition the Board to dissolve the agreement. Upon 90 days notice in writing to the clerk of each member governmental unit and to the Board of Water and Soil Resources and to Hennepin County, the Board shall hold a hearing and upon a favorable vote by a majority of all eligible votes of then existing Board members, the Board may by Resolution recommend that the Commission be dissolved. Said Resolution shall be submitted to each member governmental unit and if ratified by three-fourths of the councils of all eligible members within 60 days, said Board shall dissolve the Commission allowing a reasonable time to complete work in progress and to dispose of personal property owned by the Commission.

DISSOLUTION

XI.

Upon dissolution of the Commission , all property of the Commission shall be sold and the proceeds thereof, together with monies on hand, shall be distributed to the eligible members of the Commission. Such distribution of Commission assets shall be made in proportion to the total contribution to the Commission as required by the last annual budget.

EFFECTIVE DATE

XII.

This agreement shall be in full force and effect upon the filing of a certified copy of the resolution approving said agreement by all nine members. Said resolution shall be filed with the Chair of the existing Bassett Creek Watershed Management Commission (presently W. Peter Enck of the City of New Hope), who shall notify all members in writing of its effective date and shall set the date for the next meeting to be conducted under this amended Joint Powers Agreement.

IN WITNESS WHEREOF, the undersigned governmental units, by action of their governing bodies, have caused this agreement to be executed in accordance with the authority of Minnesota Statutes Sections 103B. 211 and 471.59.

CONTRACT NO.

03-15

COOPERATIVE AGREEMENT

CITY OF ST. LOUIS PARK

City of St. Louis Park and Minnehaha Creek Watershed District

POWELL ROAD STORMWATER DIVERSION PROJECT

This Cooperative Agreement ("Agreement") is made by and between the Minnehaha Creek Watershed District, a watershed district with purposes and powers as set forth at Minnesota Statutes Chapters 103B and 103D (District), and the City of St. Louis Park, a home rule charter city in the State of Minnesota ("St. Louis Park").

Recitals

A. The City of Hopkins ("Hopkins") owns and operates a municipal system to collect and convey stormwater from a catchment of 217 acres more or less, principally within the Hopkins, as delineated on Attachment A hereto. The conveyance passes into St. Louis Park, where it conducts the stormwater without flow management or water quality treatment to an outfall into Minnehaha Creek. St. Louis Park holds the authority to maintain that part of the conveyance within its boundaries.

B. The District owns a parcel of land of about 17 acres within Hopkins and adjacent to Minnehaha Creek (the "Property"). The District is performing feasibility work to assess the siting of a stormwater infiltration basin or similar practice that would provide water quality treatment for stormwater runoff from an area including this catchment, manage stormwater peak flow and volume, and reduce sediment discharge into the creek from bank erosion and downstream flooding.

C. The District and Hopkins have entered or will enter into a project agreement in which the responsibility is allocated between them for design, construction and maintenance of proposed improvements consisting of modification to the stormwater conveyance system, with associated structural appurtenances, to divert stormwater presently discharged directly to Minnehaha Creek to the stormwater practice on the Property (the "Project").

D. St. Louis Park supports the Project and concurs that it will benefit St. Louis Park by reducing the discharge of pollutants from the conveyance that it owns and operates into receiving waters located within St. Louis Park.

E. The purpose of this Agreement is to establish terms for cooperation in the Project. The Project will lie on and under Powell Road, private property and both public and private rail right-of-way.

THEREFORE St. Louis Park and the District agree as follows:

1.0 DESIGN

1.1 The District may proceed with Project design and to that end will retain a professional engineering consultant to prepare plans and specifications for the Project. The design will provide for connection of a diversion pipe to the conveyance within the Powell Road right-of-way in Hopkins, with a pump and other appurtenances, so that lower flows will be diverted from the conveyance but high flows will continue to flow north as presently into that part of the conveyance maintained by St. Louis Park. Attachment A depicts the alignment of the present conveyance and proposed diversion.

1.2 During the design process, St. Louis Park, in a timely fashion, will:

(a) Specify reasonable terms and conditions for work in and adjacent to its Powell Road right-of-way;

(b) Give the District all information it possesses regarding subsurface conditions and rights of third parties within and adjacent to the affected right-of-way; facilitate coordination with such third parties; and facilitate resolution of any actual or potential concerns as to the effect of Project construction or maintenance on third party rights and facilities;

(c) Otherwise advise the District of any requirements or interests that may affect the plans, specifications and construction including any technical considerations for the stormwater conveyance system.

1.3 The District will obtain easements, permits and other approvals necessary to construct and maintain the Project. St. Louis Park will process any permits or approvals it requires promptly and will not impose on the District any fees for those permits or approvals.

1.4 St. Louis Park will be given the opportunity to review and comment on 90 percent plans and will do so promptly.

2.0 CONSTRUCTION

2.1 The District may award a contract to construct the Project and proceed with construction. The District will manage the construction contract, but will give St. Louis Park advance notice of all formal pre-construction and construction meetings, which St. Louis Park may attend. St. Louis Park will not direct the contractor.

2.2 For work within the St. Louis Park right-of-way, the District's contract will require that:

(a) The contractor name St. Louis Park as an additional insured for general liability, on a primary basis and for both ongoing work and completed operations;

(b) The contractor will indemnify St. Louis Park for the contractor's negligent acts and those of its subcontractors;

(c) The contractor will be responsible to locate and protect all utilities;

(d) The contractor will provide a performance bond for the completion of the Project;

(e) The contractor will comply with local traffic and site control requirements; and

(f) The contractor will restore or repair any damage to St. Louis Park's lands, equipment or facilities resulting from the contractor's activities.

2.3 Until Hopkins accepts the Project per subsection 3.1, below, the District and its contractor may occupy St. Louis Park right-of-way within areas so designated in the plans and specifications, including to stage and operate equipment and vehicles, stockpile excavation and fill materials, store materials, maintain erosion and sediment control practices, and otherwise as necessary or convenient to construct the Project.

2.4 In performing its responsibilities under this section 2.0, including its securing of any work in progress insurance, the District is not assuming the role or authority of an owner of St. Louis Park right-of-way or an operator of St. Louis Park's stormwater infrastructure. The District assumes no responsibility for any pre-existing environmental condition within St. Louis Park right-of-way disturbed by the Project.

3.0 MAINTENANCE

3.1 The project agreement referenced in recital C above provides that on certification of Project substantial completion by the District's engineer and the delivery of record drawings to Hopkins, Hopkins will provide written acceptance of same and at that time will assume ownership of the Project infrastructure, including but not limited to all pumps, manholes and other appurtenances, and the responsibility to maintain that infrastructure. The District will monitor this maintenance responsibility so that there is no hydraulic obstruction in the diversion that risks damage to St. Louis Park's portion of the conveyance north of the diversion or increased maintenance cost for St. Louis Park related thereto.

3.2 St. Louis Park will maintain its portion of the conveyance north of the diversion so as not to impair the design function of the diversion.

3.3 The District may temporarily occupy St. Louis Park right-of-way to inspect and repair any part of the Project located in or adjacent to it. The District will coordinate with St. Louis Park in advance of any such work to minimize disruption to other uses of the right-of-way. The District may assign rights and responsibilities under this paragraph to Hopkins.

4.0 COST RESPONSIBILITIES and REMEDIES

4.1 St. Louis Park will bear its own administrative costs to perform its roles under this Agreement and its costs of maintenance under subsection 3.2.

4.2 St. Louis Park does not otherwise bear any cost related to the design, construction or maintenance of the Project.

4.3 Each party holds harmless, and agrees to defend and indemnify, the other party from and against that portion of any and all liability, loss, claim, damage or expense (including reasonable attorney fees, costs and disbursements) that the indemnified party may incur as a result of the performance of this Agreement due to any negligent act or omission of the indemnifying party or any other act or omission that subjects the indemnifying party to liability in law or equity.

4.4 St. Louis Park holds the District harmless from and against that portion of any and all liability, loss, claim, damage or expense (including reasonable attorney fees, costs and disbursements) arising from a pre-existing environmental condition on St. Louis Park right-of-way.

4.5 Notwithstanding subsections 4.3 and 4.4, this Agreement creates no right in and waives no immunity, defense or liability limit with respect to any third party or the other party to this Agreement. This Agreement is not a joint powers agreement under Minnesota Statutes §471.59 and nothing herein constitutes either party's agreement to be responsible for the acts or omissions of the other party pursuant to subdivision 1a of that statute.

4.6 Only contractual remedies are available for the failure of a party to fulfill the terms of this Agreement.

5.0 PROJECT REPRESENTATIVES

5.1 Each communication under this Agreement will be made to the following representatives:

MCWD:

Project Manager, Powell Road Project
Minnehaha Creek Watershed District
15320 Minnetonka Boulevard
Minnetonka MN 55345-1503

CITY:

Phillip Elkin, Senior Engineering Project Manager
City of St. Louis Park
5005 Minnetonka Boulevard
St. Louis Park, MN 55416

A party may change its contact by written notice to the other party.

IN WITNESS WHEREOF the parties execute this Agreement by their authorized officers.

CITY OF ST. LOUIS PARK

By _____ Date: 1/23/15
Its Mayor

By _____ Date: 1/23/15
Its City Manager

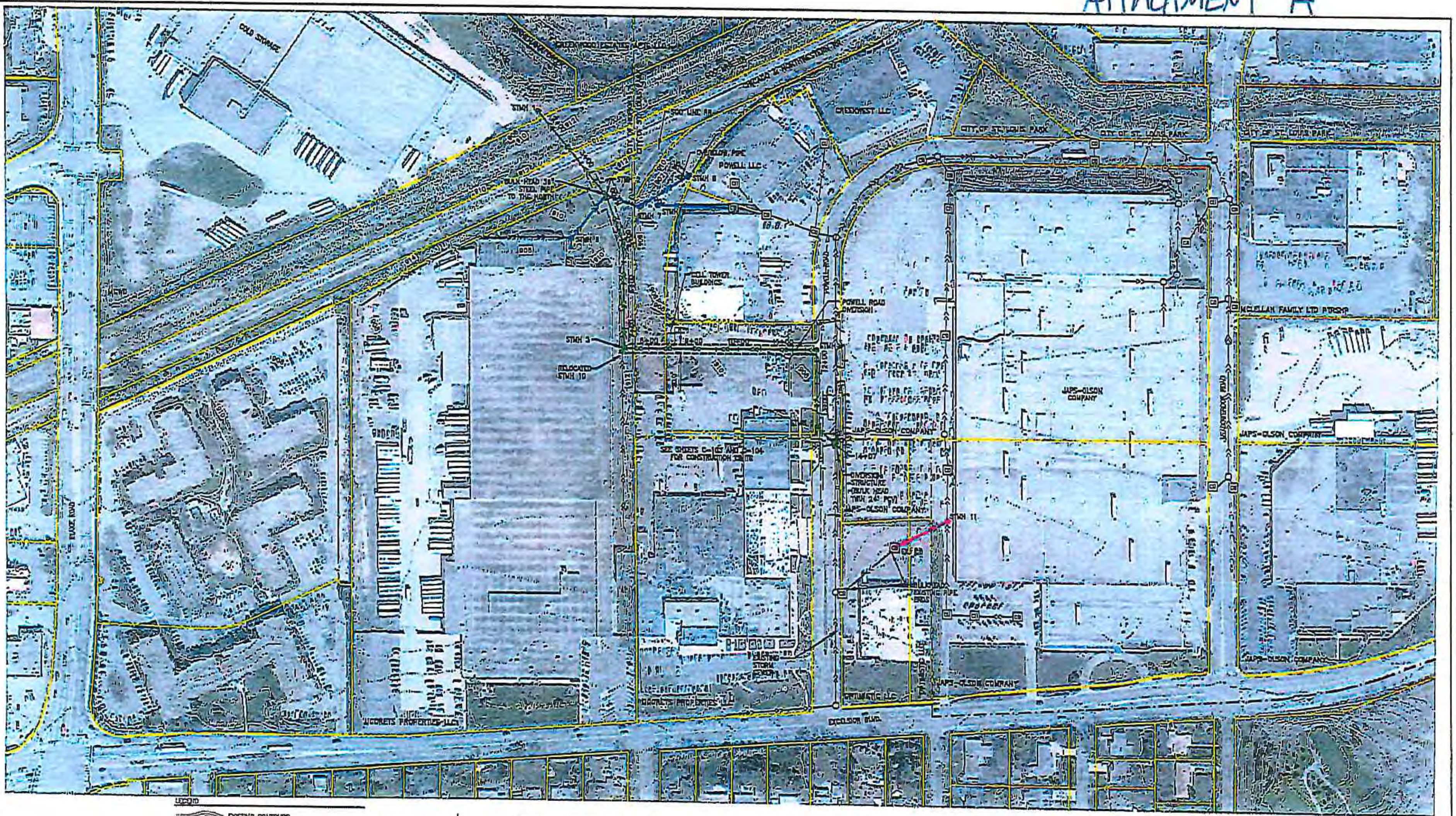
MINNEHAHA CREEK WATERSHED DISTRICT

By Sherry Davis White Date: 1-29-2015
Its President

Approved for form and execution:

_____
MCWD Counsel

ATTACHMENT A



LEGEND

- EXISTING CONTOURS
- CITY BOUNDARY LINES
- EXISTING STORM SEWER
- DIVERSION FOR REGIONAL TREATMENT
- LOCAL DRAINAGE DIVERSION
- LOCAL DRAINAGE DIVERSION (ALT. BID)
- UCORETS PROPERTY LLC
- PROPOSED EASEMENT

N

0 100 200

GRAPHIC SCALE IN FEET

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	ISSUED FOR FINAL	JVB	JNT	10/08/14

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: JOEL TOSO

SIGNATURE:

DATE: 10/08/2014 REG. NO. 18630

PRIME CONSULTANT

Wenck

© Wenck Associates, Inc. Consulting Engineers

PROJECT TITLE

CONSTRUCTION PLANS FOR POWELL ROAD STORMWATER DIVERSION PROJECT

MINNEHAHA CREEK WATERSHED DISTRICT

QUALITY OF WATER, QUALITY OF LIFE

SHEET TITLE

PROPOSED OVERALL SITE LAYOUT

DWN BY	CHK'D	APP'D	DWG DATE	AUGUST 2014
JVB	JT	JT	SCALE	AS SHOWN
PROJECT NO.	SHEET NO.		REV NO.	
0185-5087	C-102		1	

CONTRACT NO.

05-16

CITY OF ST. LOUIS PARK

MEMORANDUM of UNDERSTANDING

**Between the Minnehaha Creek Watershed District
and the City of St. Louis Park
for Local Water Planning and Regulation**

This Memorandum of Understanding (MOU) is made this 24th day of March KRS, 2016 by and between the Minnehaha Creek Watershed District, a watershed district with purposes and powers as set forth at Minnesota Statutes Chapters 103B and 103D ("MCWD"), and the City of St. Louis park, a body corporate and politic and a statutory city in the State of Minnesota ("City").

Recitals and Statement of Purpose

WHEREAS, in 2007, the MCWD revised its comprehensive watershed management plan under Minnesota Statutes § 103B.231, which details the existing physical environment, land use and development in the watershed, and establishes a plan to regulate water resource use and management to protect water resources, improve water quality, prevent flooding, and otherwise achieve the goals of Minnesota Statutes Chapters 103B and 103D;

WHEREAS, the MCWD's comprehensive watershed management plan incorporates the Rules adopted by the MCWD to protect water resources, improve water quality, prevent flooding and otherwise achieve the goals of Minnesota Statutes Chapters 103B and 103D;

WHEREAS, the City has developed a local water management plan under Minnesota Statutes § 103B.235 that describes the existing and proposed physical environment and land use within the City and sets forth an implementation plan for bringing local water management into conformance with the MCWD's comprehensive watershed management plan;

WHEREAS, on September 3, 2009, the MCWD Board of Managers conditionally approved the City's local water management plan by adoption of Resolution 09-087, which resolution is attached to and incorporated herein as Exhibit A, and the City satisfied the conditions therein;

WHEREAS, the City now wishes to assume sole permitting responsibility in the area of erosion control, but to continue to authorize MCWD to exercise permitting authority with respect to all other areas regulated by the MCWD;

WHEREAS, MCWD approval of a local plan requires a finding that the official controls of the local government are at least as protective of water resources as the MCWD rules;

WHEREAS, the finding by the MCWD Board of Managers in this regard with respect to permitting areas other than erosion control, rested on the City's authorization of the MCWD's continued exercise of regulatory authority within the City in accordance with Minnesota Statutes § 103B.211, subdivision 1(a)(3);

WHEREAS the MCWD Board of Managers finds that the City's erosion control ordinance[s], attached to and incorporated herein as Exhibit B, are at least as protective of water resources as MCWD's Erosion Control Rule;

WHEREAS, the MCWD and City desire to memorialize their respective roles in implementing water resource protection and management within the City;

NOW THEREFORE, it is mutually agreed by and between the parties that they enter into this MOU in order to document the understanding of the parties as to the roles and responsibilities of each party.

1.0 Responsibilities of the City

1.1 The City may exercise all present and future authority it otherwise may possess to issue permits for and regulate activities affecting water resources within the City.

1.2 The City is solely responsible for permitting for purposes of erosion control within the City. The City will regulate these activities in accordance with the City's approved local water management plan and the terms of this MOU.

1.3 The City will not issue a variance from an above-referenced ordinance until the MCWD has approved the variance and proposed conditions. On receipt of a property owner's or agent's request for a variance from the above-reference ordinance(s), the City promptly will transmit a copy of the variance request and supporting documentation to the MCWD for review.

1.4 The City will maintain a log of permits it grants pursuant to this MOU, will provide the log to the MCWD annually and will meet at least annually with the MCWD to review the implementation of the City's local water management plan and erosion control ordinance[s].

2.0 Responsibilities of the MCWD

2.1 The MCWD will continue to apply and enforce its Rules, as they may be amended from time to time, within the City except for erosion control, which will not apply within the City.

2.2 The MCWD will review and issue a decision on any variance request transmitted to it by the City in accordance with paragraph 1.3 herein within 45 days of receipt.

2.3 The MCWD will meet with the City at least annually to review the implementation of the City's local water management plan and erosion control ordinance[s].

2.4 The MCWD retains the right to enforce any and all of its rules in the event that the City is unable or unwilling to carry out its obligations listed in Section 1.0 of this MOU.

2.5 The MCWD retains all authority that it may possess under Minnesota Statutes Chapters 103B and 103D or any other provision of law, except as explicitly reposed in the City under this MOU, including but not limited to authority set forth at Minnesota Statutes § 103B.211, subd. 1(a); 103D.335 and 103D.341.

3.0 Amendment

This MOU may be amended only by a writing signed by both of the parties.
IN WITNESS WHEREOF, the parties hereto have executed this Memorandum of Understanding.

CITY OF ST. LOUIS PARK

By _____ Date: 1/25/16
Mayor

By _____ Date: 1/20/16
City Manager

MINNEHAHA CREEK WATERSHED DISTRICT

By Sherry Davis White Date: 3-24-2016
President, Board of Managers

APPROVED AS TO FORM AND EXECUTION

By _____
Its Attorney

APPROVED AS TO FORM AND EXECUTION

By _____
Its Attorney

St. Louis Park
MINNESOTA

Meeting: City Council
Meeting Date: January 19, 2016
Consent Agenda Item: 4g

EXECUTIVE SUMMARY

TITLE: Memorandum of Understanding with Minnehaha Creek Watershed District for Erosion Control Permitting Authority

RECOMMENDED ACTION: Motion to Approve the Memorandum of Understanding (MOU) with the Minnehaha Creek Watershed on consolidating permitting authority for Construction Stormwater Management.

POLICY CONSIDERATION: Does the City Council wish to enter into the attached MOU with the Minnehaha Creek Watershed for Erosion and Sediment Control Permitting?

SUMMARY: The Engineering Department developed the attached MOU with the Minnehaha Creek Watershed District (MCWD) to reduce redundant construction permitting requirements. Currently, residents seeking building permits within the City need to obtain similar Erosion and Sediment Control permits from both the City of St. Louis Park and the MCWD. This MOU will expedite building permit issuance, especially for single family home construction and remodeling. In order to obtain this MOU from the MCWD, the City of St. Louis Park has demonstrated that the existing permit application, plan review, permit issuance, and inspection processes are consistent with MCWD regulations and are already in place.

FINANCIAL OR BUDGET CONSIDERATION: There are no additional financial or budgetary considerations for obtaining construction stormwater management permitting authority, as these processes are already in place.

VISION CONSIDERATION: St. Louis Park is committed to being a leader in environmental stewardship. We will increase environmental consciousness and responsibility in all areas of city business.

SUPPORTING DOCUMENTS: Memorandum of Understanding

Prepared by: Erick Francis, Water Resources Manager
Reviewed by: Phillip Elkin, Sr. Engineering Project Manager;
Debra Heiser, Engineering Director
Approved by: Tom Harmening, City Manager

Bassett Creek Watershed Management Commission

February 21, 2018

Erick Francis
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park MN 55416

RE: 2017 Water Education Activities – Letter of Understanding

Dear Erick,

This letter is to serve as an official arrangement between the Bassett Creek Watershed Management Commission (BCWMC) and the City of St. Louis Park. The City of St. Louis Park provides financial contributions to the BCWMC through an annual assessment based on area within the watershed and tax valuation of property in the watershed. In 2017 this assessment was $19,463. Further, watershed commissioners representing St. Louis Park and St. Louis Park city staff participate in, guide, and help implement the programs of the BWCMC, including its public education program.

Education-related activities of the BCWMC are guided by its 2015 Watershed Management Plan, specifically its education and outreach policies (Section 4.2.9), and its overall Education and Outreach Plan found in Appendix B. http://www.bassettcreekwmo.org/document/wmp-plans. The specific activities of the BCWMC public outreach and education program are set annually by the Commission after recommendations are forwarded by the BCWMC Education and Outreach Committee.

In 2017, the BCWMC performed or participated in the following education and outreach activities:

BCWMC Website - The BCWMC maintained its new user-friendly website in 2017 and maintained the information including latest news, contact list, meeting calendar, meeting materials, watershed plan, data, and projects. In 2017, there were approximately 6,945 with 22,849 page views.

West Metro Water Alliance (WMWA) Membership – The BCWMC continued its participation in WMWA along with several watershed management and other water-related organizations in the west Metro area. Through WMWA, these organizations collaborated on educational campaigns including the Watershed PREP program aimed at educating 4th grade students about water resources and the impacts of stormwater. In 2017, 121 classes totaling 3,249 students attended Watershed PREP lessons within the WMWA watersheds, including 1,083 students in the Bassett Creek Watershed. In 2017 WMWA published three newsletters called Water Links. The newsletter was sent via email to over one thousand subscribers through Hennepin County. WMWA also continued its "Pledge to Plant" campaign aimed at engaging residents and businesses in converting turf or hard surfaces to native plantings http://www.westmetrowateralliance.org/ .

Metro WaterShed Partners Membership —The BCWMC participated as a member of the Metro WaterShed Partners as a general supporter of the program and a financial supporter of the Metro Clean Water Minnesota Media Campaign. Metro Watershed Partners maintains a listserve and a website as forums for information sharing, holds monthly meetings for members to collaborate, and displays an exhibit at the State Fair to educate the public about watersheds. In 2017, the Clean Water Minnesota Media Campaign began

featuring monthly, seasonally appropriate stories about metro area residents taking action at home and in their lives to keep water clean. These professionally produced stories and photos were used by partners across a variety of media platforms. The BCWMC used these stories in newsletters, social media, and on it homepage. www.cleanwatermn.org .

Participation in Community Events and Meetings – The BCWMC began using its new educational display materials (including watershed map, banners, and bean bag toss game) and participated in the Plymouth Home Expo, the Golden Valley Arts and Music Festival, a restoration event at Westwood Nature Center. Give-aways included dog waste disposal bag dispensers, watershed maps, cups showing the amount of deicer needed for a certain space, and written educational materials.

Parking Lot & Winter Maintenance Training Course – The BCWMC hosted a free "Parking Lot and Sidewalk Winter Maintenance Workshop" at Crystal's Community Center. Twenty-one city staff, private applicators, and parks district staff attended the 5-hour course. Most participants took an exam to become certified in level one "smart salting."

Signs at Creek Crossings – The BCWMC designed and purchased eight creek identification signs for placement where roads cross Bassett Creek. Two signs were installed on Douglas Drive in Golden Valley, one on each side of the creek. Three more stream crossings in Golden Valley will be posted in 2018.

Partnership with Metro Blooms for Harrison Neighborhood Project – The BCWMC continued its partnership and support of Metro Blooms' Harrison Neighborhood Project. The project aims to engage residents, train youth, and install water quality practices in Minneapolis' Near North neighborhood. The BCWMC received a $100,000 grant from the Met Council for this project on behalf of Metro Blooms in 2016 and was awarded a Clean Water Fund grant from the MN Board of Water and Soil Resources that will be executed in 2017.

Volunteer Monitoring Programs – The BCWMC entered agreements with the Metropolitan Council and Hennepin County to participate in the Citizen Assisted Monitoring Program (CAMP) and the River Watch Program, respectively.

Commissioner Training Sponsorship – The BCWMC reimbursed Commissioners for registration costs to attend the Road Salt Symposium, Water Resources Conference, and the DNR's Aquatic Invasive Species Detection Training.

Social Media – The BCWMC started a Facebook page and continues with weekly posts. The page currently has 192 followers. In 2017, the BCWMC made 101 posts and reached 35,010. BWCMC continues to work on growing its Facebook followers.

Financial Sponsorship for Organizations – The BCWMC financially sponsored Metro Blooms and the Children's Water Festival.

Due to the City of St. Louis Park's financial contributions and close involvement and participation with the BCWMC's activities, the BCWMC's education activities can and should be considered part of the city's implementation of Minimal Control Measures (MCM) 1 and 2 in the MS4 stormwater permit.

Please let me know if you have any questions or require further information.

Sincerely,

Laura Jester, Administrator

STORMWATER POLLUTION PREVENTION PROGRAM (SWPPP)

City of St. Louis Park

March 2019

MS4 Owner

City of St. Louis Park

Mailing Address

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Hennepin County

Name(s) of Responsible Officials

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Acronyms

BCWMC	Bassett Creek Watershed Management Commission
BMP	Best Management Practice
CAMP	Citizen-Assisted Monitoring Program
CFR	Code of Federal Regulations
CWA	Clean Water Act
EPA	Environmental Protection Agency
ERP	Enforcement Response Procedures
ESC	Erosion and Sediment Control
GIS	Geographic Information System
IDDE	Illicit Discharge Detection and Elimination
MCM	Minimum Control Measures
MCWD	Minnehaha Creek Watershed District
MEP	Maximum Extent Practicable
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer Systems
NPDES	National Pollutant Discharge Elimination System
SLP	St. Louis Park
SOP	Standard Operating Procedures
SWMM	Stormwater Management Model
SWMP	Surface Water Management Plan
SWPPP[1]	Stormwater Pollution Prevention Program
TMDL	Total Maximum Daily Load
WHNC	Woodland Hills Nature Center
WLA	Waste Load Allocation

I. Background and Introduction

The United States (U.S.) Congress enacted the Federal Water Pollution Control Act (Act) to "enhance the quality and value of our water resources and to establish a national policy for the prevention, control, and abatement of water pollution" in 1948. The Act has been amended several times, with the most notable amendment in 1977, which changed the name of the Act to the Clean Water Act (CWA). The CWA established a structure for regulating point and nonpoint source discharges to waters of the U.S. and gave the U.S. Environmental Protection Agency (EPA) authority to implement pollution control programs. The EPA delegated the administration of those programs to some state agencies, including the Minnesota Pollution Control Agency (MPCA) for the state of Minnesota.

Phase I of the EPA's Stormwater Discharge Regulations (40 Code of Federal Regulations [CFR] Part 122) promulgated in 1990 instituted a National Pollutant Discharge Elimination System (NPDES) permit for all facilities/projects/municipalities that fell into one of the following three categories: 1) stormwater discharges associated with industrial activities, 2) stormwater discharges associated with construction activities disturbing five (5) acres or more of land, or 3) discharges from medium- and large-sized municipal separate storm sewer systems (MS4s). Phase II of the Stormwater Discharge Regulations (40 CFR 122.26, Stormwater Discharges applicable to State NPDES Programs) was promulgated in 1999. Phase II redefined and expanded the MS4-regulated areas to include military bases, universities, and other entities that exist within locales defined as "Urban Areas" or small-sized MS4s by the U.S. Census Bureau. In response to these federal regulations, after years of development, public comment, and contested case hearings, the MPCA published the Phase I and II Stormwater Program rules and issued the associated general permit.

The City of St. Louis Park ("City" or "St. Louis Park") is one of many communities within the Twin Cities metropolitan area that is federally required to obtain an NPDES MS4 permit for managing nonpoint source stormwater discharges. As part of the NPDES MS4 permit process, St. Louis Park is required to develop and implement a Stormwater Pollution Prevention Program (SWPPP) with measurable goals for regulating and improving nonpoint and point source pollutant discharges to the waters of the U.S. to the maximum extent practicable (MEP).

The following sections describe the City and present the City's SWPPP.

II. Description

Located in the east central portion of Hennepin County just west of Minneapolis, the 10.7-square-mile city of St. Louis Park is a fully developed first-ring suburban community. It is bordered by the cities of Minneapolis on the east, Golden Valley and Plymouth on the north, Hopkins and Minnetonka on the west, and Edina on the south. The population of St. Louis Park is approximately 48,800 residents, making it the 20th-largest city in Minnesota.

St. Louis Park contains a variety of natural resources, including several wetlands and small lakes, wooded areas, parks, and recreational lands, as well as the Minnehaha Creek corridor. Two watershed management organizations cover St. Louis Park, each with its own governing body: the Bassett Creek Watershed Management Commission (BCWMC) and the Minnehaha Creek Watershed District (MCWD). They comprise 12 percent and 88 percent of the City, respectively.

St. Louis Park's population has been relatively stable since 1980. Most of the city was developed in the 1950s and 1960s and is experiencing some moderate redevelopment today. St. Louis Park's land use consists of predominantly low-density residential areas with interspersed park and open areas. Residential areas consist of small residential lots of approximately 1/5 of an acre. Commercial, office, industrial, and other high-density land uses generally occur along the major transportation corridors nearby, such as Interstate 394, Highway 7, Excelsior Boulevard, Highway 100, and Highway 169.

Because much of the city developed before many major standards and regulations related to wetlands, water quantity, and water quality were implemented, the city has had to retroactively update its surface water management and treatment infrastructures. As this redevelopment occurs, stormwater management practices can be incorporated into the system. St. Louis Park's stormwater system consists of approximately 110 miles of underground pipe ranging in size from 12 inches to 102 inches, 12 lift stations, 22 lakes and ponds, and more than 3,000 catch basins. Ninety percent of the city's streets are curb and gutter systems. Stormwater within the city drains to the two watersheds, Basset Creek and Minnehaha Creek, with the Mississippi River as the terminus.

III. The Stormwater Pollution Prevention Program

The City's SWPPP must implement practices that align with the six minimum control measures (MCM) of the NPDES permit summarized below in Table III.1.

TABLE III-1: Minnesota Pollution Control Agency Required Six Minimum Control Measures Elements

Minimum Control Measures	Description
Public Education and Outreach	Develop and implement a public education program to distribute educational materials and perform equivalent outreach that informs the public of the impact stormwater discharges have on water bodies; this includes actions citizens, businesses, and other local organizations can take to reduce the discharge of pollutants to stormwater.
Public Participation/Involvement	Provide opportunities through a public participation/involvement program to solicit public input on the development and implementation of the Stormwater Pollution Prevention Program.
Illicit Discharge Detection and Elimination (IDDE)	Develop, implement, and enforce a plan to detect and eliminate illicit discharges into a small municipal separate storm sewer system (MS4).
Construction Site Runoff Control	Develop, implement, and enforce a construction site stormwater runoff control program that reduces pollutants in stormwater runoff to the small MS4 from construction activity with a land disturbance of greater than or equal to one (1) acre, including projects of less than one acre that are part of a larger common plan of development or sale.
Postconstruction Storm Water Management	Develop, implement, and enforce a postconstruction stormwater management program that prevents or reduces water pollution after construction activity is completed, related to new development and redevelopment projects with land disturbance of greater than or equal to one (1) acre, including projects of less than one acre that are part of a larger common plan of development or sale.
Pollution Prevention/Good Housekeeping	Develop and implement an operations and maintenance program that prevents or reduces the discharge of pollutants from city-owned/operated facilities and operations to the small MS4.

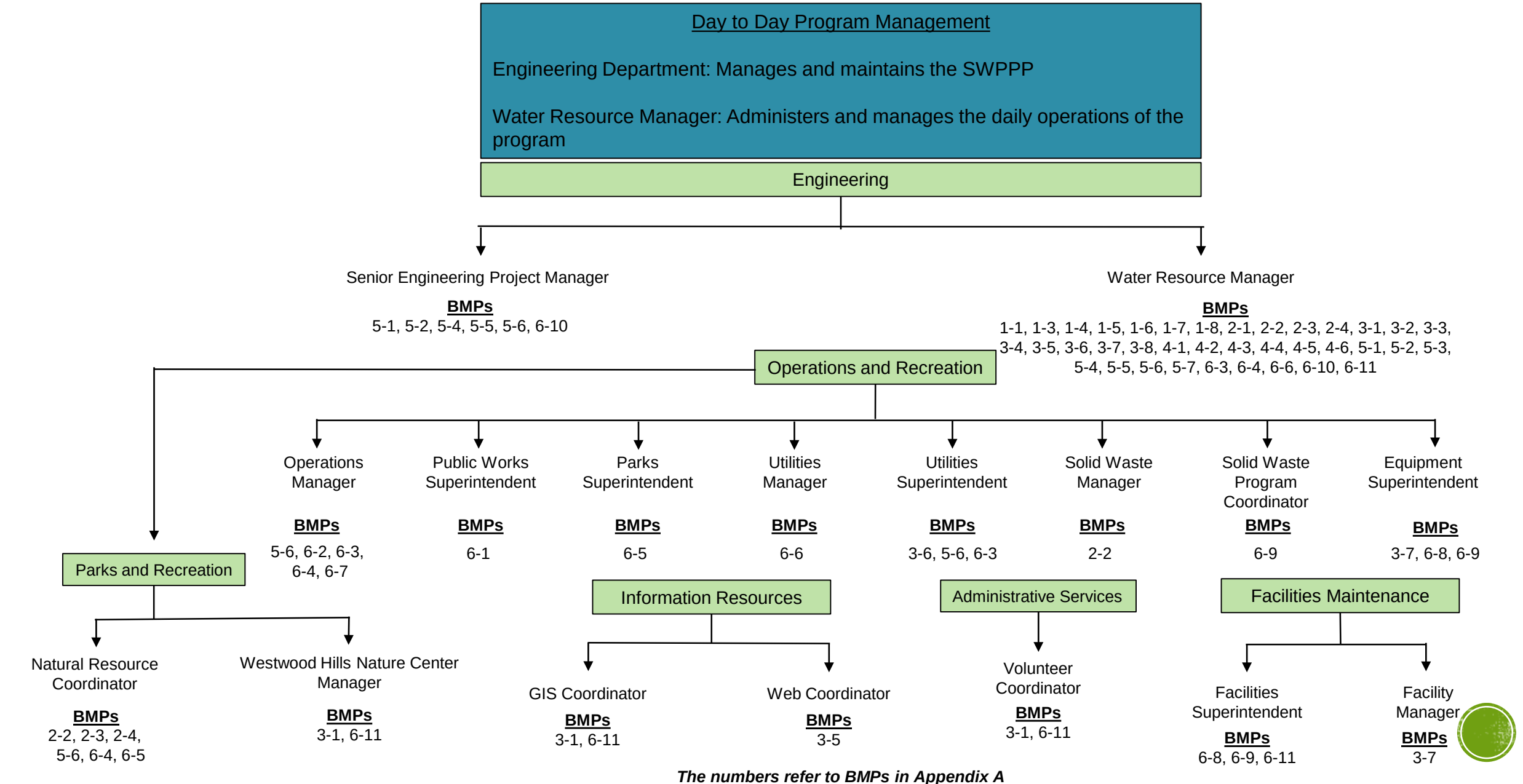
The city developed its first SWPPP in 2003 and has periodically updated it to incorporate new understandings of stormwater management and to retire ineffective practices. This SWPPP and other reference documents (such as standard operating procedure [SOPs], St. Louis Park City Code Sec.12-151 to 12-168… etc.) detail measures taken by the city to reduce discharge of pollutant-laden stormwater that may reach U.S. waters, namely Bassett Creek, Minnehaha Creek, and the Mississippi River. Additionally, it describes measurable goals and outcomes and general best management practices (BMPs) for construction and postconstruction stormwater management; includes a program evaluation process (e.g., monitoring, recordkeeping, and reporting); and conforms to the requirements set forth by the MPCA General Permit MNR040000 Authorization to Discharge Stormwater Associated with Small MS4s under the NPDES/State Disposal System Permit Program (MS4 NPDES Permit) effective August 2013 through July 2018.

St. Louis Park operates under the council-manager form of government. An elected city council sets the policy and overall direction for St. Louis Park. City staff, under the direction of a professional city manager, accountable to the city council, carry out council decisions and provide day-to-day city services. The responsibility for carrying out the MS4 permit and associated stormwater management activities is shared by various departments within St. Louis Park. However, day-to-day MS4 permit and SWPPP administration and compliance are the responsibility of the Water Resources Manager in the Engineering Department. Figure III-1 presents the city's organizational chart, and Tables III 2–3 present the Communication Plan and Tracking Chart, respectively.

St. Louis Park is committed to being a leader in environmental stewardship through its goal of increasing environmental consciousness and responsibility in all areas of City business and management. This commitment means that merely complying with the NPDES MS4 permit is not enough. In 2000, the City implemented a stormwater utility fee to provide revenue for stormwater management (e.g., master planning, regulatory oversight and enforcement, remedial maintenance, and capital projects). Additionally, the City exhibits leadership through its education and outreach program, operation and maintenance program, and regulatory mechanisms, all of which are captured in Appendix A: Minimum Control Measures—Best Management Summary Sheets.

FIGURE III-1: St. Louis Park Stormwater Pollution Prevention Program Organization Chart

MS4 SWPPP Responsible Parties Organizational Charts



The numbers refer to BMPs in Appendix A

TABLE III-2: St. Louis Park Stormwater Pollution Prevention Program Communication Plan

COMMUNICATIONS MATRIX

Project Name:	MS4 Permit Stormwater Pollution Prevention Program (SWPPP)
City:	St. Louis Park
Project Manager Name:	Water Resources Manager
Project Description:	SLP MS4 Stormwater Pollution Prevention Program Communication Plan

ID[1]	Communication Vehicle[2]	Target Audience[3]	Description/Purpose[4]	Frequency[5]	Owner[6]	Distribution Vehicle[7]	Internal / External[8]	Comments[9]
1-1	Stormwater Management Educational Materials Meeting	General Public	This meeting will be conducted at the end of the year and/or early in the year to plan and discuss the educational materials that will be produced and where/when/how they will be published throughout the year.	Semi-annually	Water Resources Manager	E-mail In person Handouts Social media	Internal	The number of articles published, and partners engaged with should be documented. These educational activities should be reported in the Annual Report to the MPCA.
1-2	Nature Center Activity Report	Project Team	A report summarizing programming, attendees, and materials distributed will be published quarterly.	Quarterly	WHNC Manager	E-mail	Internal & External	The report will focus on surface water, stormwater, and other environmental education programs.
1-6	Field Employee Training Manual	Project Team	Annual training to review and discuss SOPs, organizational charts, MCM BMPs, regulations, etc.	Annually	Water Resources Manager	Training	Internal	Training will be held annually, and attendance will be logged.
1-8	Rainwater Rewards Annual Report	Project Team	An annual summary report of the number of applications received and funded.	Annually	Water Resources Manager	E-mail	Internal & External	
2-1	SWPPP Public Notice Meeting	General Public	Meeting to provide information to the public about the SWPPP and to solicit input. The meeting will be noticed in the local newspaper, and information will be put on the city's website informing the public of meeting time(s) and location(s), as well as of the 10-day public comment period.	Annually	Water Resources Manager	Web Page Public Notice, Sun Sailor Social Media	External	Input from the Senior Engineering Program Manager may be required for this meeting. A summary report of the comments received should be prepared. Feasible public comments should be considered to be incorporated into the SWPPP. Changes in watershed state and federal requirements that may require an amendment to the SWMP should be reviewed.

[1] ID: A unique ID number used to identify the communication within the communication matrix. It also connects to the primary SWPPP minimum control measure it addresses and meeting can be held concurrently.
[2] Communication Vehicle: This column should be populated with a description of the type of communication that will be conducted.
[3] Target Audience: This field should be populated with a description of the target audience for this communication vehicle.
[4] Description/Purpose: This field should be populated with a description of the purpose of the communication.
[5] Frequency: This field should be populated with the frequency of which the communication will be distributed.
[6] Owner: This field should be populated with the name of the owner of the communication.
[7] Distribution Vehicle: This filed should be populated with the type of distribution vehicle that will be used to disseminate the communication.
[8] Internal/External: This field should indicate if the communication is for internal, external, or both internal and external distribution.
[9] Comments: This column should be populated with any additional comments.

COMMUNICATIONS MATRIX

Project Name:	MS4 Permit Stormwater Pollution Prevention Program (SWPPP)
City:	St. Louis Park
Project Manager Name:	Water Resources Manager
Project Description:	SLP MS4 Stormwater Pollution Prevention Program Communication Plan

ID[1]	Communication Vehicle[2]	Target Audience[3]	Description/Purpose[4]	Frequency[5]	Owner[6]	Distribution Vehicle[7]	Internal / External[8]	Comments[9]
2-3	Cleanup Event Meeting	Project Team	Meeting to organize and facilitate household cleanup event(s) and cleanup activities adjacent to water resources in the city.	Quarterly	Volunteer Coordinator	E-mail	Internal & External	Input from the Natural Resources Coordinator, Volunteer Coordinator, WHNC Manager, and Solid Waste Manager may be required for this meeting. The number of events, participants, loads disposed of, waterbodies cleaned, and their locations should be documented.
2-4	Lake and Stream Monitoring Annual Report	Project Team	An annual report will be developed documenting the number of volunteers, lakes monitored, and citizen-assisted monitoring program (CAMP) activities undertaken within the city.	Annually	Water Resources Manager	E-mail	Internal & External	Input from the Natural Resources Coordinator may be required. Information will be solicited annually from the Bassett Creek Water Management Commission and Minnehaha Creek Watershed District on their citizen monitoring programs.
3-3	IDDE Plan Meeting	General Public	The meeting will consist of reviewing public informational documents and updates to the city's website.	Quarterly	Water Resources Manager	E-mail	Internal & External	A review of illicit discharge reports will occur, and the number of violations identified and resolved will be discussed and documented.
3-6	Wellhead Protection Plan Meeting	Project Team	This meeting will be held to discuss areas that need to be reviewed per the plan.	Annually	Water Resources Manager	E-mail	Internal	Input from the Utilities Superintendent will be required for this meeting.
4-1	City Ordinances Review Meeting	Project Team	This meeting will consist of reviewing the city's ordinances 12-157,1 2-156, 12-158, and Ch. 12 Article V. based on enforcement and inspection activities.	Annually	Water Resources Manager	E-mail	Internal	

COMMUNICATIONS MATRIX

Project Name:	MS4 Permit Stormwater Pollution Prevention Program (SWPPP)
City:	St. Louis Park
Project Manager Name:	Water Resources Manager
Project Description:	SLP MS4 Stormwater Pollution Prevention Program Communication Plan

ID[1]	Communication Vehicle[2]	Target Audience[3]	Description/Purpose[4]	Frequency[5]	Owner[6]	Distribution Vehicle[7]	Internal / External[8]	Comments[9]
4-2	Site Plan Review Meeting	Developer and Contractors	This meeting will cover the number of site plans reviewed for permitting as well as review the application process for any improvements that can be made. Reviews of infrastructure design and construction should also be reviewed and updated as necessary. This meeting will also discuss erosion and sedimentation control on construction sites. Financial securities for these types of activities shall also be discussed and documented.	Quarterly	Water Resources Manager	E-mail	Internal	Input from the Senior Engineering Project Manager may be required for this meeting. The number of permitted projects and inspections, and the number and type of enforcement actions taken will be documented.
4-6	Erosion Control Inspector Meeting	Project Team	This meeting will address certification requirements and updates to inspection protocols.	Annually	Water Resources Manager	E-mail	Internal	Trained and certified inspectors will be tallied. Inspectors will be updated on additional training requirements, as needed.
5-2	Stormwater Management Plan Review Meeting	Project Team	This meeting will consist of reviewing stormwater management plans for completeness and compliance with city ordinances.	Annually	Water Resources Manager	E-mail	Internal & External	Input from the Senior Engineering Project Manager Senior Planner may be required for this meeting. A report summarizing the number of projects reviewed and permitted will be produced.
5-6	Storm Sewer System Meeting	Project Team	This meeting will discuss, plan, and address maintenance and operation of the storm sewer system. This meeting will also discuss the structural pollution control device inspection reports. Review and revise the Operations and Maintenance Program of storm water infrastructure. An annual maintenance summary will be kept, including the number of maintenance agreements established. Employee training in these areas will also be discussed and planned. A review of inspection results every two years will be conducted to see if changes in the maintenance program need to be made. The street sweeping program will also be discussed and changed as necessary.	Annually	Water Resources Manager	E-mail	Internal	This meeting requires input from the Public Works Superintendent, Utilities Superintendent, Utilities Manager, Operations Manager, and GIS Coordinator. Any changes made to the storm sewer system should be updated and reflected on the Storm Sewer Map.

COMMUNICATIONS MATRIX

Project Name:	MS4 Permit Stormwater Pollution Prevention Program (SWPPP)
City:	St. Louis Park
Project Manager Name:	Water Resources Manager
Project Description:	SLP MS4 Stormwater Pollution Prevention Program Communication Plan

ID[1]	Communication Vehicle[2]	Target Audience[3]	Description/Purpose[4]	Frequency[5]	Owner[6]	Distribution Vehicle[7]	Internal / External[8]	Comments[9]
5-7	Impaired Waters Meeting	Project Team	This meeting consists of reviewing/updating the impaired waters map and actions being taken to address that area.	Annually	Water Resources Manager	E-mail	Internal	Produce a report summarizing the number of projects underway and the performance of those projects.
6-7	Annual Snowplow Meeting	Project Team	This meeting will consist of reviewing the amount of salt and other products used, number of spreaders calibrated, and corrective practices and issues employed during street de-icing.	Annually	Operations Manager	Training	Internal	Document the amount of salt and other products used, number of spreaders calibrated, and the number of employees in attendance at the meeting.
6-11	Facilities Meeting	Project Team	The meeting will consist of reviewing mapped facilities and making recommendations for modifications, where warranted. The meeting will also review and update the city's procedures and emergency response to spills. Inspection of stockpiles, storage, and material handling areas will be planned and documented. Procedures for materials handling will also be reviewed and updated. Maintenance of city vehicles will also be discussed.	Quarterly	Water Resources Manager	E-mail	Internal	This meeting will require input from the Equipment Superintendent and Facilities Manager. A report will be produced summarizing the amount of fertilizer, pesticide, and herbicide used by the city and maintain a list of employees who are trained to handle these materials. A hazardous materials inventory will be maintained and updated. Hazardous material and annual “Right to Know” employee training will be administered. The number of spills over and under 5 gallons will be documented and reported. The number of vehicles maintained, and the volume of materials recycled will be tracked.

TABLE III-3: St. Louis Park Stormwater Pollution Prevention Program Annual Goal Tracking Chart

Annual Goal Tracking Chart						
BMP #	**BMP Implementation Strategy**	**Responsible Person**	**Measurable Goals**	**Goals and schedule met?**	**Following year priority?**	**Comments**
MCM 1 - Public Education and Outreach						
1-1	Stormwater Education Program	Water Resource Manager	Track materials produced and distributed			
			Number of educational articles published			
			Website analytics			
1-2	Environmental Programming at Westwood Hills Nature Center (WHNC)	Westwood Hills Nature Center Manager	Record events, visitors and program attendees			
			Quantities and descriptions for materials distributed			
1-3	Education Plan Implementation and Coordination	Water Resource Manager	Track materials produced and distributed			
			Number of educational articles published			
			Track number of partners			
1-4	Evaluate Public Education and Outreach Strategies	Water Resource Manager	Complete annual review and evaluation			
			Complete summary spreadsheet			
1-5	Communications Plan	Water Resource Manager	Implement Communication Plan			
1-6	Employee Training Program	Water Resource Manager	Complete annual training			
			Attendance log			
			Update SWPPP organizational chart, as needed			
1-7	Participate in Clean Water Minnesota	Water Resource Manager	Maintain membership			
1-8	Rainwater Rewards Program	Water Resource Manager	Number of applications received			
			Number of applications funded			
MCM 2 - Public Involvement/Participation						
2-1	Opportunities for Public Input on the SWPPP	Water Resource Manager	Complete public notice requirement			
			Document public comments received (verbal or written)			
			Incorporate feasible public input into SWPPP			
2-2	Household Cleanup Events	Water Resource Manager	Number of events completed			
		Solid Waste Manager	Number of participants or loads disposed of			
		Natural Resource Coordinator				
2-3	Continue Volunteer Opportunities	Volunteer Coordinator	Track volunteers			
		Natural Resource Coordinator	Document waterbodies cleaned and locations			
		Westwood Hills Nature Center Manager	Document trash collected			
		Water Resource Manager				

Annual Goal Tracking Chart						
BMP #	**BMP Implementation Strategy**	**Responsible Person**	**Measurable Goals**	**Goals and schedule met?**	**Following year priority?**	**Comments**
2-4	Lake and Stream Monitoring	Natural Resource Coordinator	Number of volunteers			
		Water Resource Manager	Number of lakes monitored in CAMP			
			Annual monitoring reports from BCWMC and MCWD			
MCM 3 - Illicit Discharge Detection and Elimination						
3-1	Storm Sewer Map	Water Resource Manager	Maintain updated database and map			
		GIS Coordinator				
3-2	Regulatory Control Program	Water Resource Manager	Review ordinance and Enforcement Response			
			Procedures for updates if needed based on inspections and monitoring			
3-3	Illicit Discharge Detection and Elimination Program	Water Resource Manager	Review brochure(s) for updates if needed			
			Review website for updates if needed			
			Review IDDE Plan for updates if needed			
3-4	Illicit Discharge Inspection Training and Inspections	Water Resource Manager	Attendance logs			
			Designate priority illicit discharge inspection areas			
			Review and evaluate training program			
			Number of illicit discharges identified			
3-5	Illicit Discharge Webpage and Reporting	Water Resource Manager	Review webpage and My SLP App for updates, as needed			
		Web Coordinator	Document and track reports received			
			Review Enforcement Response Procedures and documentation information			
3-6	Implement Wellhead Protection Plan	Water Resource Manager	Development review(s) in vulnerable areas			
		Utilities Superintendent				
3-7	Spill Reduction for Municipal Operations	Water Resource Manager	Number of spills under and over 5 gallons reported			
		Equipment Superintendent	Number of employees trained			
		Facility Manager	Update written procedures if needed			
3-8	Enforcement Response Procedures (ERP)	Water Resource Manager	Documentation of all relevant information			
			Number of violations			
			Number of violations resolved			
MCM 4 - Construction Site Stormwater Runoff Control						
4-1	Ordinance or Other Regulatory Mechanism	Water Resource Manager	Updates to ordinance, as needed			

Annual Goal Tracking Chart						
BMP #	**BMP Implementation Strategy**	**Responsible Person**	**Measurable Goals**	**Goals and schedule met?**	**Following year priority?**	**Comments**
4-2	Procedure for Site Plan Review	Water Resource Manager	Number of site plans reviewed			
			Review permit application packages and checklists annually for updates			
4-3	Construction Sites and Erosion Control Inspections	Water Resource Manager	Number of permitted projects			
			Number of inspections			
			Number of enforcement actions			
4-4	Erosion Control Enforcement	Water Resource Manager	Record number and type of enforcement actions			
4-5	Financial Securities	Water Resource Manager	Number of financial securities			
			Number of retained financial securities			
4-6	Erosion Control Inspection Training	Water Resource Manager	Number of trained/certified inspectors			
MCM 5 - Post Construction Stormwater Management						
5-1	Design and Construction Standards	Water Resource Manager	Review guidance and standards materials annually, update as needed			
		Senior Engineering Project Manager				
5-2	Plan Review and Approval Procedures	Water Resource Manager	Number of projects reviewed			
		Senior Engineering Project Manager	Number of permitted projects			
5-3	Development Agreements	Water Resource Manager	Number of development agreements			
5-4	Ordinance or Other Regulatory Mechanism	Water Resource Manager	Updates to ordinance, as needed			
		Senior Engineering Project Manager				
5-5	Surface Water Management Plan (SWMP)	Water Resource Manager	Review watershed plans (as updated) to incorporate into SWMP through a formal amendment process			
		Senior Engineering Project Manager	Annually update SWPPP in conjunction with submitting Annual Report to the MPCA			
5-6	Long-term Operation and Maintenance of BMPs	Water Resource Manager	Annual maintenance summary			
		Senior Engineering Project Manager	Number of maintenance agreements established			
		Utilities Superintendent				
		Operations Manager				
		Natural Resource Coordinator				

Annual Goal Tracking Chart						
BMP #	**BMP Implementation Strategy**	**Responsible Person**	**Measurable Goals**	**Goals and schedule met?**	**Following year priority?**	**Comments**
5-7	Review of Impaired Waters with approved Total Maximum Daily Loads (TMDLs) and applicable Waste Load Allocations (WLAs)	Water Resource Manager	Review/Update the impaired waters map			
			Tally of projects that decrease constituents of concern and the total number of lbs. sequestered.			
MCM 6 - Pollution Prevention/Good Housekeeping for Municipal Operation						
6-1	Municipal Operations and Maintenance Program	Public Works Superintendent	Review and revise operations and maintenance program, as needed.			
			Annual employee training			
6-2	Municipal Street Sweeping Program	Operations Manager	Number of lane miles swept			
			Number of loads collected			
6-3	Annual Inspection of All Structural Pollution Control Devices	Utilities Superintendent	Inspection reports			
		Operations Manager	Number of maintenance actions completed			
		Water Resource Manager				
6-4	Quarterly Stockpile, Storage, and Material Handling Program	Water Resource Manager	Quarterly inspections completed			
		Natural Resource Coordinator				
		Operations Manager				
6-5	Fertilizer, Pesticide, and Herbicide Application Program	Parks Superintendent	Number of employees trained, licensed			
		Natural Resource Coordinator	Quantity of products applied			
6-6	Inspection Analysis and Frequency	Water Resource Manager	Review inspection results every 2 years			
		Utilities Manager	Adjust programs when needed			
6-7	Street Deicing Program	Operations Manager	Number of employees trained			
			Amount of salt and other products used			
			Number of spreaders calibrated annually			
6-8	Fleet and Building Maintenance Program	Equipment Superintendent	Number of vehicles maintained			
		Facilities Supervisor	Volume of materials recycled			
			Number of employees trained			
6-9	Hazardous Material Storage and Recycling Program	Equipment Superintendent	Annual Right to Know training completed			
		Facilities Supervisor	Maintain inventory of hazardous materials			
		Solid Waste Program Coordinator				

Annual Goal Tracking Chart						
BMP #	**BMP Implementation Strategy**	**Responsible Person**	**Measurable Goals**	**Goals and schedule met?**	**Following year priority?**	**Comments**
6-10	Stormwater Treatment Effectiveness Assessment	Senior Engineering Project Manager Water Resource Manager	Evaluate the effective of treatment practices every 3 - 5 years and, where warranted, recommend modifications			
6-11	Facilities Inventory	GIS Coordinator Water Resource Manager Facilities Supervisor	Review mapped facilities and, where warranted, recommend modifications			

APPENDIX A: MINIMUM CONTROL MEASURES—BEST MANAGEMENT PRACTICE SUMMARY SHEETS

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-1

Minimum Control Measures Addressed by this BMP

X	Public education & outreach	X	Construction site runoff controls
X	Public participation & involvement	X	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Stormwater Education Program

BMP Description:
Stormwater education is critical for the successful implementation of the city's Stormwater Pollution Prevention Plan (SWPPP) and for achieving its goal of protecting and improving water quality. The city has a comprehensive surface water education and outreach program outlined in its Standard Operating Procedure (SOP), which contains the required inclusions of the MS4 NPDES Permit. City staff develop, coordinate, and distribute materials to various audiences to promote consistent stormwater messaging through various communication channels. Materials focus on informing the public about the impacts of stormwater runoff on water quality, and it informs and educates the public on how the city manages stormwater runoff through implementation of the SWPPP. Educational materials, including the SWPPP, are available on the city's Stormwater Management webpage. Educational materials are also placed at public offices for distribution or viewing. City staff also dedicates time and resources to coordinating outreach events, such as stormwater events, open houses, presentations, and other events with various civic groups.

Measurable Goals:	**Timeline / Implementation Schedule:**
Track materials produced and distributed Number of educational articles published Website analytics	Currently implemented and will continue annually

Specific Components & Notes (optional):
Materials and information generated, distributed and promoted address topics in all MCMs for the current MS4 NDPES Permit (2013-2018).

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager	**Department:**	Engineering

Components related to this BMP (description or number – optional):

Audience:	Residents, contractors, community groups, schools, and partnering organizations
Goals:	Promote general awareness and understanding of the stormwater management, runoff pollution prevention, and environmental stewardship.
Activities:	Develop and distribute brochures, newsletters, and other communication channels. Review the city's surface and Stormwater Management webpage quarterly and update, as appropriate. Participate in and facilitate stormwater events, open houses, presentations, and other events, as deemed appropriate.
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-2

Minimum Control Measures Addressed by this BMP

X	Public education & outreach	-	Construction site runoff controls
X	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Environmental Programming at Westwood Hills Nature Center (WHNC)

The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential
Westwood Hills Nature Center (WHNC) is a 160-acre natural area, featuring marsh, woods, and restored prairie. Within the WHNC is a beautiful area that is home to many animals including deer, foxes, minks, and owls. Westwood Naturalists conduct year-round programs for visitors of all ages to increase the visitors' understanding and appreciation of our natural world and aspects of surface and stormwater quality and quantity management. WHNC, owned and operated by the city, also hosts and advertises volunteer opportunities featuring educational programming, special events (e.g., tree plantings, trash cleanups), and habitat restoration.

Measurable Goals:	**Timeline / Implementation Schedule:**
Record events, visitors and program attendees Quantities and descriptions for materials distributed	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Westwood Hills Nature Center Manager	**Department:**	Parks and Recreation

Components related to this BMP (description or number – optional):

Audience: Residents, visitors of all ages

Goals: To provide age appropriate environmental education and stewardship to all visitors.

Activities: Year-round activities include youth and school trips, facility/shelter rentals, and equipment rentals for Activities: canoes, snowshoeing, kick sleds, and fishing equipment. Volunteer activities include the Naturalists and Junior Naturalist programs, Natural Resource Stewards, and maintenance or administrative support opportunities.

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-3

Minimum Control Measures Addressed by this BMP

X	Public education & outreach	X	Construction site runoff controls
X	Public participation & involvement	X	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Education Plan Implementation and Coordination

The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential
This SWPPP will be hosted on the city's website along with related educational materials. The minimum control measures found in Section 1: Public Education and Outreach of the city's SWPPP and SOP serve as the Education Plan. The best management practices are coordinated to meet specific activities and schedules that reach measurable goals for each target audience. The city encourages interdisciplinary collaboration with watershed management organizations and other partners to increase educational efforts and cross-promote articles, events, or programs. The city also shares content and other resources with educational partners, when appropriate.

Measurable Goals:	**Timeline / Implementation Schedule:**
Track materials produced and distributed Number of educational articles published Track number of partners	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager	**Department:**	Engineering

Components related to this BMP (description or number – optional):

Audience:	Residents, business owners, developers, and contractors
Goals:	Educate the public that live, work, and do business in the City on stormwater management goals, opportunities, and issues and ways to address pollution prevention
Activities:	Coordinate implementation activities according to the Section III.D.1. of the MS4 NPDES Permit in Appendix A.
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-4

Minimum Control Measures Addressed by this BMP

X	Public education & outreach	X	Construction site runoff controls
X	Public participation & involvement	X	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Evaluate Public Education and Outreach Strategies

The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential
The city will conduct a review of public education and outreach strategies used each year in conjunction with submitting the Annual Report to the Minnesota Pollution Control Agency. Annual reviews will assess educational measures, activities, and timelines for their ability to meet the goals of the city's SWPPP. Findings and implementation strategies for the upcoming year will be documented in the SWPPP summary.

Measurable Goals:	**Timeline / Implementation Schedule:**
Complete annual review and evaluation Complete summary spreadsheet	2018: Create tracking spreadsheet and continue future annual reviews

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: General public

Goals: To evaluate relevant and available educational information for public use

Activities: Annual evaluation

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-5

Minimum Control Measures Addressed by this BMP

X	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Communication Plan

The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential
The Communication Plan is an additional tool the city can utilize to further implement and organize the strategies required to assess and implement the SWPPP. The city's Communication Plan will further coordinate outgoing stormwater messages across all city communication channels. It outlines the quarterly (seasonal) messages to the public explaining how stormwater from public and private properties could impact water quality and includes the type of communication, target audience(s), timeline, and draft language and/or photos prepared each January.

Measurable Goals:	**Timeline / Implementation Schedule:**
Implement Communication Plan	2018: Develop Communication Plan. Review annually.

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager	**Department:**	Engineering

Components related to this BMP (description or number – optional):

Audience:	Residents, business owners, developers, contractors
Goals:	Promote general awareness and understanding of the stormwater management, runoff pollution prevention, and environmental stewardship.
Activities:	Implement Communications Plan
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-6

Minimum Control Measures Addressed by this BMP

X	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Employee Training Program

BMP Description:
City staff will arrange an annual training for field employees, as presented in the city's SOP. The training outlines responsible departments for each BMP contained in the city's SWPPP and the SOPs for implementing the BMPs. The training will address the importance of protecting water quality, introductory water quality protection concepts, current stormwater regulations, and requirements of the permit that are relevant to employee job duties. The training will also highlight the importance of achieving individual BMP goals to the overall effectiveness of the city's SWPPP. In addition to properly implementing BMPs to reduce the impact of city operations, field staff will be trained to recognize minimum control measures on construction sites and illicit discharges. City employees are provided a current SWPPP organizational chart to report any potential violations for further investigation. All training opportunities, including the dates and the names of employees in attendance, will be tracked, as best as possible.

Measurable Goals:	**Timeline / Implementation Schedule:**
Complete annual training Attendance log Update SWPPP organizational chart, as needed	Currently implemented and will continue annually. Train new and/or seasonal employees annually.

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience:	City field staff
Goals:	Address the importance of protecting water quality and cover the requirements of the permit that are relevant to the job duties of the employee
Activities:	Conduct annual training, provide SWPPP organizational chart
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-7

Minimum Control Measures Addressed by this BMP

X	Public education & outreach	-	Construction site runoff controls
X	Public participation & involvement	X	Post-construction stormwater management
X	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Participate in Clean Water Minnesota

BMP Description:
Clean Water Minnesota is an outreach program of the Metro Watershed Partners that celebrates metro-area residents who use water-friendly practices. The city is a member of Metro Watershed Partners and uses the information and assistance of Clean Water Minnesota to help educate residents on ways they can help protect lakes and other water bodies. Recent activities include metro-wide messages on using salt responsibly, taking small actions at home, cleaning up neighborhoods, and adopting a storm drain.

Measurable Goals:	**Timeline / Implementation Schedule:**
Maintain membership	Currently implemented and will continue annually as funding allows

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager	**Department:**	Engineering

Components related to this BMP (description or number – optional):

Audience: General public

Goals: Promote public understanding that inspires people to protect and improve lakes and rivers

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-8

Minimum Control Measures Addressed by this BMP

X	Public education & outreach	-	Construction site runoff controls
X	Public participation & involvement	X	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Rainwater Rewards Program

BMP Description:
The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential projects that effectively manage stormwater in the city. It may be used by residents implementing projects that do one or more of the following: (1) protect and restore stormwater by capturing pollutants in runoff, (2) increase the watershed's ability to store water, (3) preserve and restore native plant and wildlife communities, and (4) protect and preserve groundwater quality and quantity. Funding is awarded to applicants that meet specific criteria, including location in the watershed and the type of project proposed. To maintain the efficacy of the raingarden, a maintenance agreement is required specifying routine inspections.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of applications received Number of applications funded	Currently implemented and will continue annually as funding allows

Specific Components & Notes (optional):

Rainwater Rewards Program requires application and maintenance agreement

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager	**Department:**	Engineering

Components related to this BMP (description or number – optional):

Audience: St. Louis Park residents

Goals: Cost share with residents to reduce pollutants and/or runoff volume from property

Activities: Promote and manage program

Annual Summary:

St. Louis Park MINNESOTA
Experience LIFE in the Park

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 2-1

Minimum Control Measures Addressed by This BMP

X	Public education & outreach	X	Construction site runoff controls
X	Public participation & involvement	X	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Opportunities for Public Input on the SWPPP

BMP Description:
Provide at least one annual opportunity for the public to review and provide comments or input to the city's SWPPP and annual report. The opportunity may be an event or meeting. The city will provide a ten-day public-comment period published in the newspaper and on the city's website including the location to view the document(s). The city will document the date(s) and time(s) the event(s) were held and review all relevant input to determine if SWPPP modifications are necessary based on input received.

Measurable Goals:	**Timeline / Implementation Schedule:**
Complete public notice requirement	Post 10-day meeting notice
Document public comments received (verbal or written)	Currently implemented and will continue annually
Incorporate feasible public input into SWPPP	

Specific Components & Notes (optional):
The SWPPP, annual report, and other documentation is available for public review on the City's Stormwater Management webpage

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Residents, developers, business owners, and contractors

Goal: To inform the public on the status of the City's SWPPP and provide members of the public an opportunity to provide input on the SWPPP.

Activities: Notice the opportunity, solicit public input and document comments received.

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 2-2

Minimum Control Measures Addressed by This BMP

X	Public education & outreach	-	Construction site runoff controls
X	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Household Cleanup Events

BMP Description:
The city will hold two household-cleanup events each year where residents can bring garbage/refuse not accepted by their haulers. Examples of collected materials include electronics, tires, appliances, and general debris. This program reduces the number of potentially toxic or hazardous items illegally disposed of or dumped within the city. All materials collected are taken by licensed haulers and disposed of properly.

Measurable Goals:	**Timeline / Implementation Schedule:**
Completed events Number of participants or loads disposed of	Currently implemented and will continue twice a year

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Natural Resources Coordinator, Solid Waste Manager, Water Resources Manager	**Department:**	Operations and Recreation, Engineering

Components related to this BMP (description or number – optional):

Audience:	Residents
Goal:	Provide residents a local, accessible option to recycle and/or safely dispose of unwanted household items.
Activities:	Publicize the Household Clean Up event
Annual Summary:	

St. Louis Park MINNESOTA
Experience LIFE in the Park

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 2-3

Minimum Control Measures Addressed by This BMP

X	Public education & outreach	-	Construction site runoff controls
X	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Continue Volunteer Opportunities

BMP Description:
The city annually partners with several schools or community volunteer programs to provide opportunities to participate in cleaning up trash and debris from parks and areas adjacent to creeks, lakes, or ponds. The programs generally provide awareness of the amount of trash and debris that may accumulate and enter into the city's stormwater system. Typically, these events are held in the spring and summer months and focus on Earth Day or Arbor Day themes. Additionally, the Minnehaha Creek Watershed District (MCWD), Bassett Creek Watershed Management Commission (BCWMC), and WHNC annually coordinate a major cleanup effort where the city assists through outreach efforts using its website and social media networks. Trash collected is weighed, and disposal is coordinated with haulers.

Measurable Goals:
Track volunteers
Document waterbodies cleaned and locations
Document trash collected

Timeline / Implementation Schedule:
Currently implemented and will continue annually

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Volunteer Coordinator, Natural Resources Coordinator, WHNC Manager, Water Resources Manager	**Department:**	Administrative Services, Operations and Recreation, Parks and Recreation, Engineering

Components related to this BMP (description or number – optional):

Audience: Residents, school, or civic organizations

Goal: To provide a public participation opportunity that increases awareness of local water issues

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 2-4

Minimum Control Measures Addressed by This BMP

X	Public education & outreach	-	Construction site runoff controls
X	Public participation & involvement	X	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Lake and Stream Monitoring

BMP Description:
The city partners with the Metropolitan Council, Bassett Creek Watershed Management Commission (BCWMC) and Minnehaha Creek Watershed District (MCWD) on monitoring activities on annual lakes and streams. The Citizen-Assisted Monitoring Program is a Metropolitan Council program that allows volunteers to collect surface-water samples for analysis. The city gathers volunteers and pays for sample testing annually. This program tracks trends in lakes over time and offers a public participation opportunity for interested residents. The Minnehaha Creek Watershed District and the Bassett Creek Watershed Management Commission staff or consultants provide lake and stream monitoring.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of volunteers Number of lakes monitored in CAMP Annual monitoring reports from BCWMC and MCWD	Currently implemented and will continue annually 2018-2020: Evaluated monitoring opportunities based on future needs and trends

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Natural Resources Coordinator, Water Resources Manager	**Department:**	Operations and Recreation, Engineering

Components related to this BMP (description or number – optional):

Audience:	Residents, school or civic organizations looking to learn more about water quality
Goal:	To provide a public participation opportunity on water quality monitoring that will increase awareness of local water issues
Activities:	See BMP description above
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-1

Minimum Control Measures Addressed by This BMP

X	Public education & outreach	-	Construction site runoff controls
X	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Storm Sewer Map

BMP Description:
The city maintains a storm sewer map in a geographic information system showing the location of all structural infrastructure (e.g., catch basins, manholes, pipes 12" or greater, and lift stations) and all receiving waters. The map includes all outfalls, flow direction, unique identification numbers, and associated geographic coordinates. This map represents an integral part of the city's effective inspection and maintenance program. (See SWPPP Appendix B for 2018 Storm Sewer Map)

Measurable Goals:	**Timeline / Implementation Schedule:**
Maintain updated database and map	Update map annually with changes or redevelopment

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager, GIS Coordinator	**Department:** Engineering, Information Resources

Components related to this BMP (description or number – optional):

Audience:	City staff
Goal:	Enables City staff to view and analyze dynamic maps to enhance their daily operations, improve decision-making, and effectively respond to customer requests and emergency situations
Activities:	Update, as needed.
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-2

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Regulatory Control Program

BMP Description:
Only stormwater should be conveyed through the city's stormwater discharge system. Any other pollutants or discharges are considered illicit and prohibited. City Code 12-157 regulates the introduction of pollutants into the stormwater system. This regulatory mechanism effectively prohibits illicit connections and discharges into the stormwater system. The code and written Enforcement Response Procedures are designed to utilize the maximum extent practical to reduce the discharge of pollutants to protect water quality. The city has the authority to carry out all inspections and to monitor procedures necessary to ensure compliance with this ordinance.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review ordinance and Enforcement Response Procedures for updates if needed based on inspections and monitoring	Currently implemented and will continue annually

Specific Components & Notes (optional):
City Code Chapter 12: Environment and Public Health; Article V. Stormwater, Soil Erosion, And Sedimentation; Section 12-157 Illicit Discharge and Connection
Enforcement Response Procedures

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager	**Department:**	Engineering

Components related to this BMP (description or number – optional):

Audience: City Staff and Public

Goal: Educate the staff and the public on the importance of Illicit discharge detection and elimination (IDDE).

Activities: Maintain material on the City's Stormwater Management Webpage

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-3

Minimum Control Measures Addressed by This BMP

X	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Illicit Discharge Detection and Elimination Program

BMP Description:
The city will continue to implement the Illicit Discharge Detection and Elimination (IDDE) program outlined in its SOP. The Minimum Control Measures found in Section 3: Illicit Discharge Detection and Elimination of the city's SWPPP further outline the IDDE Program. BMPs herein are coordinated to meet specific activities and schedules that set measurable goals for each target audience. The IDDE Program focuses on providing a timely response to known, suspected, or reported illicit discharges. The city disseminates all IDDE information via its Illicit Discharge webpage, printed brochures for the public, and city staff trainings tailored to their work activities. The educational materials clearly state what the public should do if they suspect or witness an illicit discharge, and the materials include contact information for reporting. The materials also contain information about the city's proactive efforts to inspect for these harmful pollutants. Resources are used for both the public and new employees/seasonal field staff.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review brochure(s) for updates if needed Review website for updates if needed Review IDDE Plan for updates if needed	Currently implemented and will continue annually

Specific Components & Notes (optional):
Illicit Discharge Detection and Elimination Plan (2015)
See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Residents, city staff, contractors

Goal: Provide comprehensive resources to the public for identifying and eliminating potential illicit discharges

Activities: Provide updated brochures and website information

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-4

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Illicit Discharge Inspection Training and Inspections

BMP Description:
The city has incorporated illicit discharge detection into all maintenance and inspection activities for permanent and seasonal field staff. Staff will be made familiar with the program goals, able to recognize illicit discharges, and able to report them for further investigation to the proper contacts. The city may use dye testing, televise infrastructure with a camera, or use other means necessary to help track or detect illegal and/or improper connections to storm drainage systems and receiving waters. To prioritize inspections, the city will evaluate land uses associated with business/industrial activities, areas where illicit discharges have been identified in the past, and areas with storage or large quantities of materials that could result in an illicit discharge.

Measurable Goals:	**Timeline / Implementation Schedule:**
Attendance logs Designate priority illicit discharge inspection areas Review and evaluate training program Number of illicit discharges identified	Annually review potential priority inspection areas

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: City field staff

Goal: Train city field staff on spill reduction and response to limit impacts on water resources

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-5

Minimum Control Measures Addressed by This BMP

X	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Illicit Discharge Webpage and Reporting

BMP Description:
The city will continue to host an Illicit Discharge webpage and the My SLP app, providing information for both city staff and the public regarding investigating, locating, and eliminating illicit discharges.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review webpage and My SLP App for updates, as needed Document and track reports received Review Enforcement Response Procedures and documentation information	Currently implemented and will continue annually

Specific Components & Notes (optional):
Enforcement Response Procedures
See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager, Web Coordinator	**Department:** Engineering, Information Resources

Components related to this BMP (description or number – optional):

Audience: General public

Goal: Provide education and contact information for citizens and/or field staff to report potential illicit discharges for investigation

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-6

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Implement Wellhead Protection Plan

BMP Description:
The city currently has a Wellhead Protection Plan that includes an assessment of the city and management strategies to protect groundwater resources from contamination. This plan was reviewed and updated in 2015.

Measurable Goals:	**Timeline / Implementation Schedule:**
Development review(s) in vulnerable areas	Currently implemented and will continue annually

Specific Components & Notes (optional):
Wellhead Protection Plan Update (2015)
See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager, Utilities Superintendent	**Department:** Engineering, Operations and Recreation

Components related to this BMP (description or number – optional):

Audience: Residents, developers, businesses

Goal: To maintain or improve groundwater resources

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-7

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Spill Reduction for Municipal Operations

BMP Description:
The city operates a spill reduction and response program to prevent or contain hazardous waste from reaching the city's stormwater system. The city provides training for employees on storage, handling, and disposing of hazardous waste materials. In the event of a spill, the city's storm sewer map assists in identifying receiving waters and potential impacts for quick spill response, if required. Written emergency response procedures are available to all staff. The city supplies cleanup kits in vehicles and city buildings for immediate deployment, if needed.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of spills under and over 5 gallons reported Number of employees trained Update written procedures if needed	Currently implemented and will continue annually

Specific Components & Notes (optional):
See the City's SOP for additional information.

The City uses spill kits, designated storage and containers, written procedures for spill response, and MSDS training.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager, Equipment Superintendent, Facility Manager	**Department:**	Engineering, Operations and Recreation, Facilities Maintenance

Components related to this BMP (description or number – optional):

Audience: City staff

Goal: Train City staff on spill reduction and response to limit impacts on water resources

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-8

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Enforcement Response Procedures *(SWPPP Appendix C)*

BMP Description:
The city will follow the written Enforcement Response Procedures or ERP for responding to spills and notifying the Minnesota Department of Public Safety Duty Officer, if applicable. Following reports of alleged illicit discharges, the city will investigate and, if needed, document the name of the person responsible, date(s), and location(s) of the observed violation(s). In correspondence, the city will reference the relevant city code from Chapter 12 and outline corrective actions and the associated completion timeline. The city will conduct follow-up inspections and further document the date(s) and type(s) of enforcement used to compel compliance and refer to other regulatory agencies, if applicable. See SWPPP Apendix C for the city's ERP)

Measurable Goals:	**Timeline / Implementation Schedule:**
Documentation of all relevant information Number of violations Number of violations resolved	Currently implemented and will continue annually

Specific Components & Notes (optional):
Enforcement Response Procedures
City Code 12-156 Environment and Public Health; Article V. Stormwater, Soil Erosion, And Sedimentation

Responsible Party (refer to the organizational	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Residents, developers, contractors and city staff

Goal: Ensure procedures are developed to help the City enforce and achieve compliance with the ordinances when stormwater violations are discovered

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-1

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Ordinance or Other Regulatory Mechanism

BMP Description:
City Code Chapter 12 Environment and Public Health; Article V. Stormwater, Soil Erosion, and Sedimentation addresses reducing and controlling stormwater, soil erosion, and sedimentation within the city. It establishes standards and specifications for conservation practices and planning activities, which enhance water quality; minimize stormwater pollution, soil erosion, and sediment in waterways; and control the volume of water runoff to receiving streams and other water resources. This regulatory mechanism guides the city's Erosion and Sediment Control permitting and inspections program and contains provisions for enforcement, as well as penalties, if needed.

Measurable Goals:	**Timeline / Implementation Schedule:**
Updates to ordinance, as needed	Currently implemented and will continue annually

Specific Components & Notes (optional):
City Code Chapter 12 Environment and Public Health; Article V. Stormwater, Soil Erosion, And Sedimentation; Section 12-156 Construction Site Stormwater Runoff and Erosion Control

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: City staff, developers and contractors

Goal: Implement city requirements

Activities: Conduct plan reviews, ordinance reviews and enforcement

Annual Summary:

St. Louis Park MINNESOTA
Experience LIFE in the Park

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-2

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Procedure for Site Plan Review

BMP Description:
The city has established procedures and guidelines for construction site erosion and sedimentation control during both the concept and development stage of site planning and also throughout the permit and approval process. The city will review site plans, make recommendations for appropriate erosion and sediment control BMPs, and analyze impacts to surrounding natural resources. The city reviews each site plan for grading, drainage, and utilities to ensure conformity with all city ordinances and design guidelines and to ensure the plans meet the city's Surface Water Management Plan (Appendix M) requirements prior to permitting or approval. The city requires an Erosion and Sediment Control (ESC) Permit when a project will disturb an area of 5,000 square feet or greater; will excavate a volume of 50 cubic yards or greater; or is within 100 feet of a lake, pond, or wetland.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of site plans reviewed Review permit application packages and checklists annually for updates	Currently implemented and will continue annually

Specific Components & Notes (optional):
ESC Permit Application Package, site plan checklist for small projects, site plan checklist for large projects
Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Developers, contractors

Goal: Provide transparent review process, allow applicants to anticipate requirements and inspections

Activities: Provide checklists for applicants, review site plans according to guidelines, document review details

Annual Summary:

St. Louis Park MINNESOTA
Experience LIFE in the Park

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-3

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Construction Sites and Erosion Control Inspections

BMP Description:
The city has erosion and sedimentation control BMP requirements within Chapter 12: Article V. Stormwater, Soil Erosion, and Sedimentation ordinance. Specifications of site-specific erosion and sediment control plans and individual SWPPPs, with mapped locations of these BMPs, are required prior to permit approval. Prior to permitting, the city provides design standards, manuals, and standard site plan review procedures. Project owners/permittees are responsible to self-inspect their construction sites and provide documentation of the inspections, findings, and remedies in their individual SWPPP records. The city also conducts regular erosion and sedimentation inspections for all permitted projects. Written procedures and checklists are used by city staff to determine compliance with city code from the site plan review stage, throughout construction, to final stabilization.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of permitted projects Number of inspections Number of enforcement actions	Currently implemented and will continue annually

Specific Components & Notes (optional):
City Code Chapter 12-157: Environment and Public Health, Article II. Nuisances; Article III. Litter; and Article V. Stormwater, Soil Erosion, and Sedimentation and Enforcement Response Procedures
See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Developers, contractors

Goal: Ensure temporary and permanent ESC BMPs are properly maintained on construction sites with regular inspections

Activities: Provide regular inspections and document findings

Annual Summary:

St. Louis Park MINNESOTA
Experience LIFE in the Park

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-4

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Erosion Control Enforcement

BMP Description:
The city uses the Enforcement Response Procedures or ERP identified in City Code Chapter 12: Environment and Public Health; Article V. Stormwater, Soil Erosion, and Sedimentation; Section 12-160 Enforcement to remedy issues regarding noncompliant construction sites. When the city observes violations, it will provide a written description of the violation, corrective actions required, and a timeframe for completion to the permittee or responsible party. The city may notify other applicable agencies and document the date the violation was resolved.

Measurable Goals:	**Timeline / Implementation Schedule:**
Record number and type of enforcement actions	Currently implemented and will continue annually

Specific Components & Notes (optional):
Enforcement Response Procedures
City Code Chapter 12-157: Environment and Public Health, Article V. Stormwater, Soil Erosion, and Sedimentation; Section 12-160 Enforcement

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Developers, contractors

Goal: Assure proactive compliance with city code and permit standards to prevent enforcement actions or penalties

Activities: Record number and type of enforcement actions discovered during inspections

Annual Summary:

St. Louis Park MINNESOTA
Experience LIFE in the Park

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-5

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Financial Securities

BMP Description:
Permitted projects may require financial securities to ensure all erosion and sedimentation BMPs are installed properly. Financial securities or damage deposits are required with erosion and sediment control permit applications. The city may use a portion or the entire financial security/deposit to remedy construction site problems due to noncompliance with city code and permit standards. The financial security/damage deposit must be provided via secured funds and made out to the City of St. Louis Park when the erosion and sediment control application is submitted. Applications will not be reviewed if the damage deposit is not included.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of financial securities Number of retained financial securities	Currently implemented and will continue annually

Specific Components & Notes (optional):
City Code Chapter 12 Environment and Public Health; Article V. Stormwater, Soil Erosion, And Sedimentation; Section 12-156 Construction Site Stormwater Runoff and Erosion Control
Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines

The secured funds will be placed in a non-interest bearing account and will be returned to the applicant once the project is complete.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience:	Developers, contractors
Goal:	Damage deposits are intended to reduce non-compliance issues and to ensure that outstanding non-compliance issues are corrected quickly.
Activities:	Record financial securities. Reduce the deposit or return in full as projects are completed
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-6

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Erosion Control Inspection Training

BMP Description:
The city provides regular training for all construction site inspectors through the University of Minnesota Erosion and Stormwater Management Certification Program (or equivalent). The certification program covers state permit requirements and BMPs to reduce or control erosion and sedimentation. Other topics include soil erodibility, turf-establishment techniques, grading techniques to minimize erosion, timing of installations, and the proper installation of best management practices. Staff also attend additional stormwater education workshops or conferences.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of trained/certified inspectors	Currently implemented Acquire and maintain certification

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager	**Department:**	Engineering

Components related to this BMP (description or number – optional):

Audience: City field staff

Goal: Ensure field staff conducting site inspections are aware of rules, current trends or practices, and technologies with regular training or certification programs

Activities: Attend and record trainings, acquire and maintain certifications

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-1

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	X	Construction site runoff controls
-	Public participation & involvement	X	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Design and Construction Standards

BMP Description:
The city has standards for public and private infrastructure design and construction projects to aid in redevelopment, and it provides standard detail plates for temporary and permanent erosion and sediment control BMPs and specification, which are posted on the Engineering Department's webpage.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review guidance and standards materials annually, update as needed	Currently implemented and will continue annually

Specific Components & Notes (optional):
Comprehensive Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines, Details and Specification on the City's Engineering Dept. Webpage

Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Senior Engineering Project Manager, Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Developers, contractors

Goal: Provide standard specifications for temporary and permanent erosion and sediment control

Activities: Provide standard detail plates, review annually for updates

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-2

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	X	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Plan Review and Approval Procedures

BMP Description:
Plan review procedures are identified in City Code Section 12-156 and 12-158, which require submittal, review, and approval of required permit applications and the Stormwater Management plan. The plan must detail how stormwater and associated water quality impacts, resulting from the proposed development, will be controlled or managed. This plan must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices. The stormwater management plan(s) shall be referred to interested agencies for comment, and any comments must be addressed in the final Stormwater Management Plan. This final plan must be signed by a licensed professional engineer, who will verify that the design of all stormwater management practices meet the submittal requirements of the Surface Water Management Plan (SWMP). Timelines for review are provided in ordinance and guided by state requirements. Design standards (Appendix M) are provided in city ordinance, city policies, and the Engineering Standard Detail Plates. The city uses these combined mechanisms to ensure post-construction runoff control compliance with the SWMP and NPDES MS4 General Permit. Project approval is contingent upon the execution of an agreement to maintain post-construction stormwater BMPs, if applicable.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of projects reviewed Number of permitted projects	Currently implemented and will continue annually

Specific Components & Notes (optional):
City Code Chapter 12: Environment and Public Health, Article V. Stormwater, Soil Erosion, and Sedimentation; Section 12-156 Construction Site Stormwater Runoff and Erosion Control, and Section 12-158 Post Construction Stormwater Runoff; Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines; See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager, Senior Engineering Project Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience:	Developers, contractors
Goal	Establish minimum stormwater management requirements and controls to minimize stormwater
Activities:	Review permit applications and Stormwater Management Plans according to written guidelines and document review details
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-3

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	X	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Development Agreements

BMP Description:
Permitted projects may require a development agreement to ensure all erosion and sedimentation BMPs are installed properly. Development agreements are a legal document between an applicant and the city that details all terms, conditions, and responsibilities of a permitted project.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of development agreements	Currently implemented and will continue annually

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience:	Developers, contractors
Goal:	Ensure a legal mechanism is in place to hold developer or contractor accountable for properly maintaining erosion and sediment controls throughout construction
Activities:	Record development agreements
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-4

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	X	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Ordinance or Other Regulatory Mechanism

BMP Description:
City Code Section 12-158 contains requirements for Post-Construction Stormwater Management including objectives, applicability, plan requirements, maintenance requirements, and inspections and reporting activities. This code provides the basis for ensuring stormwater is managed properly for development and redevelopment projects. The code also contains an additional regulatory mechanism, a formal maintenance covenant, which must be approved by the city and recorded at the Hennepin County Recorder's Office prior to final plan approval. As part of the covenant, a schedule must be developed, including periodic inspections and the performance of discharge standards to ensure the proper functioning of the stormwater management facility.

Measurable Goals:	**Timeline / Implementation Schedule:**
Updates to ordinance, as needed	Currently implemented and will continue annually

Specific Components & Notes (optional):
City Code Chapter 12: Environment and Public Health, Article V. Stormwater, Soil Erosion, and Sedimentation; Section 12-158 Post Construction Stormwater Runoff; Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines ; See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager, Senior Engineering Project Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Property owners and developers

Goal: Ensure each developed/redeveloped property meets the City's requirements

Activities: Review ordinance and track modification

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-5

Minimum Control Measures Addressed by This BMP

X	Public education & outreach	X	Construction site runoff controls
X	Public participation & involvement	X	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Surface Water Management Plan (SWMP)

BMP Description:
The city's Surface Water Management Plan (SWMP) serves as the guiding document for all surface water issues, goals, policies, and implementation strategies to protect water quality. The SWMP discusses current issues and challenges such as impaired waters and contaminated sites and opportunities to leverage resources with local and regional partners. The SWMP provides a comprehensive road map for improving water resources and infrastructure within the city in conjunction with the most current local watershed organization requirements and standards, as well as state and/or federal rules. The city is required to revise the SWMP every ten years, and it must be submitted to the Metropolitan Council and the two watershed organizations (BCWMC and MCWD) for review and approval. The SWMP may be updated prior to the ten-year review cycle as watershed management plans are updated or if other significant changes arise that would require an amendment. The process to amend is outlined in the SWMP. Some of the implementation strategies to achieve the SWMP's goals are outlined in the city's SWPPP, which is reviewed and updated annually in conjunction with submittal of the Annual Report to the Minnesota Pollution Control Agency.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review watershed plans (as updated) to incorporate into SWMP through a formal amendment process Annually update SWPPP in conjunction with submitting Annual Report to the MPCA	Currently implemented and will continue annually

Specific Components & Notes (optional):

Surface Water Management Plan (2018)

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager, Senior Engineering Project Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: Staff, residents, contractors, developers

Goal: Provide a surface water management plan for the City

Activities: Implement the plan

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-6

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	X	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Long-term Operation and Maintenance of BMPs

BMP Description:
The city has an established stormwater utility to fund the continued long-term maintenance costs of the publicly owned storm sewer system. The city will operate and maintain public stormwater management facilities to reduce the discharge of pollutants. Routine inspections of the system and these facilities identify necessary maintenance that may be prioritized for future improvements based on the severity of the maintenance need. Priority projects will provide the most cost-effective pollution reduction. For private stormwater infrastructure, provisions in city code require the long-term operation and maintenance agreements and/or maintenance covenants.

Measurable Goals:	**Timeline / Implementation Schedule:**
Annual maintenance summary Number of maintenance agreements established	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Water Resources Manager, Senior Engineering Project Manager, Utilities Superintendent, Operations Manager, Natural Resources Coordinator	**Department:**	Engineering, Operation and Recreation, Parks and Recreation

Components related to this BMP (description or number – optional):

Audience:	City staff and property owners
Goal	Effect operation and maintenance of best management practices (BMPs)
Activities:	Inspect and maintain BMPs
Annual Summary:	

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-7

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	X	Post-construction stormwater management
-	Illicit discharge detection & elimination	-	Pollution prevention/Good housekeeping

BMP Title: Review of Impaired Waters with approved Total Maximum Daily Loads (TMDLs) and applicable Waste Load Allocations (WLAs)

BMP Description:

Annually, the city will conduct a review of all approved total maximum daily loads(TMDLs) with applicable waste load allocations . The review will assess and document the city's progress toward meeting each discharge requirement, and it will include a list of BMPs being applied to achieve the applicable WLAs.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review/Update the impaired waters map Tally of projects that decrease constituents of concern and the total number of lbs. sequestered.	2018 Model update - EPA SWMM model (Hydrology, Hydraulics and Water Quality) Currently Implemented and will continue annually.

Specific Components & Notes (optional):

The outcomes of implementing the SWPPP, SOP and associated codes should reduce transport and discharge of constituents of concerns.

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: City staff and regulatory agencies

Goal: Meet WLA to the maximum extent practicable

Activities: Update WLA activities, look for opportunities to reduce pollutants of concern

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-1

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Municipal Operations and Maintenance Program

BMP Description:
The city's operations and maintenance program include routine maintenance of stormwater infrastructure to maintain the original capacity and intent of the system. Routine operations include cleaning pipes, catch basins, and manhole sump structures; lift station upkeep; pump replacement; general pond maintenance; sediment removal; and inspections of all outfalls and stockpiles.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review and revise operations and maintenance program, as needed. Employee Training	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Public Works Superintendent	**Department:** Operations and Recreation

Components related to this BMP (description or number – optional):

Audience: City employees

Goal: Effective inspection, operation and maintenance of storm sewer and stormwater management infrastructure to minimize pollutant transport to water resources.

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-2

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Municipal Street Sweeping Program

BMP Description:
All city streets and parking lots are swept at least twice a year and on an "as needed" basis. Priority areas around impaired water bodies considered "Intensive Sweeping Areas," receive additional sweepings during the year. The city uses regenerative air sweepers and documents lane miles swept and disposal records for all materials collected.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of lane miles swept Number of loads collected	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Operations Manager	**Department:** Operations and Recreation

Components related to this BMP (description or number – optional):

Audience:

Goal:

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-3

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	X	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Annual Inspection of All Structural Pollution Control Devices

BMP Description:
The city inspects all structural pollution control devices annually to evaluate the physical and operational condition of the infrastructure. Any maintenance or repair needs found are scheduled via a work order system. During these inspections, if dry weather flows are found that are not explained by areas of groundwater intrusion, irrigation, or lift station discharge, the flow is investigated for illicit discharges and/or connections.

Measurable Goals:	**Timeline / Implementation Schedule:**
Inspection reports Number of maintenance actions completed	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Utilities Superintendent, Operations Manager, Water Resources Manager	**Department:**	Operations and Recreation, Engineering

Components related to this BMP (description or number – optional):

Audience: City field staff

Goal: Inspect and maintain BMPs

Activities: BMP inspection and maintenance, as needed

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-4

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Quarterly Stockpile, Storage, and Material Handling Program

BMP Description:
All exposed stockpiles, storage, and material-handling areas will be inspected at least quarterly. The city has a written procedure to identify and manage all exposed stockpiles and follows proper storage techniques, as prescribed in the Material Safety Data Sheets and by state and federal authorities.

Measurable Goals:	**Timeline / Implementation Schedule:**
Quarterly inspections completed	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager, Natural Resources Coordinator, Operations Manager	**Department:** Engineering, Operations and Recreation

Components related to this BMP (description or number – optional):

Audience: City employees

Goal: Prevent discharges from stockpiles, storage and material handling areas

Activities: Inspection and maintenance, as needed

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-5

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
X	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Fertilizer, Pesticide, and Herbicide Application Program

BMP Description:
The Parks and Recreation Department applies fertilizer, pesticide, and herbicide within the city. No phosphorus fertilizer will be used unless a soil test determines need. Employees are trained on proper fertilizer and herbicide handling, application, and cleanup procedures. Pesticide application is handled by licensed employees to ensure safe handling and proper application.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of employees trained, licensed Quantity of products applied	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Parks Superintendent, Natural Resources Coordinator	**Department:** Operations and Recreation

Components related to this BMP (description or number – optional):

Audience: City field staff and contractors

Goal: Reduce use and leeching potential

Activities: Reduce use

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-6

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Inspection Analysis and Frequency

BMP Description:
The city maintains records of inspection results, dates, weather conditions, and any maintenance performed or recommended for structural stormwater pollution control devices. After two years of regular inspections, if maintenance patterns become apparent, the frequency of inspections may be adjusted accordingly. For example, if maintenance or sediment removal is required as a result of the first two annual inspections, the frequency of inspection shall be increased to at least twice annually, or more frequently as needed to prevent carry-over or washout of pollutants from the structures and maximize pollutant removal. If maintenance or sediment removal is not required as a result of both of the first two annual inspections, the frequency may be reduced to once every two years.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review inspection results every 2 years Adjust programs when needed	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Water Resources Manager, Utilities Manager	**Department:** Engineering, Operations and Recreation

Components related to this BMP (description or number – optional):

Audience: City field staff

Goal: Ensure proper operation of BMPs

Activities: Inspect, review and adjust frequency of inspections, as needed

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-7

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Street Deicing Program

BMP Description:
The city's street deicing program includes training of new employees and an Annual Snowplow Meeting to review correct practices and issues related to street deicing. The city has developed a Sensible Salt Program that helps to determine the appropriate mixture of salt and/or salt mixtures for road applications according to the temperature, forecast, and road conditions. An enclosed building is used for all salt storage, truck loading, and mixing. Salt applicator trucks are calibrated and equipped with temperature sensors to determine application rates and to control salt applications. The city continuously reviews new technologies, alternative products or equipment, and procedures to reduce salt usage.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of employees trained Amount of salt and other products used Number of spreaders calibrated annually	Currently implemented and will continue annually

Specific Components & Notes (optional):
Sensible Salt Program, Annual snowplow meeting
New employee training

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)	**Responsible Department**
Title: Operations Manager	**Department:** Operations and Recreation

Components related to this BMP (description or number – optional):

Audience: City employees

Goal: Provide city staff awareness of policy regarding street deicing procedures and associated stormwater impacts

Activities: Conduct annual meeting, new employee training

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-8

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Fleet and Building Maintenance Program

BMP Description:
The city's Facilities Maintenance Division provides scheduled maintenance and safety checks on all city vehicles. This program aims to minimize leaks from the city's fleet and equipment. The program recycles used oils, antifreeze, and other materials. The city has an indoor wash bay for washing vehicles and the runoff is directed to grit chambers/sediment traps prior to discharge to the sanitary sewer. Employees are also responsible for inspecting for leaks from various city facilities and buildings.

Measurable Goals:	**Timeline / Implementation Schedule:**
Number of vehicles maintained Volume of materials recycled Number of employees trained	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Equipment Superintendent, Facilities Supervisor	**Department:**	Facilities Maintenance

Components related to this BMP (description or number – optional):

Audience: City employees

Goal: Educate employees on proper fleet and building operation and maintenance

Activities: Maintain and track records

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-9

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Hazardous Material Storage and Recycling Program

BMP Description:
Hazardous materials management is outlined in the city's Emergency Operations Plan. Any hazardous material situation triggers an emergency response. The city recycles items such as fluorescent light bulbs, floor dry, solvents, and automobile fluids. The program is designed to reduce waste and contain all hazardous materials. Employees working with hazardous materials are trained on the proper storage, handling, and recycling of those materials.

Measurable Goals:	**Timeline / Implementation Schedule:**
Annual Right to Know training completed Maintain inventory of hazardous materials	Currently implemented and will continue annually

Specific Components & Notes (optional):
St. Louis Park Emergency Operations Plan
See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	Equipment Superintendent, Facilities Supervisor and Solid Waste Program Coordinator	**Department:**	Facilities Maintenance, Operations and Recreation

Components related to this BMP (description or number – optional):

Audience: City employees

Goal: Reduce pollutant runoff from city operations, prevent spills or leakage

Activities: See BMP Description above

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-10

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Stormwater Treatment Effectiveness Assessment

BMP Description:
In an effort to ensure proper stormwater storage and treatment capacity, the city began an advanced evaluation of its stormwater detention ponds in 2011. This stormwater pond evaluation and prioritization process aids city staff with scheduling and budgeting appropriate resources for pond maintenance and provides the city with a better understanding of its ponds' current condition and functionality. The evaluation and assessment process is outlined in the city's SOP.

Measurable Goals:	**Timeline / Implementation Schedule:**

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**
Title:	Senior Engineer Project Manager, Water Resources Manager	**Department:** Engineering

Components related to this BMP (description or number – optional):

Audience: City staff

Goal: Determine most effective treatment practices

Activities: Develop and maintain a water quality model

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-11

Minimum Control Measures Addressed by This BMP

-	Public education & outreach	-	Construction site runoff controls
-	Public participation & involvement	-	Post-construction stormwater management
-	Illicit discharge detection & elimination	X	Pollution prevention/Good housekeeping

BMP Title: Facilities Inventory

BMP Description:
In 2016, a comprehensive review and inventory of all city-owned facilities was completed to assess the stockpile and materials handling location, assess the potential for materials to discharge to and to impact surface water resources, and determine the need for BMP installation and/or maintenance. During the inspection (which included public works facilities, police stations, parks, open space, a water treatment facility, etc.), it was determined that only two facilities have areas with potential concerns that would warrant quarterly inspections. At the two facilities (SLP Stockyards), fueling procedures, stockpiles, hazardous waste storage, and vehicle/equipment washing areas will be inspected to ensure existing BMPs are maintained to function properly.

Measurable Goals:	**Timeline / Implementation Schedule:**
Review mapped facilities and, where warranted, recommend modifications	Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)		**Responsible Department**	
Title:	GIS Coordinator, Water Resources Manager, Facilities Supervisor	**Department:**	Information Resources, Engineering, Facilities Maintenance

Components related to this BMP (description or number – optional):

Audience: City staff

Goal: To keep an inventory of the City's building and facilities and to manage potential pollution

Activities: Inspect and maintain the City's facilities

Annual Summary:

APPENDIX B: ST. LOUIS PARK 2018 STORM SEWER MAP

St. Louis Park
MINNESOTA

SURFACE WATER SYSTEM

LEGEND

- Intercommunity Flow Locations
- Stormwater Lift Stations
- Stormwater Discharge Points
- Storm Mains (Gravity)
- Storm Mains (Pressure)
- 01-Westwood Lake District (740 acres)
- 02-Golden Valley District (219 acres)
- 03-Hannan Lake District (605 acres)
- 04-Minnehaha Creek District (3,783 acres)
- 05-Twin Lake District (1,636 acres)
- 06-Minneapolis District (649 acres)
- 07-Bass Lake District (1,362 acres)
- 08-Edina District (497 acres)
- City Boundary

N

0 0.25 0.5 1 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

APPENDIX C: ST. LOUIS PARK ENFORCEMENT RESPONSE PROCEDURES (ERP)

St. Louis Park
MINNESOTA
Experience LIFE in the Park

City of St. Louis Park Enforcement Response Procedures

Introduction to the Enforcement Response Procedures
The purpose of this Enforcement Response Procedures (ERP) is to define the city's enforcement capabilities for noncompliance with city, state, and local stormwater laws, ordinances, and design guidelines. In addition, this ERP outlines the enforcement procedures and methods used to compel compliance with the defined regulatory mechanisms that have been developed and are implemented by the City of St. Louis Park.

Inclusion of the Enforcement Response Procedures
This ERP includes, but is not limited to, stormwater discharge violations and noncompliance for the following stormwater discharge related issues:

- Construction Stormwater Runoff (city ordinance 12-156)
- Illicit Discharge (city ordinance 12-157)
- Post Construction Stormwater Runoff (city ordinance 12-158)
  Please refer to the aforementioned city ordinances and Appendix M of the city's Surface Water Management Plan for further details on city stormwater regulations.

The City requires contractors to obtain all required permits pertaining to land disturbance activities from various agencies. Permits may include watershed district, DNR, ACOE, City and/or State permits. The city's MS4 permit requires the City to implement a system to monitor construction activities and to enforce Permit provisions. The City has an inspection oversight responsibility and must ensure that a trained employee inspects construction activity at sites until final stabilization is achieved. If violations occur, City employees are directed to follow this enforcement response procedure to encourage a timely response by the alleged violator.

Identification and Reporting of Stormwater Discharge Related Issues
Inspections and investigations of stormwater related issues by city staff occur on a routine or reactive basis. Routine inspections generally occur on permitted sites, known areas of concern, and long-term maintenance sites. Reactive inspections for stormwater related issues occur based on a resident or staff identification and reporting.

Inspection and Documentation of Stormwater Discharge Related Issues
Inspection and any enforcement actions required by the city, based on referral or routine inspections, shall be documented and include the following information:

1. Name of the person responsible for violating the terms and conditions of the permittee's Regulatory Mechanism
2. Date and location of the observed violation

3. Description of the violation, including reference to relevant regulatory mechanism
4. Corrective action schedule issued by the permittee
5. Date and type of enforcement used to compel compliance
    1. Verbal notice of violation
    2. Written notice of violation
    3. Withholding of authorization of permits
    4. Stop work order
    5. Draw on damage deposit (city ordinance 12-157)
    6. Administrative penalty order (city ordinance 6-179)
    7. Legal action / property assessment (city ordinance 6-179)
    8. Referral to additional regulatory agencies
6. Referrals to other regulatory organizations, if necessary
    a. Emergency Response 911
    b. Police and Fire Dispatch (non-emergency) 952-924-2618
    c. Water Resources Manager 952-924-2690
        i. Erick Francis (efrancis@stlouispark.org)
    d. MystlouisparkApp (Report an Issue)
        i. http://iframe.publicstuff.com/#?client_id=1310#picker-top
            1. Construction stormwater runoff
            2. Illicit discharge
    e. Minnesota State Duty Officer 800-422-0798
7. Date when the stormwater related violation has been resolved

Response to Stormwater Discharge Related Issues

If a prohibited stormwater discharge is found in and/or entering the City's storm water system, city staff will perform investigations, per each MCM 3, 4, or 5 SOP, within the watershed to determine the source of pollution and the party responsible for the discharge, if possible. Investigators will notify selected city staff, as defined on the MS4 Organizational Chart, and any other regulatory agency as necessary, noted above, to assist in the containment, cleanup, and remediation of the discharge. Please note that at times, situations may be become unpleasant or hostile and it is important to know that it's acceptable to call for police assistance at any time if these situations occur. The City's response to stormwater related discharges will be determined on a case by case scenario.

Enforcement to Stormwater Discharge Related Issues

Typical enforcement actions for a stormwater discharge related issues will include one or more of the following actions:

1. Verbal notice of violation
2. Written notice of violation
3. Withholding authorization of permits
4. Stop work order
5. Draw on damage deposit
6. Administrative penalty order
7. Legal action / property assessment
8. Referral to additional regulatory agencies

The extent of the enforcement action due to a stormwater related discharge will be determined on a case by case scenario by city staff based on the consistency of the discharge and its extent, environmental impact, and ability to remediate the environmental impact. Enforcement actions may also be escalated based on level of cooperation from the responsible parties, response time and remediation actions from responsible parties, and the reoccurrence or negligence by the responsible party. Enforcement action will increase from 1 to 8 based on these aforementioned criteria and direction from city staff.

In the instance of an accidental incident or spill, additional consideration will be given to what level of enforcement, if any, will be implemented if after the investigation has been completed and it has been determined the intent of the incident or spill was determined to not be on accident and not malicious. However, the incident will still be investigated and documented per this ERP.

Part I Wellhead Protection Plan Update

Wellhead Protection Area Delineation
Drinking Water Supply Management Area Delineation
Well and Drinking Water Supply Management Area Vulnerability Assessments

St. Louis Park
MINNESOTA

Public Water Supplier 1270050

February 2015

SOURCEWATER
SOLUTIONS

Part I Wellhead Protection Plan Update
St. Louis Park, Minnesota
February 2015

Public Water Supplier 1270050

Source Water Solutions, LLC

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Geologist under the laws of the State of Minnesota.

Erik J. Tomlinson, PG, LEED AP

Date: _____ Lic. No.: 46739

Source Water Solutions, LLC
221 McCarron St.
Roseville, MN 55113

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Glossary of Terms

Data Element. A specific type of information required by the Minnesota Department of Health to prepare a wellhead protection plan.

Drinking Water Supply Management Area (DWSMA). The area delineated using identifiable land marks that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules, part 4720.5100, subpart 13).

Drinking Water Supply Management Area Vulnerability. An assessment of the likelihood that the aquifer within the DWSMA is subject to impact from land and water uses within the wellhead protection area. It is based upon criteria that are specified under Minnesota Rules, part 4720.5210, subpart 3.

Emergency Response Area (ERA). The part of the wellhead protection area that is defined by a one-year time of travel within the aquifer that is used by the public water supply well (Minnesota Rules, part 4720.5250, subpart 3). It is used to set priorities for managing potential contamination sources within the DWSMA.

Inner Wellhead Management Zone (IWMZ). The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subpart 19). The public water supplier must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

Wellhead Protection (WHP). A method of preventing well contamination by effectively managing potential contamination sources in all or a portion of the well's recharge area.

Wellhead Protection Area (WHPA). The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, section 103I.005, subdivision 24).

Well Vulnerability. An assessment of the likelihood that a well is at risk to human-caused contamination, either due to its construction or indicated by criteria that are specified under Minnesota Rules, part 4720.5550, subpart 2.

Acronyms

CWI - County Well Index

DNR - Minnesota Department of Natural Resources

EPA - United States Environmental Protection Agency

OPDC - Prairie du Chien Group

CJDN – Jordan Sandstone

CMTS – Mt. Simon Sandstone

MDA - Minnesota Department of Agriculture

MDH - Minnesota Department of Health

MGS - Minnesota Geological Survey

MnDOT - Minnesota Department of Transportation

MPCA - Minnesota Pollution Control Agency

PLS – Public Land Survey

SWCD - Soil and Water Conservation District

UMN - University of Minnesota

USGS - United States Geological Survey

1.0 Public Water Supply Profile

The following persons are the contacts for the St. Louis Park Wellhead Protection Plan.

1.1 Wellhead Protection Manager

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1.2 Wellhead Protection Plan Consultant

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2.0 Introduction

Source Water Solutions was retained by the City of St. Louis Park (City) (PWSID 1270050) to complete an update to the City's wellhead protection (WHP) plan. The work was performed in accordance with the Minnesota Wellhead Protection Rule, Parts 4720.5100 to 4720.5590.

This report presents the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply wells and DWSMAs. **Figure 1** shows the boundaries for the DWSMA and WHPA. The WHPAs are defined by a 10-year time of travel. **Figure 2** shows the emergency response areas (ERA), which are defined by a 1-year time of travel and the Inner Wellhead Protection Management Zone (IWMZ), a 200 foot radius around each well. Definitions of rule-specific terms that are used are provided in the "Glossary of Terms."

This report also documents the technical information that was required to prepare this portion of the WHP Plan in accordance with the Minnesota Wellhead Protection Rule. Additional technical information is available from MDH.

The municipal water supply wells included in the WHP Plan are listed in **Table 1.**

Table 1 - Water Supply Well Information

Well No.	Unique Well No.	Use/Status	Year Constructed	Casing Diam. (in)	Casing Depth (ft)	Total Depth (ft)	Aquifer Formation	Vulnerability
3	206440	Abandoned	8/1939	24	103	286	St. Peter	Vulnerable
4	200542	Primary	1946	24/18	304	510	Prairie du Chien-Jordan	Vulnerable
5	203196	Out of Service	1947	24/20	305	465	Prairie du Chien-Jordan	NA
6	206457	Emergency	1948	24/20	303	480	Prairie du Chien-Jordan	Vulnerable
7	206436	Out of Service	1952	24/20	274	450	Prairie du Chien-Jordan	NA
8	203678	Primary	1955	24/16	314	507	Prairie du Chien-Jordan	Not Vulnerable
9	206437	Out of Service	1956	24/16	289	473	Prairie du Chien-Jordan	NA
10	206442	Primary	1955	24/16	316	479	PDC-JDN	Vulnerable
11	206439	Primary	1960	24/16	880	1093	Mt. Simon	Not Vulnerable
12	206456	Primary	1965	30/24/16	900	1095	Mt. Simon	Not Vulnerable
13	206424	Primary	1964	30/24/16	891	1045	Mt. Simon	Not Vulnerable
14	227965	Primary	1955	30/24/16	389	485	Jordan	Vulnerable
15	215447	Primary	1969	30/24	398	503	Jordan	Vulnerable
16	203187	Primary	1973	30/24	425	510	Jordan	Vulnerable
17	147459	Out of Service	1983	36/30/24	818	1085	Mt. Simon	NA

3.0 Assessment of the Data Elements

MDH staff met with representatives of the public water supplier in August 2013 for a scoping meeting that identified the data elements required to prepare Part I of the WHP Plan Update. **Table 2** presents the assessment of these data elements, relative to the present and future implications of planning items, as specified in Minnesota Rules, part 4720.5210. The Scoping Decision Notice is provided as **Appendix A**.

Table 2 - Assessment of Data Elements

	Present and Future Implications				Data Source
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Precipitation					
Average monthly and annual precipitation	L	M	L	M	Midwestern Regional Climate Center
Geology					
Maps and geologic descriptions	M	H	H	H	MGS, DNR, USGS, Consultant Reports
Subsurface data	M	H	H	H	MGS, MDH, MPCA, DNR, MDA
Borehole geophysics	M	H	H	H	MGS, Consultant Reports
Surface geophysics	L	L	L	L	DNR, MPCA, Consultant Reports
Maps and soil descriptions	L	M	L	M	USDA SURGGO
Water Resources					
Watershed units	L	M	L	M	DNR
List of public waters	L	M	L	M	DNR
Land Use					
Parcel boundaries map	L	H	L	M	Hennepin County
Political boundaries map	L	H	L	M	DNR
PLS map	L	H	L	L	DNR
Public Utility Services					
Transportation routes and corridors	L	H	M	M	Mn/DOT, City of St. Louis Park
Storm/sanitary sewers and PWS system map	L	L	M	M	City of St. Louis Park
Public drainage systems map or list	L	M	M	M	DNR, City of St. Louis Park
Records of well construction, maintenance, and use	H	H	H	H	City of St. Louis Park, CWI, MDH files
Surface Water Quantity					
Stream flow data	L	L	M	L	USGS, MPCA, DNR
Ordinary high water mark data	L	L	L	M	DNR
Permitted withdrawals	M	L	M	M	DNR, City of St. Louis Park
Protected levels/flows	M	L	M	M	DNR, MPCA
Water use conflicts	M	M	M	M	DNR, MPCA

	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Groundwater Quantity					
Permitted withdrawals	H	H	H	H	DNR
Groundwater use conflicts	H	H	H	H	DNR
Water levels	H	H	H	H	DNR, MPCA, MDA, MDH, City
Surface Water Quality					
Monitoring data summary	L	L	M	M	MPCA
Groundwater Quality					
Monitoring data	H	H	H	H	MPCA, MDH, MDA, USGS
Isotopic data	H	H	H	H	MPCA, MDH, MDA, USGS, County, UMN
Tracer studies	H	H	H	H	DNR, MPCA
Contamination site data	H	M	H	H	MPCA, MDA
MPCA and MDA spills/release reports	H	L	H	H	MPCA, MDA

Definitions Used for Assessing Data Elements:

High (H) - the data element has a direct impact

Moderate (M) - the data element has an indirect or marginal impact

Low (L) - the data element has little if any impact

Acronyms used in this report are listed on page ii, after the "Glossary of Terms."

3.1 Precipitation

Precipitation Data was obtained from the Midwestern Regional Climate Center website. Monthly data was available for the past five years at the MINNEAPOLIS/ST PAUL Airport station (USW00014922) and is provided below in **Table 3**. Precipitation data can be used for determining local recharge for the groundwater model.

Table 3 - Precipitation Data

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
2009	0.57	0.93	1.5	1.57	0.53	2.86	2.17	6.43	0.46	5.57	0.38	1.83	24.8
2010	0.45	0.75	0.69	2.32	2.5	6.25	3.03	4.91	5.52	1.61	2.07	2.79	32.89
2011	1	1.12	2.06	2.8	4.04	5.28	5.23	3.03	0.36	0.7	0.3	0.99	26.91
2012	0.36	1.71	1.4	3.04	9.34	3.59	4.9	1.38	0.3	1.3	0.63	1.64	29.59
2013	0.86	1.33	2.04	5.22	6.24	5.17	3.51	2.07	1.35	3	0.52	1.46	32.77

Note: All values are in inches.

3.2 Geological Information

The local and regional geologic and hydrogeologic conditions influence the delineation of the WHPAs for the public water supply wells. By characterizing these conditions, the geometry, location and magnitude of groundwater recharge and discharge areas, and the groundwater flow direction of the source water aquifer could be determined or estimated.

Existing geological maps, reports, and studies that were used are listed in the References section of the plan. Through the use of public-domain well records and local and regional geologic studies and

publications, the geology and hydrogeology of the area have been evaluated and reviewed to aid in the WHPA delineations and vulnerability assessments. These resources were provided by the City, the MDH, the Minnesota Geological Survey (MGS), and the USGS. These resources provided the basis for defining local geologic and hydrologic conditions but this interpretation was refined using the records of wells, borings, exploration test holes, and excavations. The City has no additional geologic information from logs or borehole geophysical records of wells, borings, or exploration test holes, nor additional information from surface geophysical studies. A surficial geology map is presented as **Figure 3** and a bedrock geologic map is presented as **Figure 4**. Geologic cross-sections were created through the study area and are provided as **Figures 5 and 6**. The cross-section locations are depicted on **Figure 4**.

Generally, the depth to bedrock in the St. Louis Park area ranges from 50 to 100 feet. However, there are areas surrounding St. Louis Park in which the depth to bedrock is 100 to 200 feet. The top of bedrock elevation ranges from 700 to 800 feet above mean sea level (MSL). According to the well records of the St. Louis Park municipal wells, bedrock was encountered at depths ranging from 69 (Municipal Well 9) to 127 feet (Municipal Well 12). Figures 2 and 3 are generalized geologic cross-sections through the St. Louis Park area. Figure 4 depicts the uppermost bedrock conditions in the St. Louis Park area and Figure 5 is a typical stratigraphic column for the St. Louis Park area.

The first bedrock unit in the St. Louis Park area is typically the Platteville and Glenwood Formations overlying the St. Peter Sandstone. The bedrock formations beneath the St. Peter Sandstone are (in descending order): the Prairie du Chien Group, the Jordan Sandstone, the St. Lawrence Formation, the Franconia Formation, the Ironton and Galesville Sandstones, the Eau Claire Formation, and the Mount Simon and Hinckley Sandstones.

The Platteville Formation is a fine-grained limestone containing thin shale partings near its top and base. It is underlain by the 0 – 5 feet thick, green sandy shale of the Glenwood Formation.

The upper half to two-thirds of the St. Peter Sandstone consists of fine- to medium-grained, friable quartz sandstone. The lower part of the formation contains multi-colored beds of mudstone, siltstone, and shale with interbedded very coarse sandstone. The typical thickness of the St. Peter Sandstone in Hennepin County is approximately 160 feet.

The Prairie du Chien Group is a dolostone that is sandy with minor amounts of shale in the upper third to half, and less sandy in the lower part. The formation is thin-bedded and contains thin beds of sandstone in the upper part, but is more massive- and thick-bedded in the lower part. Regionally, it is typically about 120 feet thick.

Below the Prairie du Chien Group is the Jordan Sandstone, a quartzose sandstone approximately 95 feet thick. The upper and middle portions of this formation are comprised of medium- and coarse-grained sandstone. The lower portion is massively bedded. The Prairie du Chien and Jordan are hydraulically connected.

The St. Lawrence Formation, a dolomitic siltstone and shale is below the Jordan Sandstone, and overlies the Tunnel City (formerly Franconia Formation), a glauconitic sandstone. The Wonewoc Sandstone (formerly Ironton and Galesville Sandstones) comprising of sandstone is found beneath the Tunnel City. Both the Tunnel City and Wonewoc are hydraulically connected.

The Eau Claire Formation - a siltstone, shale, and silty sandstone, which acts as a confining unit between the Mount Simon below, and the Wonewoc above. The Mount Simon aquifer consists of the Mount Simon Sandstone. In general, the Mount Simon is hydraulically isolated from the shallow groundwater systems and surface waters above it.

This geological information was used to define hydrogeologic boundaries that were incorporated into the delineation of the WHPA and used to assess DWSMA vulnerability. Also, the construction information about the public water supply wells was used in conjunction with groundwater quality data to assess well vulnerability.

3.3 Land Use Information

Parcel boundaries, road centerlines, and U.S. Public Land Survey coordinates were used to define the boundaries of the DWSMA.

Parcel and political boundaries are depicted in **Figure 1**. This information was primarily used to delineate the DWSMA and determine whether the limits of the DWSMA cross political boundaries. Specific land uses and zoning within and adjacent to the DWSMA will be reviewed, evaluated, assessed, and presented in Part II of the Plan.

Figures included in this Plan depict the major transportation routes and corridors within and surrounding St. Louis Park. However, sanitary and storm sewer coverage and presence of large-scale pipelines within the DWSMA will be examined in Part II of the Plan.

3.4 Water Quantity Information

Since other high capacity wells in the St. Louis Park area influence the groundwater flow field of the source water aquifer, high capacity private and public wells were evaluated and assessed in detail during the delineations of the WHPAs for the City's public water supply wells. In addition, specific information related to the construction, maintenance, and use of the municipal wells has been compiled, utilized, and presented in the Plan (**Table 1**). This information was also used in delineating the WHPAs and completing the vulnerability assessments.

Groundwater pumping information from high capacity wells was obtained from the State Water Use Data System (SWUDS) that is maintained by the DNR. The annual pumping reported by the Public Water Supplier was used in determining the daily volume of water that is discussed in Section 2 of this document (**Table 6**). Furthermore, SWUDS data, combined with well construction records from the CWI, were used to identify additional high capacity wells to be included in delineating the WHPA. The locations and daily volumes were cross checked with those in the Metro Model. The pumping volumes were updated as appropriate. These wells constitute flow boundaries (**Table 7**).

The primary wells used by the St. Louis Park public water supply system currently rely upon three source water aquifers – the Prairie du Chien, Jordan, and Mt. Simon aquifers. In 2014, the City abandoned Well 3 (206440) which had utilized the St. Peter sandstone.

Municipal Wells 4, 8 and 10 are multi-aquifer wells, open to both the Prairie du Chien and Jordan aquifers. Wells 14, 15, and 16 are completed in the Jordan sandstone and Wells 11, 12, and 13 are open to the Mt. Simon aquifer. Well 6 is also open to both the Prairie du Chien and Jordan aquifers, however it is classified as an emergency well and was not included in the WHPA delineations. Well logs are included as **Appendix B.** The existing groundwater wells appear adequate to meet the City's current and future water demand. The City has no immediate plans to replace or add municipal wells, or utilize any other source of water supply.

The City has provided the 2009-2013 water use and pumping volume records presented in this Plan to determine an appropriate discharge rate for the wells in delineating the WHPAs. In addition, the City has estimated a projected increase in groundwater use for 2017. These records are provided in **Table 6**.

Currently, there are no known, significant groundwater-use conflicts between the City and other parties.

3.5 Water Quality Information

Groundwater quality information was used to update well vulnerability. The quality of the groundwater in the source water aquifers, and in the St. Louis Park area specifically, must be evaluated and assessed for this Plan. Groundwater contamination and undesirable groundwater quality will directly impact the public water supply system. Certain naturally-occurring constituents in the groundwater also provide information that can be used to determine the vulnerability of the source water aquifer. The City publishes an annual consumer confidence report that contains water quality data collected over the course of the year.

The overall quality of groundwater in St. Louis Park is good. No contaminants were detected at levels that violated federal drinking water standards. Some were detected in trace amounts that were below legal limits. The St. Louis Park 2013 Consumer Confidence Report is available on the City website.

4.0 General Descriptions

4.1 Description of the Water Supply System

The public water supplier currently obtains its drinking water supply from nine primary groundwater wells and one emergency backup well. **Table 1** summarizes information regarding the City wells.

4.2 Description of the Hydrogeologic Setting

The description of the hydrologic setting for the aquifer used to supply drinking water is presented in **Table 4** and discussed in further detail below.

Table 4 - Description of Hydrogeologic Setting

Aquifer	Attribute	Descriptor	Data Source
Prairie du Chien (OPDC)	Aquifer Material	Dolostone	CWI Well Logs, MGS
	Porosity (type and value)	0.056	Metro Model 3.0
	Aquifer Thickness	110-121 ft.	City Well Logs
	Stratigraphic Top Elevation	623-637 ft. MSL	City Well Logs
	Stratigraphic Bottom Elevation	489-527 ft. MSL	City Well Logs
	Hydraulic Confinement	Confined	City Well Logs
	Transmissivity (T)	Reference Value/ Range: 13,100 ft^2/day (12,990-13,140 ft^2/day)	The reference value for the transmissivity of the Prairie du Chien Aquifer was determined from pumping tests on Minnetonka Well 6 and Meadowbrook Golf Course Well 2. The pump test analysis was provided as part of the Aquifer Test Plan for the OPDC and approved on December 10, 2015.
	Hydraulic Conductivity (K)	Reference Value: 73.8 ft/day	The reference K value was calculated based upon the T value provided in the ATP divided by the aquifer thickness at the tested well.
	Groundwater Flow Field	Flow to the southeast Hydraulic Gradient: 0.00083	Measured from model results. Flow generally to the southeast toward the Minnesota River.
Jordan Sandstone (CJDN)	Aquifer Material	Sandstone	City Well Logs
	Porosity (type and value)	0.318	Metro Model 3.0
	Aquifer Thickness	67-100 ft.	City Well Logs
	Stratigraphic Top Elevation	489-527 ft. MSL	City Well Logs
	Stratigraphic Bottom Elevation	422-444 ft. MSL	City Well Logs
	Hydraulic Confinement	Confined	City Well Logs

Aquifer	Attribute	Descriptor	Data Source
	Transmissivity (T)	Reference Value/Range 2,400 ft^2/day (2,360-2,510 ft^2/day)	The reference value for the transmissivity of the Jordan Sandstone Aquifer was determined from pumping tests on Minnetonka Well 6. The pump test analysis was provided as part of the Aquifer Test Plan for the Jordan and approved on December 10, 2015.
	Hydraulic Conductivity (K)	Reference Value: 25.5 ft/day	The reference K value was calculated based upon the T value provided in the ATP divided by the aquifer thickness at the tested well.
	Groundwater Flow Field	Flow to the southeast Hydraulic Gradient: 0.0011	Measured from model results. Flow generally to the southeast toward the Minnesota River.
Mt. Simon Sandstone (CMTS)	Aquifer Material	Sandstone	City Well Logs
	Porosity (type and value)	0.233	Metro Model 3.0
	Aquifer Thickness	68-81 ft.	City Well Logs
	Stratigraphic Top Elevation	67-124 ft. MSL	City Well Logs
	Stratigraphic Bottom Elevation	(-138) - (-185) ft. MSL	City Well Logs
	Hydraulic Confinement	Confined	City Well Logs
	Transmissivity (T)	Reference Value: 1,970 ft^2/day	The reference value for the transmissivity of the Mt. Simon Aquifer was determined from pumping tests on St. Louis Park Well 11. The pump test analysis was provided as part of the Aquifer Test Plan for the Mt. Simon and approved on December 10, 2015.
	Hydraulic Conductivity (K)	Reference Value: 7.49 ft/day	The reference K value was calculated based upon the T value provided in the ATP divided by the aquifer thickness at the tested well.
	Groundwater Flow Field	Flow to the southeast Hydraulic Gradient: 0.0020	Modeled groundwater flow field.

The primary wells used by the St. Louis Park public water supply system currently rely upon three source water aquifers – the Prairie du Chien, Jordan, and Mt. Simon aquifers. In 2014, the City abandoned Well 3 (206440) which had previously utilized the St. Peter sandstone.

Municipal Wells 4, 8 and 10 are multi-aquifer wells, open to both the Prairie du Chien and Jordan aquifers. Wells 14, 15, and 16 are completed in the Jordan sandstone and Wells 11, 12, and 13 are open to the Mt. Simon aquifer. Well 6 is also open to both the Prairie du Chien and Jordan aquifers, however it is classified as an emergency well and was not included in the WHPA delineations. Well 15 is no longer in use and was not analyzed for this Update.

Municipal well information including location, construction information, and aquifer is presented in **Table 1.**

5.0 Delineation of the Wellhead Protection Area

5.1 Delineation Criteria

The boundary for the City's WHPA is shown in **Figure 1**. **Table 5** describes how the delineation criteria that are specified under Minnesota Rules, part 4720.5510, were addressed.

Table 5 - Description of WHPA Delineation Criteria

Criterion	Descriptor	How the Criterion was Addressed
Flow Boundary	Local Lakes and Rivers: Minnesota River, Lake Minnetonka and Minnehaha Creek	The rivers and lakes provided boundary conditions to the model that extended to and included these natural boundaries. They were included in the model and helped set the regional groundwater flow and water balance.
Flow Boundary	Other High-Capacity Wells **Table 7**	The pumping amounts were determined based on the averaged 2003-2011 pumped volumes. The pumping amounts of these high-capacity wells were included in the methods used for the delineation.
Daily Volume of Water Pumped	See **Table 6**	Pumping information was obtained from the Minnesota Department of Natural Resources Appropriations Permit 1973-1007. The annual pumped volumes were converted to a daily volume pumped by a well.
Groundwater Flow Field	Southeast Flow See **Figures 8, 9, and 10**	The model calibration process addressed the relationship between the calculated versus observed groundwater flow field.
Aquifer Transmissivity (T)	Reference Value: OPDC: 11,269 ft^2/day CJDN: 2,400 ft^2/day CMTS: 1,970 ft^2/day	The reference value for the transmissivity of the Jordan and Prairie du Chien Aquifers were determined from pumping tests and other data collected for the City of St. Louis Park's WHP Plan. Uncertainty regarding T was addressed as described in Section 5.4.
Time of Travel	10 years	The public water supplier selected a 10 year time of travel.

Information provided by the public water supplier was used to identify the maximum volume of water pumped annually by each well over the previous five-year period, as shown in **Table 6**. Also, the projected 2017 pumping rate is shown. Previous pumping values have been reported to the DNR, as required by the public water supply's Groundwater Appropriation Permit No. (1973-1007). Maximum daily volume of discharge, used as an input parameter in the model, was calculated by dividing the greatest annual pumping volume by 365 days.

Table 6 - Annual Volume of Water Discharged from Water Supply Wells

Well Name/ Number	Unique Number	Model Well Name	2009	2010	2011	2012	2013	Projected 2017 Year Withdrawal* (gal/yr)	Daily Volume max withdrawal (cubic meters)
Well 3**	206440	206440~1973-1007_3_211	**4,655,000**	117,000	0	20,000	29,000	0	0.00
Well 4	200542	MNW_00420	513,012,000	525,041,000	521,918,000	443,539,000	491,993,000	**573,888,542**	5,959.01
Well 5	203196	MNW_00421	0	0	0	0	0	0	0.00
Well 6	206457	MNW_00422	257,000	246,000	184,000	**471,000**	94,000	109,647	1.14
Well 7	206436	MNW_00423	0	0	0	0	0	0	0.00
Well 8	203678	MNW_00424	296,189,000	545,933,000	530,319,000	457,559,000	522,378,000	**609,331,330**	6,327.03
Well 9	206437	MNW_00425	0	0	0	0	0	0	0.00
Well 10	206442	MNW_00419	206,959,000	133,248,000	245,767,000	**331,570,000**	279,588,000	326,127,302	3,386.36
Well 11	206439	206439~1973-1007_11_211	**122,233,000**	58,707,000	53,806,000	116,691,000	77,031,000	89,853,328	933.00
Well 12	206456	206456~1973-1007_12_211	**362,056,000**	307,158,000	213,246,000	187,409,000	292,369,000	341,035,786	3,541.17
Well 13	206424	206424~1973-1007_13_211	211,310,000	**228,064,000**	79,131,000	178,301,000	26,290,000	30,666,147	318.42
Well 14	227965	227965~1973-1007_14_211	214,874,000	82,696,000	185,172,000	200,316,000	262,638,000	**306,355,861**	3,181.06
Well 15	215447	215447~1973-1007_15_211	55,240,000	0	0	0	0	0	0.00
Well 16	203187	203187~1973-1007_16_211	**375,759,000**	273,452,000	262,047,000	306,562,000	257,731,000	300,632,058	3,121.63
Well 17	147459	147459~1973-1007_17_211	0	0	0	0	0	0	0.00

Annual volumes expressed as gallons. **Bold** indicates greatest annual pumping volume.

* Total annual volume taken from St. Louis Park Water Supply Plan. Well volume ratio was calculated based upon 2013 pumping. Well 3 volume was taken out of this calculation.

**Well 3 was abandoned in Spring 2014.

In addition to the wells used by the public water supplier, **Table 7** shows other high-capacity wells, within one mile of the City wells, included in the delineation to account for their pumping impacts on the capture areas for the public water supply wells. Pumping data was obtained from the DNR State Water Use Database System.

Table 7 - Other Permitted High-Capacity Wells

Unique Number	Permittee	Permit	Use	Aquifer	Reported Withdrawal (MGY)				
					2011	2010	2009	2008	2007
206474	EDINA, CITY OF	1973-1119	Municipal Waterworks	OPDC/CJDN	0	0	0	0	0
204054	MINNETONKA, CITY OF	1979-6207	Municipal Waterworks	CJDN	134.2	110.7	98.0	146.9	163.3
208012	MINNETONKA, CITY OF	1979-6207	Municipal Waterworks	CJDN	134.1	110.7	98.0	146.9	163.3
203183	MINNEAPOLIS GOLF CLUB	1986-6083	Golf Course Irrigation	OPDC/CJDN	12.2	12.7	13.6	12.9	13.5
Unknown	MINNEAPOLIS GOLF CLUB	1986-6083	Golf Course Irrigation	NA	21.5	21.1	26.6	26.0	26.0
Unknown	MINNEAPOLIS PARK & REC BOARD	1986-6125	Golf Course Irrigation	MEADOWBROOK	3.4	12.8	21.5	16.6	22.1

Unique Number	Permittee	Permit	Use	Aquifer	Reported Withdrawal (MGY)				
					2011	2010	2009	2008	2007
216009	MINNEAPOLIS PARK & REC BOARD	1986-6125	Golf Course Irrigation	OPDC/CJDN	12.2	3.2	0	0	0
224098	GENERAL MILLS INC	2007-0209	Fire Protection	OPDC/CJDN	1.6	0.8	0.5	0.2	3.0
224099	GENERAL MILLS INC	2007-0210	Landscaping/Athletic Fields	OPDC/CJDN	23.4	23.2	32.2	31.3	30.5

5.2 Method Used to Delineate the Wellhead Protection Area

Conceptual Model

The City of St. Louis Park utilizes the Prairie du Chien, Jordan, and Mt. Simon aquifers for its water supply. The Metro Model Version 3, a recognized nine layer MODFLOW base model developed by the Metropolitan Council, was used as a base model and then refined in the vicinity of the St. Louis Park area (Metropolitan Council, 2014). The model grid, pumping rates, and hydraulic conductivity/transmissivity zones were refined to better represent the local geologic conditions. Model refinement focused primarily on the OPDC (Layer 3), CJDN (Layer 4), and CMTS (Layer 9) aquifers. The model refinement is described in more detail below.

Numerical Model

MODFLOW is the name that has been given the USGS Modular Three-Dimensional Ground-Water Flow Model. Because of its ability to simulate a wide variety of systems, its extensive publicly available documentation, and its rigorous USGS peer review, MODFLOW has become the worldwide standard ground-water flow model. MODFLOW is used to simulate systems for water supply, containment remediation, and mine dewatering. MODFLOW is most appropriate in those situations where a relatively precise understanding of the flow system is needed to make a decision. MODFLOW was developed using the finite-difference method. The finite-difference method permits a physical explanation of the concepts used in construction of the model.

Ground-water flow within the aquifer is simulated in MODFLOW using a block-centered finite-difference approach. Layers can be simulated as confined, unconfined, or a combination of both. Flows from external stresses such as flow to wells, areal recharge, evapotranspiration, flow to drains, and flow through riverbeds can also be simulated. The existing Metro Model 3, a nine layer model, was used as a base model. The model layers represented include the Quaternary, St. Peter Sandstone, Prairie du Chien Group, Jordan Sandstone, St. Lawrence Formation, Tunnel City Group (formerly known as the Ironton and Galesville Sandstones), Wonewoc Sandstone (formerly known as the Franconia Formation), Eau Claire Formation, and Mt. Simon-Hinkley Sandstones (Metropolitan Council, 2014). The model was refined around the St. Louis Park area using local data and focused primarily on the layers/aquifers that the City relies on for its water supply, the Prairie du Chien, Jordan, and Mt. Simon Aquifers. The Groundwater Vistas Version 6.74 Build 39 software package was used to model the system.

Grid Development/Refinement

Because MODFLOW is a block centered finite-difference model, a grid must be defined over the model domain. The grid spacing and size of cells varies across the model domain. The Metro Model 3 consists of a uniform 500 x 500 meter grid. In areas where impact from pumping and accuracy will not impact the capture zones, cells remained 500 x 500 meters. In areas where the accuracy of

groundwater contours and the delineation of particle tracks require greater accuracy (around pumping wells) the grid spacing is 15 x 15 meters.

Boundary Conditions

Constant head boundaries were used to represent water bodies in the model along northern sections of the St Croix River. **Figure 7** shows the boundary conditions used to represent natural features in the model in the Minnetonka area. River boundaries were used to represent the water bodies in the model. Boundary conditions for local lakes and rivers were not updated due to the confined nature of the OPDC and CJDN aquifers. The remaining boundary conditions from the original Metro Model were far enough from the area of study as to not impact the study area results. Model files are provided as **Appendix E**.

Transmissivity

Transmissivity values for the OPDC, CJDN, and CMTS were calculated based the analysis of well pump tests conducted on wells completed in each aquifer. An aquifer test plan for each aquifer was submitted to and approved by the MDH. The transmissivity values in the ATPs were used as a starting point for refining the model. Those values are referenced above in **Table 5**.

A polygon shapefile was created to differentiate areas of similar and dissimilar hydraulic conductivity values. Hydraulic conductivity zone values were calculated based upon the model layer/aquifer thickness and the transmissivity value calculated for each aquifer. The zones for Layer 3 are depicted in **Figure 8,** Layer 4 in **Figure 9,** and Layer 9 in **Figure 10**.

Porosity

A porosity of 0.056 was used for the OPDC, 0.318 for the CJDN, and 0.233 for the CMTS aquifers.

Aquifer Recharge

The USGS estimates annual recharge rates to surficial materials in the Twin Cities area to range between 3 and 9 inches per year (Delin 2007). The Metro Model 3 (Metropolitan Council, 2014) estimates infiltration using the Soil Water Balance (SWB) model developed by the Metropolitan Council. The aerial average infiltration for a period 1988-2011 was 8.2 inches per year and ranged between 2.7 and 13.0 inches per year. Due to the way that the Metro Model 3 handles this variable and that the aquifers utilized by the City of St. Louis Park are confined and not likely directly affected by recharge/infiltration, the values were not altered from those of the base Metro Model 3.

5.3 Fracture Flow Delineation Method

The Prairie du Chien formation is capable of rapidly transmitting water through its secondary porosity features (fractures and solution cavities) and can transmit water to the underlying Jordan aquifer, an additional delineation effort was required for the Prairie du Chien and Jordan aquifer wells. The Minnesota Department of Health has developed a guidance document and ArcGIS tool to assist in the delineation of the wellhead capture zone in fractured bedrock aquifers. The methodology is outlined in greater detail in *Guidance for Delineating Wellhead Protection Areas in Fractured and Solution-Weathered Bedrock in Minnesota* (MDH 2005).

Three (3) of St. Louis Park's nine (9) active wells are completed at least partially in the fractured Prairie du Chien aquifer. Guidance also requires the assessment of wells completed solely in porous media aquifers that are hydraulically connected to a fractured bedrock aquifer. The City has three (3) wells that are completed only in the Jordan, so these wells were assessed for fracture flow delineation.

St. Louis Park's wells 4, 8, and 10 are multi-aquifer wells, open to both the OPDC and CJDN aquifers. The MODFLOW model allocates flow from each layer based on aquifer properties and well elevations of the well's open interval in the model. The amount of flow from Layer 3 (OPDC) at each of these wells was used to calculate the fracture flow delineation for the PDC-JDN wells. **Appendix G** summarizes the information used in the fracture flow delineations.

Pumping volumes were extracted from the MODFLOW model for wells completed in the Prairie du Chien aquifer for the layer that represents the Prairie du Chien (Layer 3). This value along with the open interval thickness was input into the MDH ArcGIS delineation tool to determine if there was any overlap of capture zones. If there is overlap, additional analysis is completed to account for the volume of water "shared" by each well from the aquifer. There was no overlap of the calculated fixed radius (CFR) delineation of the OPDC wells.

The modified Metro Model 3 model was analyzed to determine the estimated recharge from the PDC into the JDN aquifer across the 10 year delineation areas for the wells completed only in the Jordan aquifer (Wells 14 and 16). Well 15 is no longer in use and was not analyzed for this WHPP Update. The analysis comparing the pumping volume generated by the MODFLOW model to the volume of water pumped by the wells completed in the Jordan aquifer met the 10% contribution threshold indicating that there is a highly leaking setting. The fractured aquifer is a major source of recharge to the Jordan aquifer and fracture flow delineation was completed for the City's Jordan wells. This was done by computing a water balance for the cells within the 10-year capture zone. The value contributed by the PDC was used as the flow value for the Jordan wells. **Appendix G** summarizes this information.

The CFR for Well 16 and Well 8 did overlap. A separate analysis to account for the overlapped volume was completed. The final fracture flow delineation area is represented on **Figure 1**. Summary tables of fracture flow input data and output results are provided in **Appendix G**.

The fracture flow capture zones were added to the area defined by the MODFLOW model and a composite delineation was created. The City's well capture zones can be found on **Figure 1** and the shapefiles can be found in **Appendix E**.

5.4 Results of Model Calibration and Sensitivity Analysis

Model calibration is a procedure that compares the results of a model based on estimated input values to measured or known values. This procedure can be used to define model validity over a range of input values, or it helps determine the level of confidence with which model results may be used. As a matter of practice, groundwater flow models are usually calibrated using water elevation or flux.

Hydraulic conductivity zones were refined while updating the Metro Model 3 during calibration and the sensitivity analysis. **Figures 8, 9, and 10** show the updated hydraulic conductivity zones for model layers 3, 4 and 9, representing the OPDC, CJDN and CMTS aquifers respectively. The calibration results for this model are presented in **Figure 11** and the resulting potentiometric surface depicts groundwater flow direction and gradient. Hydraulic conductivity was the primary variable used to calibrate the model in the local area surrounding St. Louis Park.

Model sensitivity is the amount of change in model results caused by the variation of a particular input parameter. The direction and extent of the modeled capture zone may be sensitive to any of the input parameters:

- The pumping rate directly affects the volume of the aquifer that contributes water to the well. An increase in pumping rate leads to an equivalent increase in the volume of aquifer

within the capture zone, proportional to the porosity of the aquifer materials. However, the pumping rate is based on the results presented in **Table 6** and, therefore, is not a variable factor that will influence the delineation of the WHPA.

- The direction of groundwater flow determines the orientation of the capture area. Variations in the direction of groundwater flow will not affect the size of the capture zone but are important for defining the areas that are the source of water to the well. The potentiometric map that is produced by the refined Metro Model 3 model closely matches that as seen by the calibration points of observed static water level data (**Figures 8, 9, and 10**). Therefore, the direction of groundwater flow should not have a significant effect on WHPA delineation given the current knowledge of hydraulic head distribution in the aquifer.
- A hydraulic gradient of zero produces a circular capture zone, centered on the well. As the hydraulic gradient increases, the capture zone changes into an elliptical shape, with the well centered on the down-gradient focal point. The hydraulic gradient was determined by using water level elevations and contoured by the calibrated Metro Model 3. Generally, the accuracy of the hydraulic gradient determination is directly proportional to the amount of available data that describes the distribution of hydraulic head in the aquifer.
- The aquifer thickness and porosity influence the size and shape of the capture zone. A decrease in either thickness or porosity causes a linear, proportional increase in the areal extent of the capture zone. Aquifer thickness was verified in the area of study based upon boring and geophysical log data. The aquifer thickness in the area of study is relatively well defined, therefore is not a variable that will change to influence the WHPA delineation. A change in porosity will affect the delineation of the WHPA, however, the value used in the model for the aquifers are relatively accepted, and therefore is not a variable that will change to influence the WHPA delineation.
- Aquifer permeability will influence the size and shape of the capture zone. Permeability defines the relative proportions of the capture zone width to length. A decrease in permeability decreases the length of the capture zone and increases the distance to the stagnation point, making the capture zone more circular in shape, centered at the well. The updated hydraulic conductivity zones (**Figures 8, 9, and 10**) appeared to represent the local OPDC, CJDN and CMTS conditions relatively well. During sensitivity analysis, as the K value increased, the capture zone increased slightly. Results of the sensitivity analysis are presented in **Figure 12**. The K values used during the sensitivity analysis are included below in **Table 8**.

Table 8- Sensitivity Analysis Variables

Model Run Name	Description	Layer	T Value (ft2/d)	Kh Value (m/day)	Kv Value (m/day)	Results
Max T (Khigh)	The maximum T value (based upon pump test analysis) identified in the aquifer test plan was used.	L3	13,140	**Zone 1** 92.05 **Zone 2** 241.4 **Zone 3** 241.4	**Zone 1** 0.01 **Zone 2** 0.23 **Zone 3** 0.01	Slight shift in capture zone to the north east. Path lines extend slightly outside of the delineated DWSMA. Note: K zones are depicted in Figures

		L4	2,360	**Zone 1** 83.7	**Zone 1** 0.007	8 and 9.
Min T (Klow)	The minimum T value (based upon pump test analysis) identified in the aquifer test plan was used.	L3	12,990	**Zone 1** 59.6 **Zone 2** 156.3 **Zone 3** 156.3	**Zone 1** 0.007 **Zone 2** 0.23 **Zone 3** 0.007	Slight shift in capture zone to the north east. Path lines extend slightly outside of the delineated DWSMA. Note: K zones are depicted in Figures 8 and 9.
		L4	2,510	**Zone 1** 83.7	**Zone 1** 0.007	
K10x	The minimum T value (based upon pump test analysis) identified in the aquifer test plan was used.	L3	131,000	**Zone 1** 293.3 **Zone 2** 320.3 **Zone 3** 353.3	**Zone 1** 29.3 **Zone 2** 32.0 **Zone 3** 35.3	Dramatic increase in capture zone to the north west. Path lines extend well outside of the delineated DWSMA. Note: K zones are depicted in Figures 8 and 9.
		L4	24,000	**Zone 1** 88.8	**Zone 1** 8.88	

6.0 Delineation of the Drinking Water Supply Management Area

Boundaries used to delineate the Drinking Water Supply Management Area (DWSMA) are described above in Section 3.2. The DWSMA boundaries were defined using the following features (**Figure 1**):

- Road centerlines,
- public land surveys (including township, range, section, and ¼ section boundaries), and
- property lines (Hennepin County parcel data).

A GIS shapefile of the DWSMA is provided in **Appendix D.**

7.0 Vulnerability Assessments

The Part I wellhead protection plan includes the vulnerability assessments for the public water supply wells and the DWSMA. These vulnerability assessments are used to help define potential contamination sources within the DWSMA and to select appropriate measures for reducing the risk that they present to the public water supply.

7.1 Assessment of Well Vulnerability

The vulnerability assessment for each well used by the public water supplier is listed in **Table 1** and is based upon the following conditions:

1) Well construction meets current state Well Code specifications (Minnesota Rules, part 4725) and the well itself does not provide a pathway for contaminants to enter the aquifer used by the public water supplier;

2) The geologic conditions at the well site include a cover of geologic materials over the aquifer that is sufficient to retard or prevent the vertical movement of contaminants;

3) None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at levels indicating that the well itself serves to draw contaminants into the aquifer as a result of pumping.

4) Tritium analysis of water from each well.

Results of the well vulnerability analysis – The MDH Source Water Protection (SWP) Vulnerability rating for St. Louis Park's municipal wells determined Wells 8, 11, 12, and 13 to be not vulnerable and Wells 3, 4, 6, 10, 14, 15, and 16 to be vulnerable. In general, the wells identified as not vulnerable were the three Mt. Simon wells and Well 8 which did not have any detections of tritium or nitrate, a very low geologic sensitivity to pollution, and an L-Score of 10. These L-scores and sensitivity ratings are based upon the overlying surficial geology and the presence of any protective confining units. The wells identified as vulnerable may have a low geologic sensitivity and high L-score, however the vulnerability was overridden because the well water either had a detection of tritium or a nearby well within the same aquifer had a detection of tritium. The MDH scoring sheets are presented as **Appendix F**.

7.2 Assessment of Drinking Water Supply Management Area Vulnerability

The vulnerability of the DWSMA is shown in **Figure 11** and is based upon the following information:

Boring logs available for wells within both DWSMAs were reviewed for the presence of clay thicknesses. Geologic cross-sections were developed and are included as **Figures 5 and 6.**

MDH guidance (MDH, 1997) was followed in determining the DWSMA vulnerability. L-scores were provided by MDH staff and calculated based upon DNR geologic sensitivity guidelines for wells within the DWSMA that extended to the OPDC-OJDN. Geologic Sensitivities were also determined for each of those wells. In addition, the following criteria, incorporating available tritium data, were used to determine the vulnerability of the City's DWSMA:

1) Areas of very low geologic sensitivity but tritium present should be of low vulnerability;
2) Areas of low geologic sensitivity but tritium present should be of moderate vulnerability; and
3) Areas of moderate geologic sensitivity but tritium present should be of high vulnerability.

A review of the geologic logs contained in the CWI database and geological maps and reports indicate that the OPDC and CJDN aquifers exhibit a low to moderate geologic sensitivity within the DWSMA. Boring logs available for wells within the DWSMA were reviewed for the presence of clay thicknesses and L-scores calculated.

8.0 Recommendations

The following plan implementation action item recommendations have been made for the Public Water Supplier to consider. Each recommendation is referenced to the plan implementation category under which it can be incorporated. Each recommendation will be further evaluated during the preparation of the Part II WHP Plan Update.

Plan Implementation Category – Data Collection

Item 1 – Work Cooperatively with Neighboring Municaplities Regarding Wellhead Protection

The DWSMA that was delineated as part of this project extends beyond the St. Louis Park municipal boundaries. While developing and implementing Part II of the City's WHPP, it is recommended that the City of St. Louis Park collaborate and cooperate with municipalities in which the City's DWSMA extends to. As the City cannot dictate landuse activities outside of its jurisdiction, it can work closely with surrounding municipalities as landuses change and decisions are made that may impact the City's water supply.

Item 2 – Work Cooperatively with Neighboring Stakeholder Groups and Local Governmental Units

There are many stakeholders and local governmental units (LGUs) that may be found within the City's DWSMA boundary. It is recommended that as the City and/or LGUs plan to make changes that may affect landuse within the DWSMA boundary, that attempts be made to work collaboratively together to meet each of their needs and/or goals.

Item 3 - Addressing deficiencies in the distribution and quality of subsurface geologic and hydrologic information.

The direction of groundwater flow and the hydraulic gradient used to determine the capture zones for the water supply wells are based on information from a limited number of water well, observation well, and well sealing records. The direction of groundwater flow determines the orientation of the capture zone and the hydraulic gradient affects the length of the capture zone. Generally, the accuracy of the flow direction and hydraulic gradient determination are directly proportional to the amount and quality of subsurface information. The MDH and the Public Water Supplier should continue to verify the locations of wells, sealed wells, and other borings that are constructed within a two-mile radius of the DWSMA as part of the process for amending the WHP plan. Additional subsurface information will provide insight into whether modifications to the delineation of the WHPA and the assessment of DWSMA vulnerability are warranted under the next plan amendment process.

Plan Implementation Category – Contingency Planning

Item 4 - Addressing the potential movement of contamination toward the community well(s).

The MDH recommends that if contaminants are ever detected in a municipal water supply well, the Public Water Supplier work with the MDH to perform an evaluation of whether to continue pumping the impacted well(s). Turning off a well may alter the movement of contamination to other pumping wells and compound the problem. Therefore, it is very important to include this recommendation in the Part II contingency plan.

9.0 Standard of Care

The interpretations presented in this report are based on local data collected during this study and previous studies, such as current and historical pumping tests and regional data collected from governmental agencies. Data collected and analyzed by others and used in this report may not be precise or accurate. This Plan does not account for any variations that may occur between points of exploration; geologic and hydrogeologic conditions likely differ across the study area. Also, it must be noted that seasonal and cyclical fluctuations in the hydrogeologic characteristics and properties of the aquifers will occur.

The scope of this report and the corresponding groundwater flow model and calculations is limited to the delineation of capture zones for the St. Louis Park municipal wells. Use of the groundwater flow model by other parties or for other purposes is not advised. Use or modification of the model for purposes other than the delineation of capture zones must be done with caution and a full understanding of the inherent assumptions and limitations of the data.

This Plan represents our understanding of the significant aspects of the local geologic and hydrogeologic conditions; the conclusions are based on our hydrogeologic and engineering judgment, understanding and perspective, and represent our professional opinions. These opinions were arrived at in accordance with the currently accepted standard of care for geologic and engineering practices at this time and location. No warranty is implied or intended.

10.0 Selected References

Balaban, N.H. 1989. C-04 Geologic atlas of Hennepin County, Minnesota. Minnesota Geological Survey. Retrieved from the University of Minnesota Digital Conservancy, http://purl.umn.edu/58491.

Delin, G.N. and J.D. Falteisek. 2007. Groundwater Recharge in Minnesota, Fact Sheet 2007-3002, US Dept. of Interior, US Geological Survey.

Fetter, C.W. 1988. Applied Hydrogeology, Merrill Publishing Company, Columbus, OH.

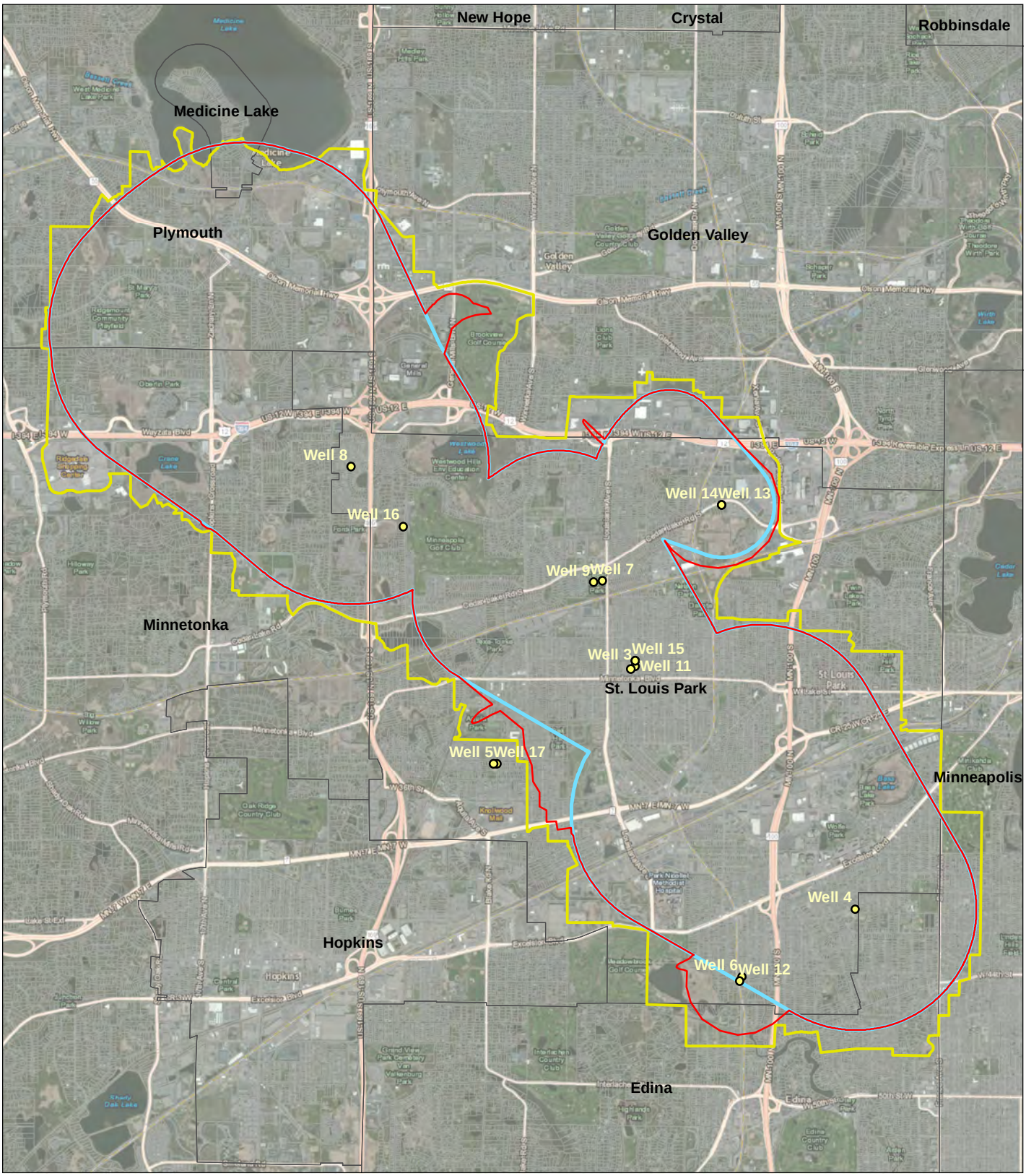
Geologic Sensitivity Project Workgroup. 1991. Criteria and Guidelines for Assessing Geologic Sensitivity of Ground Water Resources in Minnesota. Minnesota Department of Natural Resources, Division of Waters, St. Paul, MN.

Metropolitan Council. 2014. Twin Cities Metropolitan Area Regional Groundwater Flow Model, Version 3.0. Prepared by Barr Engineering. Metropolitan Council: Saint Paul, MN.

MN Climatology Working Group (State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu)

Minnesota Department of Health (MDH). 1997. Assessing Well and Aquifer Vulnerability for Wellhead Protection. MDH Drinking Water Protection Section, Source Water Protection Unit, St. Paul, MN.

List of Figures



SOURCEWATER SOLUTIONS

www.sourcewater-solutions.com
Phone: (612) 701.7343

Legend

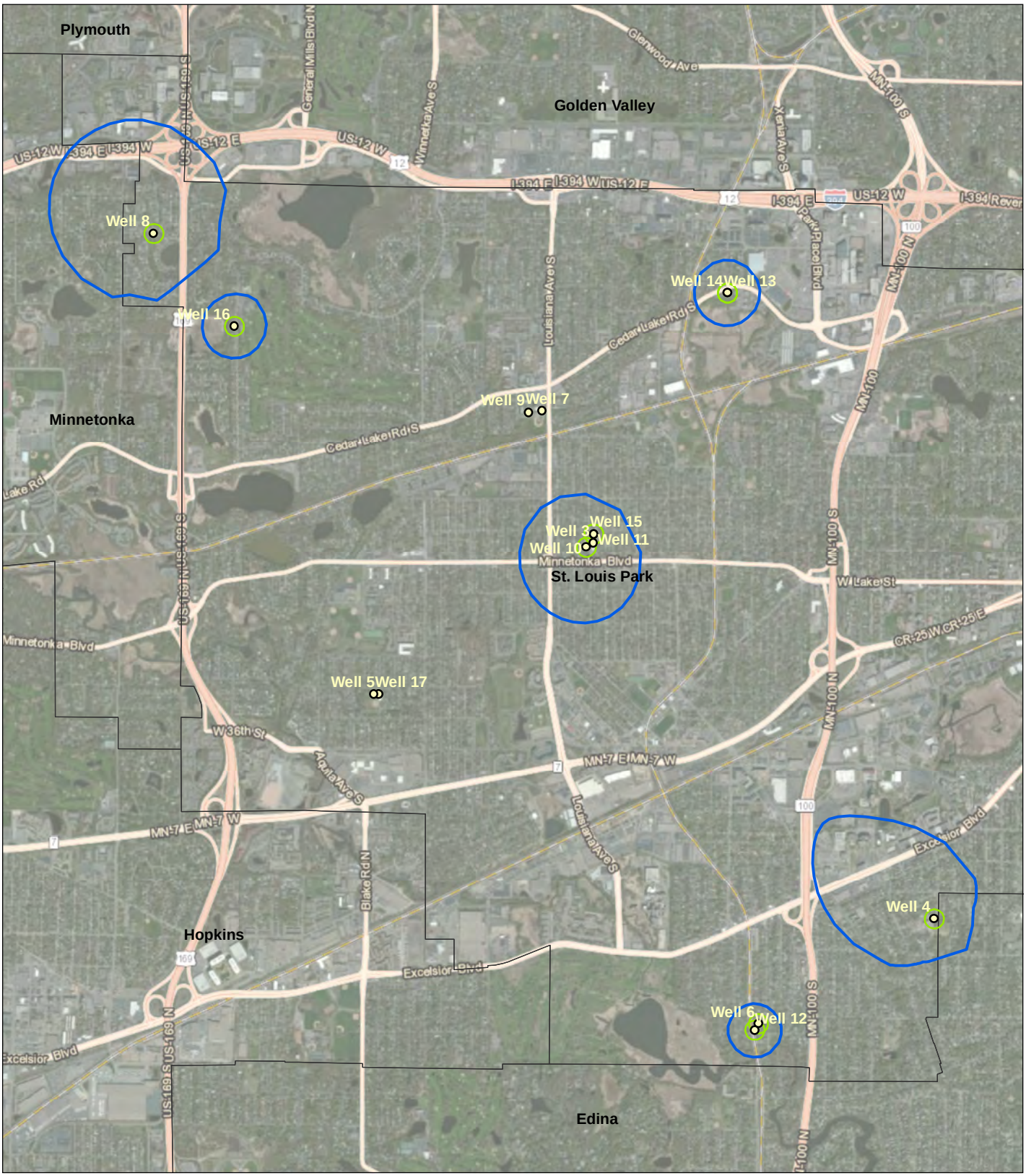
- Municipal Wells
- Municipal Boundary
- Parcels
- WHPA (10-Yr)
- DWSMA
- Fracture Flow Delineation (10-Yr)

0 375 750 1,500 2,250 Meters

Figure 1

WHPA and DWSMA

St. Louis Park Wellhead Protection Plan



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Legend

- Municipal Wells
- Fracture Flow Delineation (1-Yr)
- Municipal Boundary
- ERA (1-Yr)
- IWMZ

0 260 520 1,040 1,560 Meters

Figure 2

Emergency Response Areas and Inner Wellhead Management Zones

St. Louis Park Wellhead Protection Plan

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Legend

Surficial Geology

- Boulders
- Clay
- Diamicton
- Organic
- Rock
- Sand
- Silt
- Unspecified
- Water
- Municipal Wells
- DWSMA

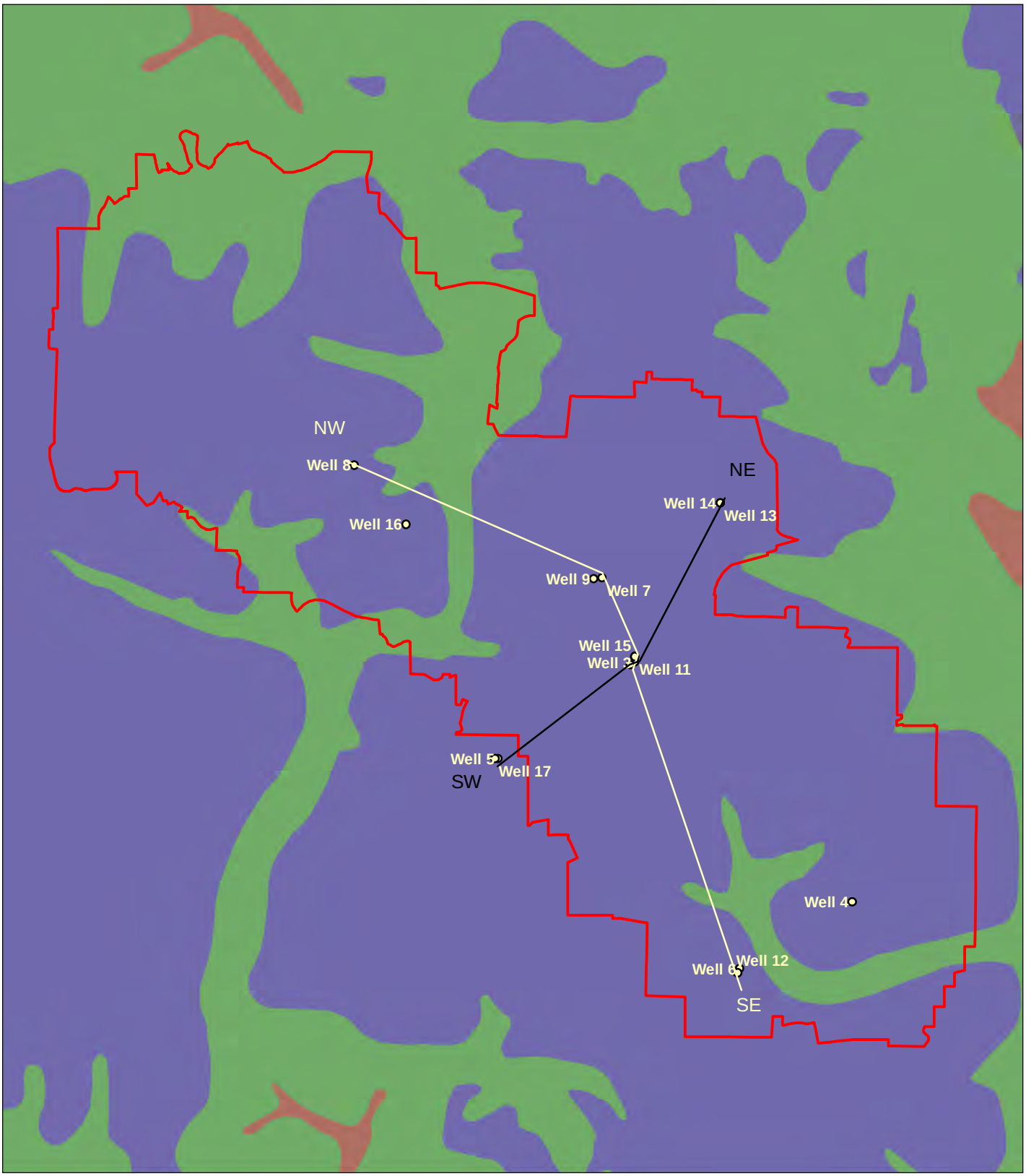
0 325 650 1,300 1,950 Meters

N W E S

Figure 3

Surficial Geology

St. Louis Park Wellhead Protection Plan



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Legend

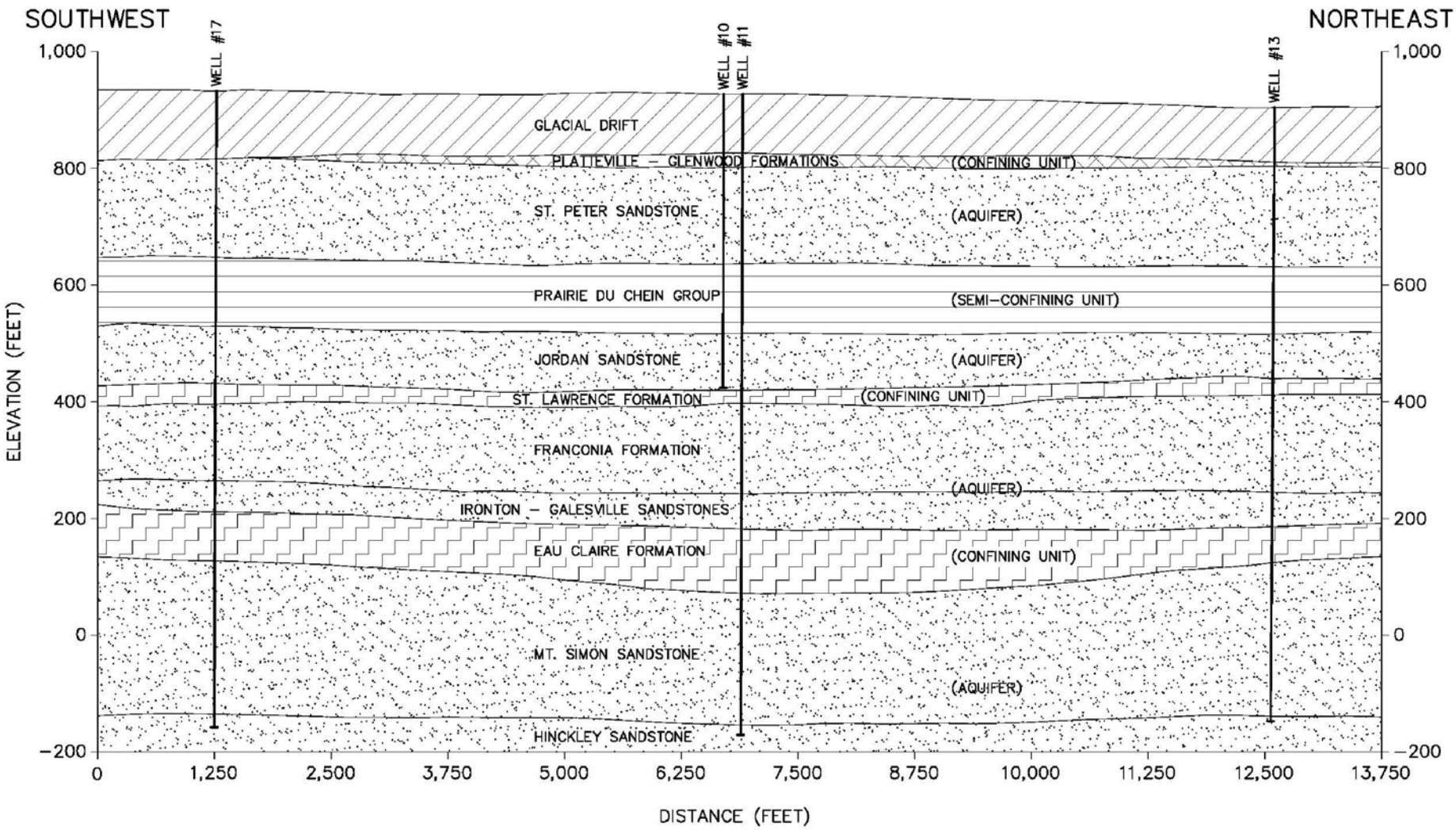
- Platteville-Glenwood
- St. Peter
- Prairie du Chein Group
- Jordan
- St. Lawrence Formation
- Franconia-Ironton-Galesville
- Eau Claire Formation
- DWSMA
- Municipal Wells

0 335 670 1,340 2,010 Meters

Figure 4

Bedrock Geology

St. Louis Park Wellhead Protection Plan



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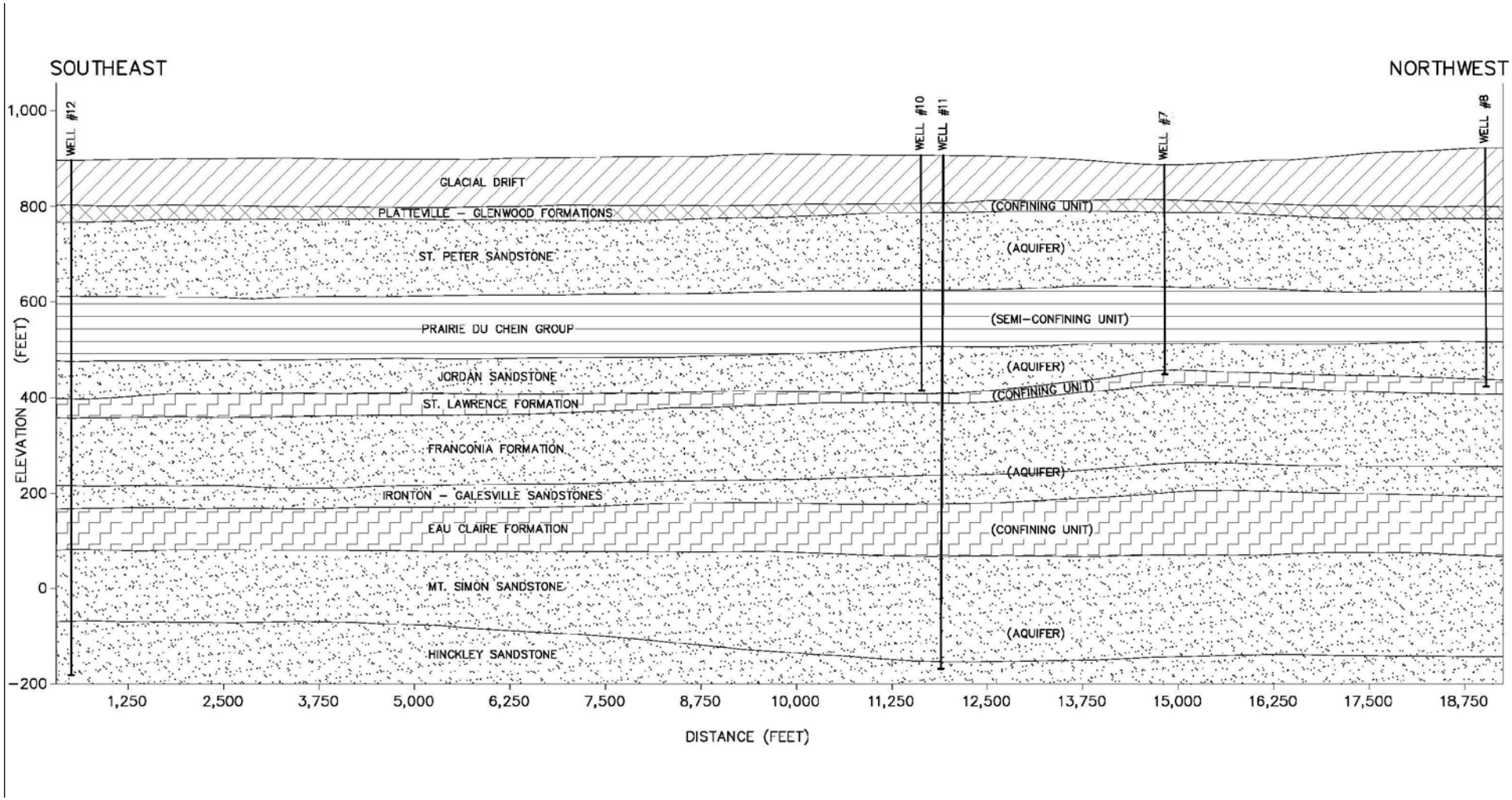
Generalized Cross Section
SW - NE

Figure 5

St. Louis Park Wellhead Protection Plan



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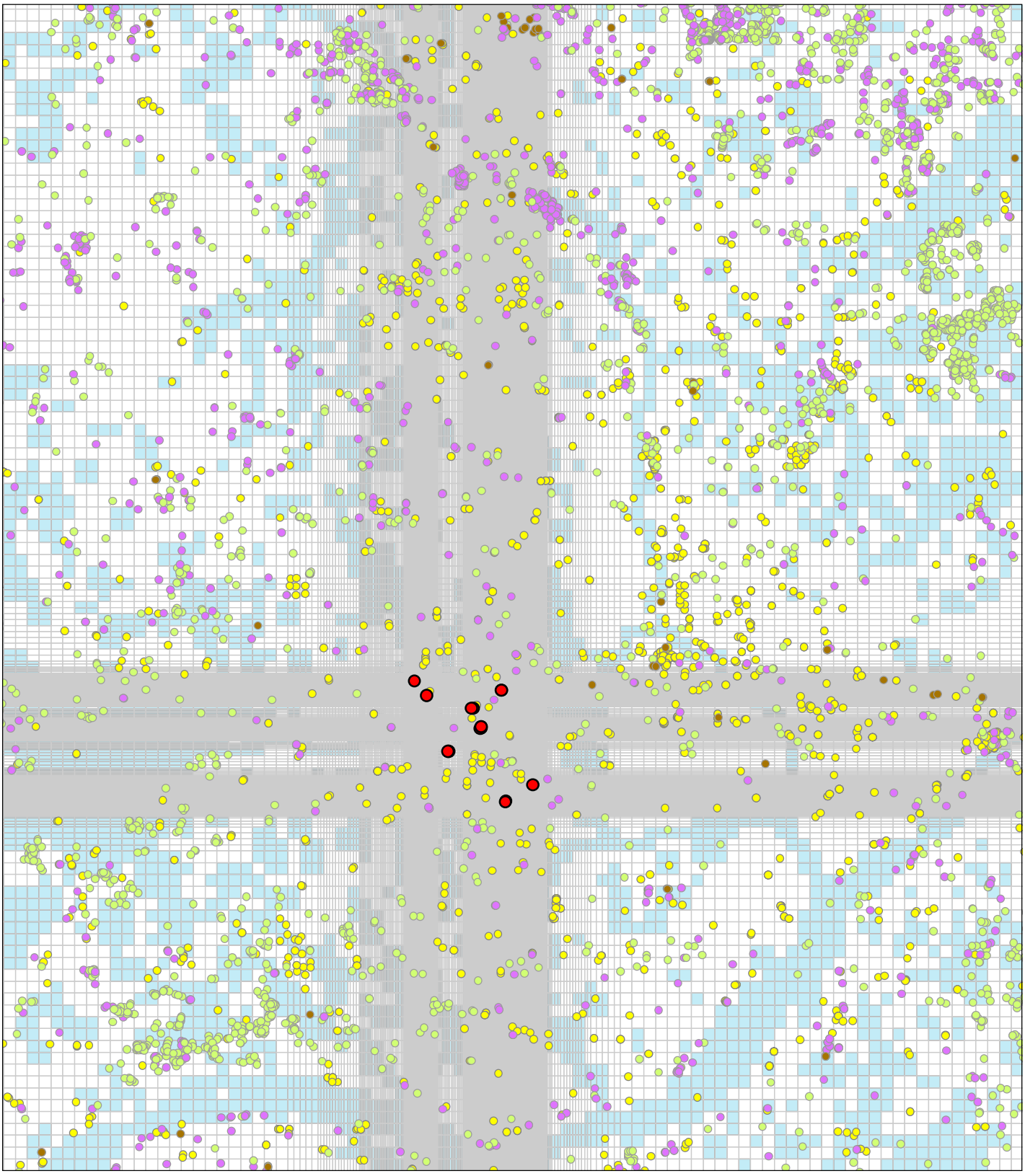
Generalized Cross Section
SE - NW

Figure 6

St. Louis Park Wellhead Protection Plan



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Legend

Calibration Targets (Layer)

- 3
- 4
- 9
- High Capacity Wells
- Municipal Wells
- Model Grid
- River Boundaries

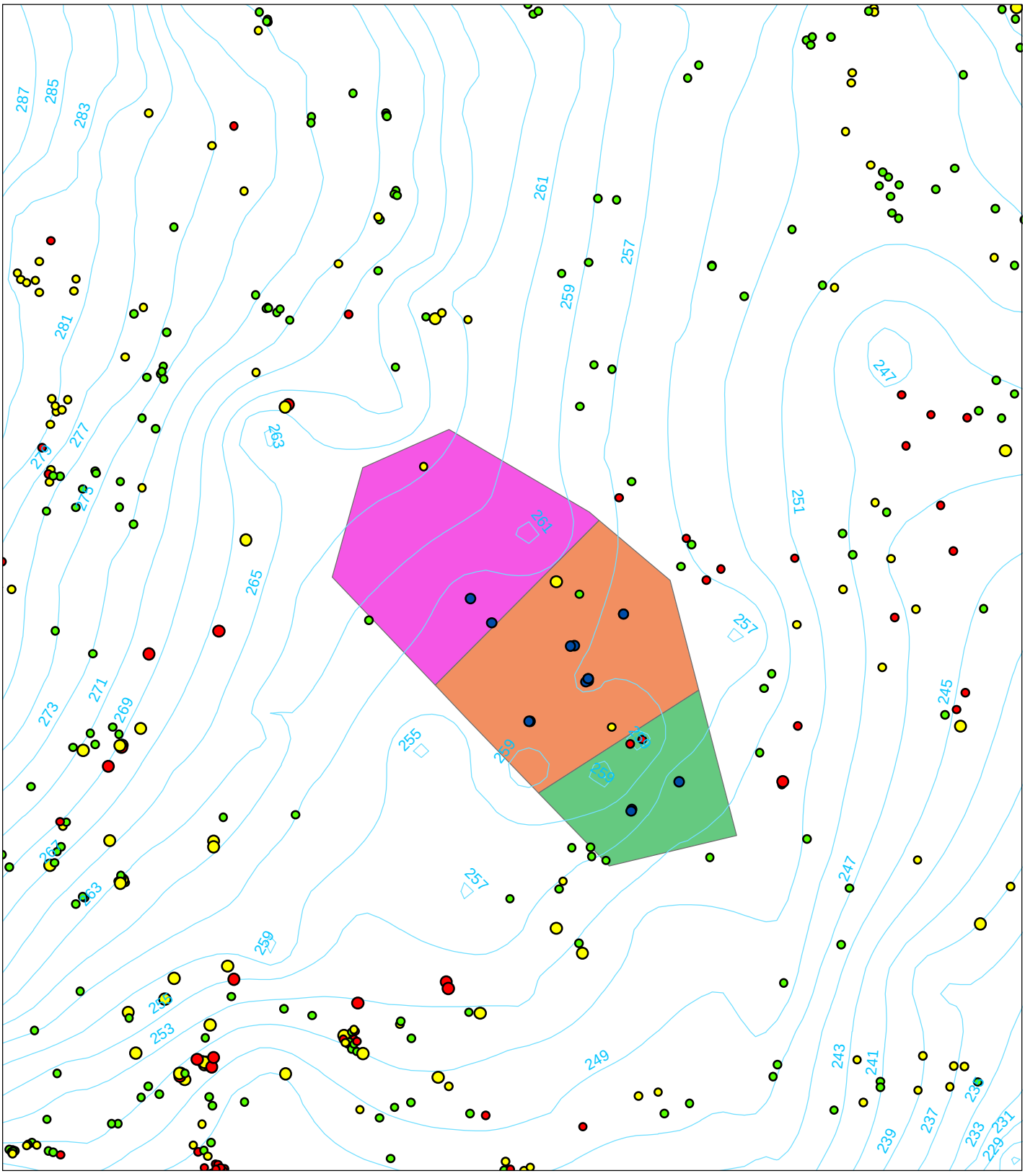
N W E S

0 1,400 2,800 5,600 8,400 Meters

Figure 7

Model Boundary Conditions

St. Louis Park Wellhead Protection Plan



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Legend

Layer 3 Residual

- -54 - -10
- -9 - -5
- -4 - 5
- 6 - 10
- 11 - 40

Municipal Wells

Layer 3 Contours (m)

Layer 3 Kh (m/d)

- 29.33
- 32.03
- 35.33

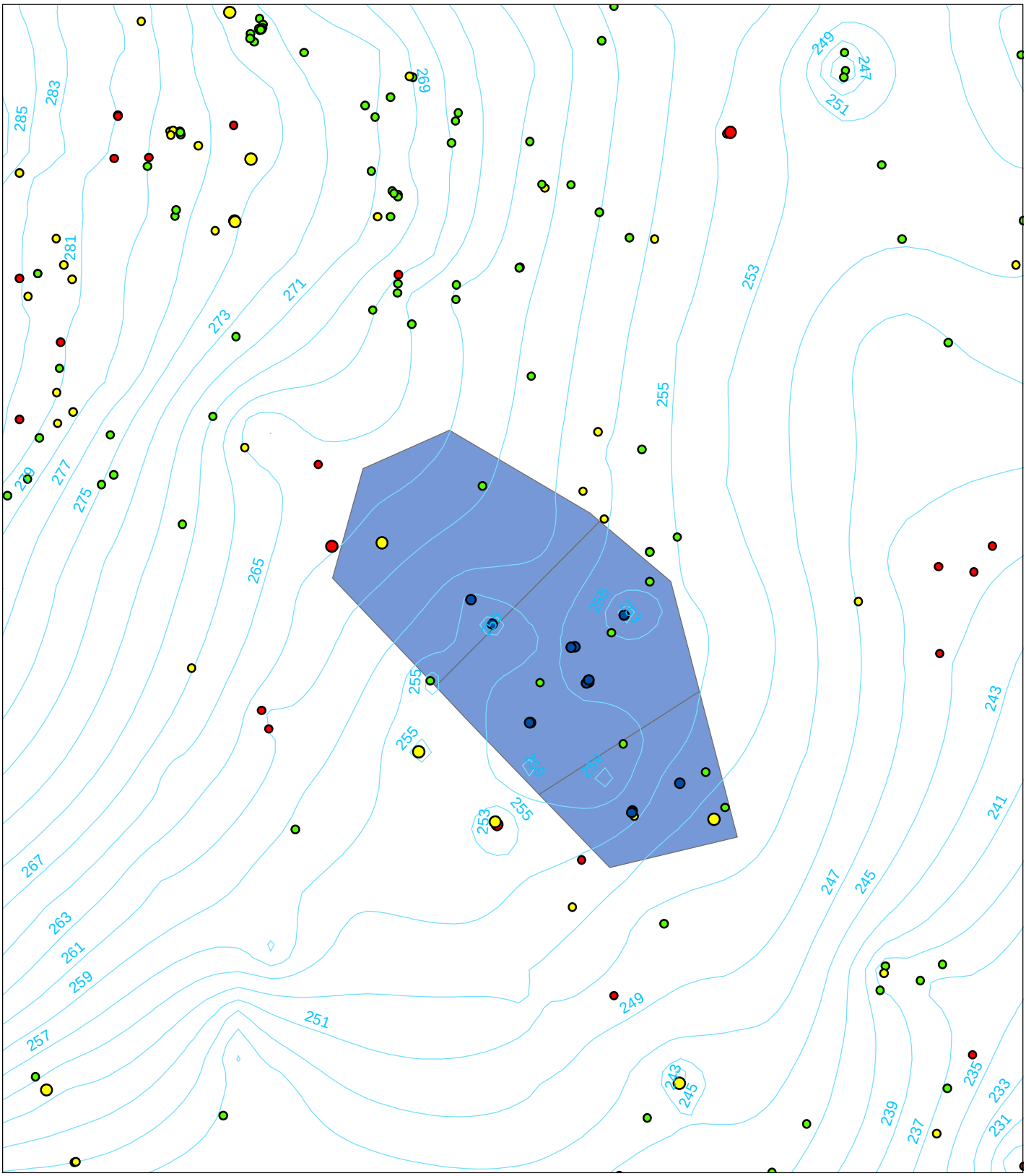
0 750 1,500 3,000 4,500 Meters

N W E S

Figure 8

Layer 3 Results

St. Louis Park Wellhead Protection Plan



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Legend

Residual

- -54 - -10
- -9 - -5
- -4 - 5
- 6 - 10
- 11 - 40

Layer 4 Kh (m/d)

- 8.88
- Layer 4 Contours (m)
- Municipal Wells

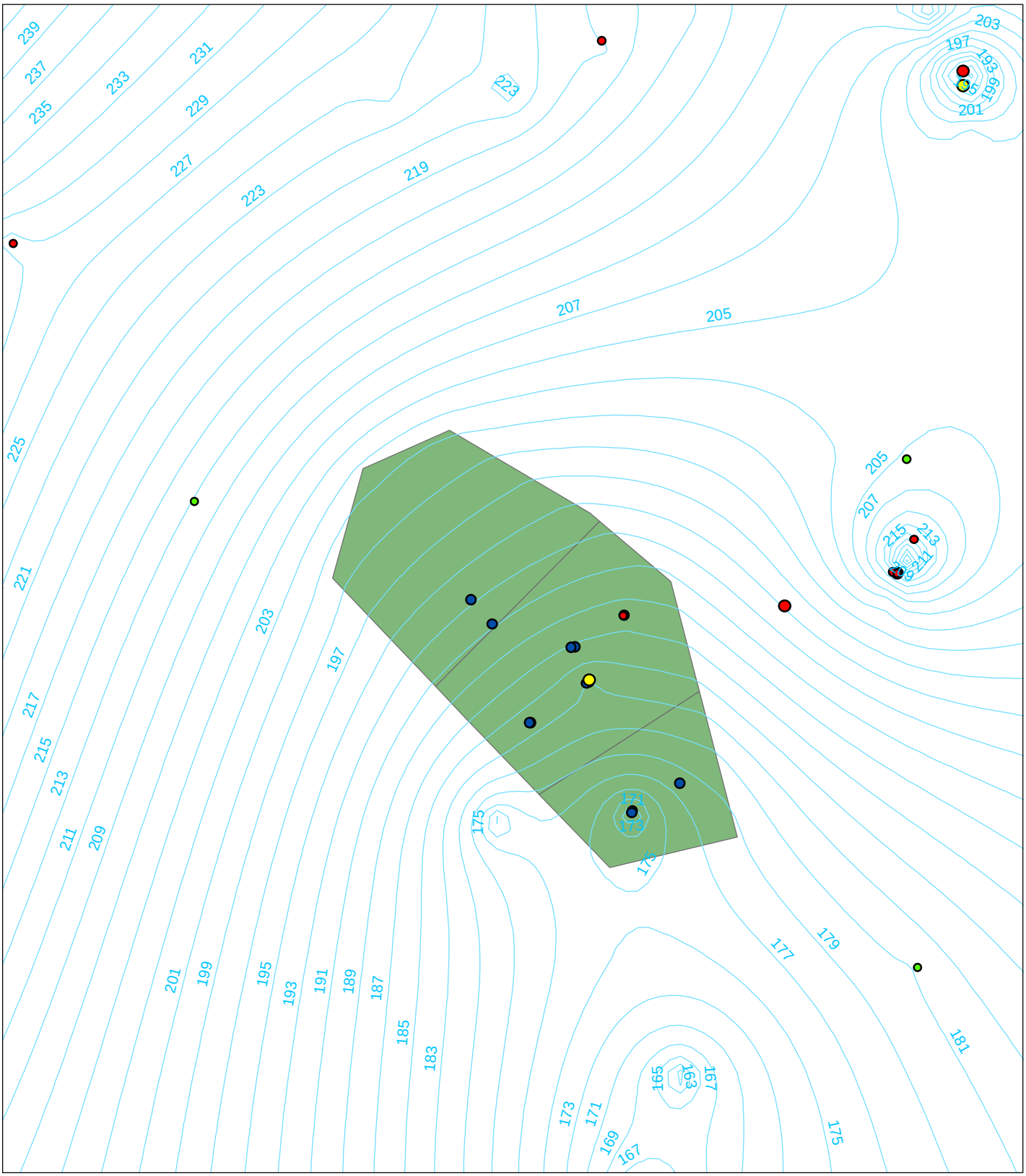
N W E S

0 750 1,500 3,000 4,500 Meters

Figure 9

Layer 4 Results

St. Louis Park Wellhead Protection Plan



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Legend

Residual

- -54 - -10
- -9 - -5
- -4 - 5
- 6 - 10
- 11 - 40

Municipal Wells

Layer 9 Contours (m)

Layer 9 Kh (m/d)

3.05

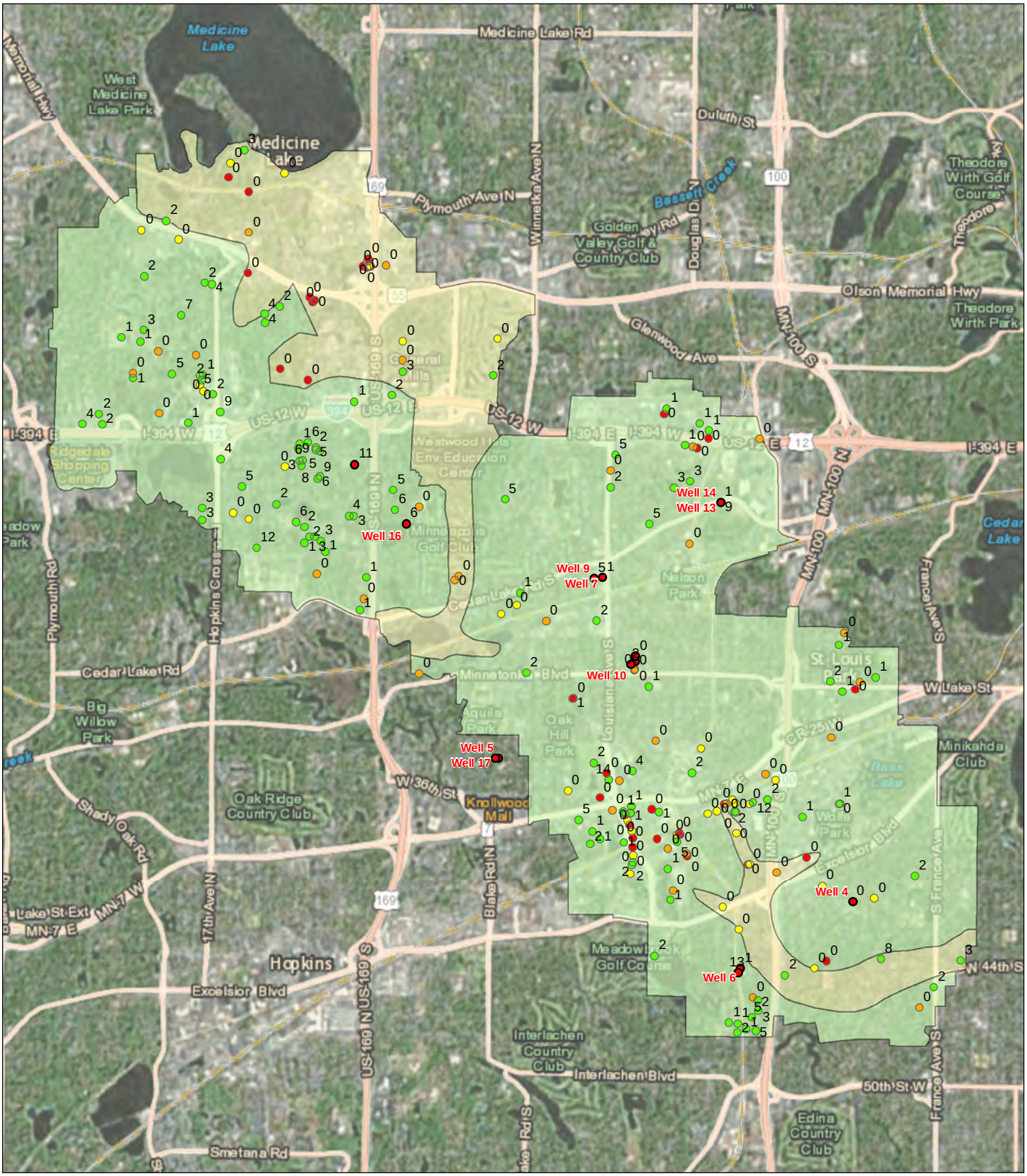
0 750 1,500 3,000 4,500 Meters

N W E S

Figure 10

Layer 9 Results

St. Louis Park Wellhead Protection Plan



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Phone: (612) 701.7343

Legend

Geologic Sensitivity
- Very High
- High
- Moderate
- Low
- Very Low

- Municipal Wells
- L-Score

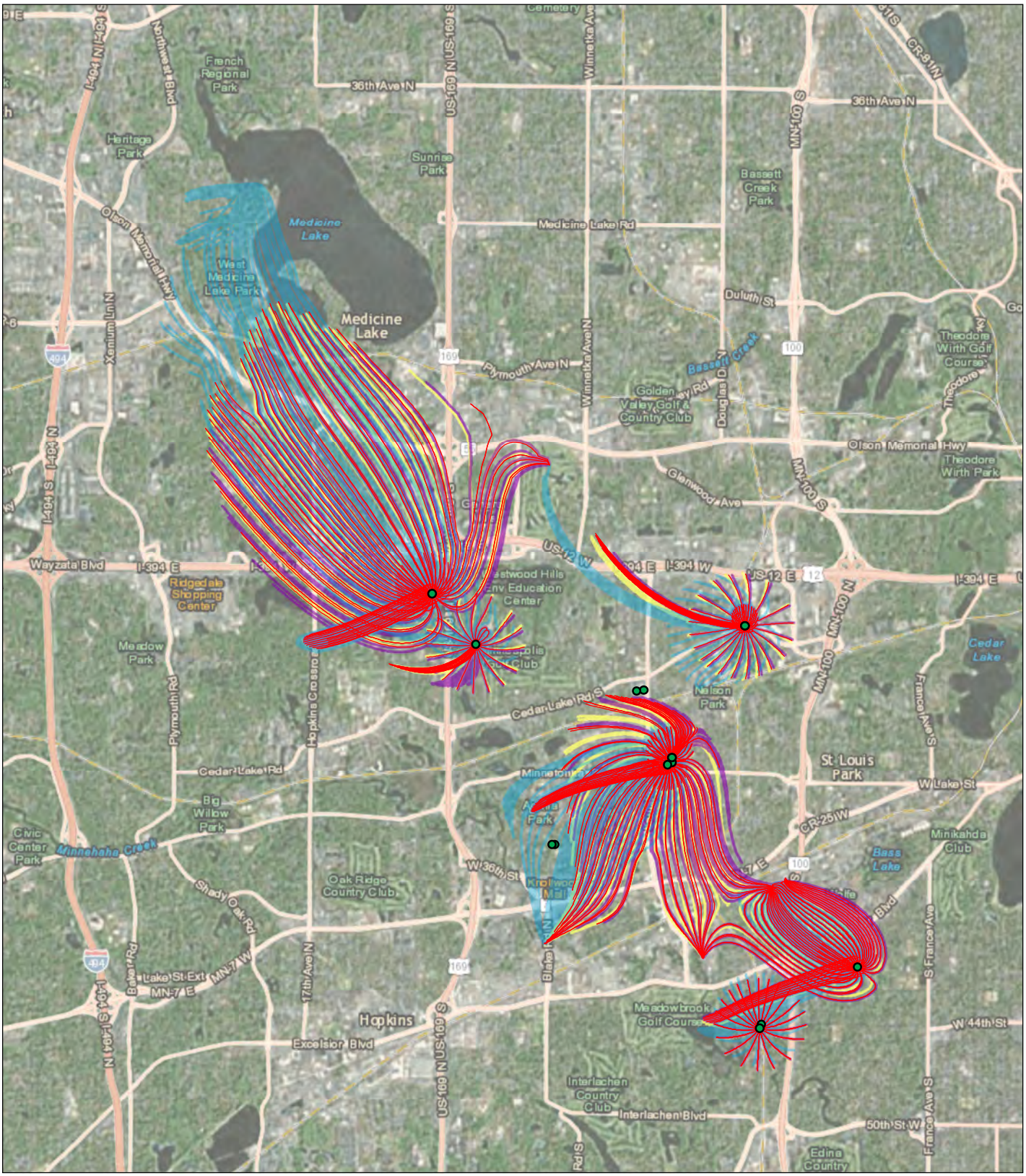
Vulnerability
- Moderate
- Low

0 337.5 675 1,350 2,025 Meters

Figure 11

DWSMA Vulnerability

St. Louis Park Wellhead Protection Plan



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Phone: (612) 701-7343
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Legend

- Municipal Wells
- Modeled 10 Yr. Capture Zone
- K10x 10yr Capture Zone
- Klow 10yr Capture Zone
- Khigh 10yr Capture Zone

0 260 520 1,040 1,560 Meters

Figure 12

Sensitivity Analysis Results

St. Louis Park Wellhead Protection Plan

Appendix A

Scoping Decision Notice

Protecting, maintaining and improving the health of all Minnesotans

August 23, 2013

Mr. Jay Hall, Utility Superintendent
City of St. Louis Park
Municipal Service Center
7305 Oxford Street
St. Louis Park, Minnesota 55426-4512

Dear Mr. Hall:

Subject: **Scoping Decision Notice No. 1 for the City of Saint Louis Park, PWSID 1270050, for Amending the Wellhead Protection Plan**

This letter provides notice of the results of the Scoping 1 meeting that Amal Djerrari and John Freitag (Minnesota Department of Health) held with you and Mark Hanson (city of Saint Louis Park) on July 24, 2013, to amend your wellhead protection plan. During the meeting, we discussed the preparation of Part I of a Wellhead Protection Plan that will document the 1) delineation of a wellhead protection area, 2) delineation of a drinking water supply management area, and 3) assessments of well and aquifer vulnerability related to these areas for the primary water supply wells that are used by the city of St. Louis Park. As you may remember, the wellhead protection area is the surface and subsurface area surrounding your public water supply wells through which contaminants are likely to move and affect your drinking water supply. The drinking water supply management area is the area delineated using identifiable landmarks that reflect the wellhead protection area boundaries as closely as possible.

It is our understanding that the city also retains Well 6 (206457) for emergency standby use. The city must manage an inner wellhead management zone that is defined by a 200-foot radius around each emergency standby well. A wellhead protection area is not defined for this well because the well only pumps during emergency water needs. The city also has four out long term wells [Well 5 (203196), Well 7 (206436), Well 9 (206437), and Well 17 (147459)]. No wellhead protection area is defined for these wells because the wells are not supposed to pump. We recommend sealing those wells if they are not in use anymore.

The city will have until April 22, 2016, to submit the amendment of its entire Wellhead Protection Plan, Part I and Part II. The Minnesota Department of Health (MDH) highly recommends that half of the time allotted be dedicated to completing Part II of the plan.

It is our understanding that you will be contracting a consultant to prepare the delineations and vulnerability assessments for the city for amending its Wellhead Protection Plan. MDH has a draft Request for Proposal (RFP) that can be used to help select a consultant that has experience in wellhead protection planning and, in particular, with preparing a Part I report. Please contact me at the phone number below if you want to discuss using the draft RFP.

At our meeting, we discussed rule requirements and the types of information needed to amend the Part I report. The Wellhead Protection Plan must be prepared in accordance with Minnesota Rules, parts 4720.5100 to 4720.5590. General wellhead protection requirements and criteria for delineating the wellhead protection area and data reporting are presented in Minnesota Rules, parts 4720.5500 to 4720.5510.

The enclosed Scoping Decision Notice No. 1 formally identifies the information the city must provide to MDH to meet rule requirements for amending and preparing Part I of the Wellhead Protection Plan. The wellhead rule refers to the existing information required for wellhead planning as data elements. Much of this information is available in the public domain, as described in the Scoping Decision Notice No. 1 form.

You only need to provide the information that is not in the public domain and, therefore, not available to MDH. The Scoping Decision Notice No. 1 form also 1) lists the Minnesota unique well number and well construction for each well that will be included in the Wellhead Protection Plan [Table 1]; 2) lists the pumping volumes for each well [Table 2]; and 3) includes a map of the well locations. A summary of the information that the PWS needs to provide is included at the end of the Scoping Decision Notice No. 1 form.

After we have had an opportunity to review the information listed in the Scoping Decision Notice No. 1 that you will be providing to MDH, we would appreciate the opportunity to again meet with you and select the appropriate method for delineating your wellhead protection area. We will also discuss how you can become involved in the preparation of amending the Part I report.

After your consultant has had an opportunity to develop a conceptual model of the local hydrogeologic setting, we would like to meet with your consultant to discuss the proposed delineation approach. This pre-delineation meeting may be accomplished by a conference call if 1) MDH approves, and 2) the consultant provides figures for the discussion beforehand. The porous media delineation could be performed using either new Metro Model that Barr Engineering developed for the Metro Council. Local detail and/or new information should be added as required and recalibration should be performed to reflect the hydrogeological conditions in Hennepin County.

A fracture flow delineation is necessary for Well 4 (200542), Well 6 (206457), Well 8 (203678) and Well 10 (206442), which are open to both the Prairie du Chien dolomite and Jordan sandstone.

Finally, it is our understanding that you will serve officially as the wellhead protection manager on behalf of the city. You are responsible for providing written notice to local units of government of the city's intent to amend the Wellhead Protection Plan, as required by the wellhead protection rule (part 4720.5300, subpart 3). A copy of this notice should be forwarded to MDH and must include a list of the city's wells, their unique well numbers, and contact information for you as Wellhead Protection manager. If you do not have a copy of your original notice from your previous WHP Plan, your Source Water Protection Unit Planner, John Freitag, can provide you with some examples of the notification of intent that other communities have used. Please contact him at 612/201-4669.

In closing, we look forward to working with you on amending your Wellhead Protection Plan. If you have any questions regarding our comments, please contact me at 651/201-4577 or at amal.djerrari@state.mn.us.

Sincerely,

Amal Djerrari, Hydrologist
Source Water Protection Unit
Environmental Health Division
P.O. Box 64975
St. Paul, Minnesota 55164-0975

AMD:ds-b
Enclosures: Scoping Decision Notice No. 1, Summary of Data Requested, Table 1 - Public Water Supply Well Information, Table 2 - Annual Volume of Water Pumped From PWS Wells, Table 3 - Permitted High-Capacity Wells, Map of Well Locations
cc: John Freitag, Source Water Protection Unit, St. Paul Office
Byron Adams, Water Monitoring Section, Minnesota Pollution Control Agency
Joe Richter, Division of Waters, Minnesota Department of Natural Resources
Ron Struss, Minnesota Department of Agriculture
Eric Mohring, Board of Water and Soil Resources
Mark Hanson, City of Saint Louis Park

SCOPING DECISION NOTICE No. 1
(Vulnerable Setting)

The purpose for the first Scoping Meeting, as required by Minnesota Rules, part 4720.5310, is to discuss the information necessary for preparing the Part I Report of a Wellhead Protection Plan. The Part I Report identifies the area that provides the source of drinking water for the public water supply (PWS) so that the PWS can develop land use or management practices to protect their groundwater resource from contamination. Specifically, the Part I Report documents the delineation of the wellhead protection area (WHPA), the delineation of the drinking water supply management area (DWSMA), and assesses the vulnerability of the PWS wells and DWSMA.

The wellhead rule (Minnesota Rules, part 4720.5310) refers to the information required for wellhead planning as data elements. This form lists the data elements stated in Minnesota Rules, part 4750.5400. The Minnesota Department of Health (MDH) uses this form to designate which data elements are needed to prepare the Part I Report, based on the hydrogeological setting, vulnerability of the wells, and aquifer information known at the time of the Scoping 1 Meeting.

Name of Public Water Supply		**Date**
City of Saint Louis Park (PWSID = 1270010)		August 23, 2013
Name of the Wellhead Protection Manager		
Mr. Jay Hall, Utility Superintendent		
Address	**City**	**Zip**
7305 Oxford Street	Saint Louis Park	55426-4512
Unique Well Numbers		**Phone**
206440 (Well 3), 200542 (Well 4), 203196 (Well 5), 206457 (Well 6-Emergency)*, 206436 (Well 7), 203678 (Well 8), 206437 (Well 9), 206442 (Well 10), 206439 (Well 11), 206456 (Well 12), 206424 (Well 13), 227965 (Well 14), 215447 (Well 15), 203187 (Well 16), 147459 (Well 17).		952/924-2557

*Emergency wells only use the IWMZ Form for data collection

Instructions for Completing the Scoping No. 1 Form

N	D	V	S	
X				**N** = If this box is checked with an "X," this data element is **NOT** necessary for the **Part I Report** of your Wellhead Protection Plan. This data element may be identified later at the Scoping 2 Meeting and used for the Part 2 Report. Please go to the next data element.

N	D	V	S	
	X			**D** = If this box is checked with an "X," the preparer of the Part I Report is **required** to use this information for the **DELINEATION** of the WHPA or the DWSMA. If there is no check in the "S" box, this information is available in the public domain or is at MDH.

N	D	V	S	
		X		**V** = If this box is checked with an "X," the preparer of the Part I Report is **required** to use this information for the **VULNERABILITY** assessment of the PWS well(s) or the DWSMA. If there is no check in the "S" box, this information is available in the public domain or is on file at MDH.

N	D	V	S	
			X	**S** = If this box is checked with an "X," the PWS **must SUBMIT** the information to the MDH.

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT

A. PRECIPITATION

N	D	V	S	
	X			A.1: An existing map or list of local precipitation gauging stations.

Technical Assistance Comments: Precipitation values can be used to determine the local recharge in the groundwater model. The map can be used to determine the closest gauging station. The locations of the gauging stations are available in the public domain.

N	D	V	S	
	X		X	A.2: An existing table showing the average monthly and annual precipitation, in inches, for the preceding five years.

Technical Assistance Comments: This information may be used for determining local recharge for the groundwater model. This information may be available in the public domain if there is a local gauging station, or obtained from the local wastewater treatment plant.

B. GEOLOGY

N	D	V	S	
	X	X	X	B.1: An existing geologic map and a description of the geology, including aquifers, confining layers, recharge areas, discharge areas, sensitive areas as defined in Minnesota Statutes, section 103H.005, subdivision 13, and groundwater flow characteristics.

Technical Assistance Comments: Information of this type is required to characterize the geologic and hydrogeologic setting of the PWS well field(s). This information is used to define aquifer geometry, location and magnitude of the recharge and discharge areas, and groundwater flow information. Aquifer tests or alternatives listed in MN Rules, part 4720.5510, subpart 6, can be used to help characterize flow in the aquifer. Reference all information used to develop the conceptual model of the geologic setting and submit to MDH only the information that is not available in the public domain.

N	D	V	S	
	X	X	X	B.2: Existing records of the geologic materials penetrated by wells, borings, exploration test holes, or excavations, including those submitted to the department.

Technical Assistance Comments: Information of this type may be useful to refine the understanding of the geologic and hydrogeologic setting on a local basis. Submit only if the PWS or city has information of test drilling or site investigations conducted by the city that is not available in the public domain.

N	D	V	S	
	X	X	X	B.3: Existing borehole geophysical records from wells, borings, and exploration test holes.

Technical Assistance Comments: Information from geophysical records may provide additional information about aquifer thickness, well construction, and water level information at a local scale. Submit only if the information is not available in the public domain.

N	D	V	S	
	X	X	X	B.4: Existing surface geophysical studies.

Technical Assistance Comments: Information from geophysical studies may be useful to refine the understanding of the geology on a local basis. Submit only if the information is not available in the public domain.

C. SOILS

N	D	V	S	
	X	X		C.1: Existing maps of the soils and a description of soil infiltration characteristics.

Technical Assistance Comments: This information is in the public domain and can be used to delineate the WHPA and assess the vulnerability of the DWSMA because it indicates the underlying geology.

N	D	V	S	
X				C.2: A description or an existing map of known eroding lands that are causing sedimentation problems.

Technical Assistance Comments:

D. WATER RESOURCES				
N	D	V	S	D.1: An existing map of the boundaries and flow directions of major watershed units and minor watershed units.
	X			
Technical Assistance Comments: This information is in the public domain and may be used to delineate the surface water contribution area of the WHPA.				
N	D	V	S	D.2: An existing map and a list of public waters as defined in Minnesota Statutes, section 103G.005, subdivision 15, and public drainage ditches.
	X	X		
Technical Assistance Comments: This information is in the public domain and may be used to delineate the surface water contribution area of the WHPA and determine the vulnerability of the DWSMA.				
N	D	V	S	D.3: The shoreland classifications of the public waters listed under sub-item (2), pursuant to part 6120.3000 and Minnesota Statutes, sections 103F.201 to 103F.221.
X				
Technical Assistance Comments:				
N	D	V	S	D.4: An existing map of wetlands regulated under Chapter 8420 and Minnesota Statutes, section 103G.221 to 103G.2373.
X				
Technical Assistance Comments:				
N	D	V	S	D.5: An existing map showing those areas delineated as floodplain by existing local ordinances.
X				
Technical Assistance Comments:				

DATA ELEMENTS ABOUT THE LAND USE

E. LAND USE				
N	D	V	S	E.1: An existing map of parcel boundaries.
	X		X	
Technical Assistance Comments: This information may be helpful in delineating the DWSMA, if available. If this information is provided, identification numbers must be provided for each parcel. An electronic format for the map is preferable.				
N	D	V	S	E.2: An existing map of political boundaries.
	X		X	
Technical Assistance Comments: Please provide this information if the boundaries have been updated/changed. This information may be helpful in delineating the DWSMA. An electronic format for the map is preferable.				
N	D	V	S	E.3: An existing map of public land surveys, including township, range, and section.
	X			
Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA.				
N	D	V	S	E.4: A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources.
X				
Technical Assistance Comments:				

N	D	V	S	E.5: An existing, comprehensive land-use map.
X				

Technical Assistance Comments:

N	D	V	S	E.6: Existing zoning map.
X				

Technical Assistance Comments:

F. PUBLIC UTILITY SERVICES

N	D	V	S	F.1: An existing map of transportation routes or corridors.
	X			

Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA.

N	D	V	S	F.2: An existing map of storm sewers, sanitary sewers, and the public water supply systems.
	X		X	

Technical Assistance Comments: Do not submit a map of the storm sewers and sanitary sewers. Describe the difference in how much water is pumped and how much is sold. The difference is the leakage that may be used as recharge in the groundwater model.

N	D	V	S	F.3: An existing map of gas and oil pipelines used by gas and oil suppliers.
X				

Technical Assistance Comments:

N	D	V	S	F.4: An existing map or list of public drainage systems.
	X	X		

Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA.

N	D	V	S	F.5: An existing record of construction, maintenance, and use of the public water supply well(s) and other wells within the DWSMA.
	X	X	X	

Technical Assistance Comments: If the information is different from that with MDH, please provide 1) the pumping rates for the current and previous years, and the projected annual pumping rates for the next five years for each well in the PWS; and 2) well record(s) for the PWS well(s). Information about the PWS well(s) may affect the vulnerability assessment due to rehabilitation/reconstruction of a well or changes in pumping rates.

DATA ELEMENTS ABOUT WATER QUANTITY

G. SURFACE WATER QUANTITY

N	D	V	S	
	X	X		G.1: An existing description of high, mean, and low flows on streams.

Technical Assistance Comments: This information is available in the public domain and may be used to determine hydraulic connections between surface water bodies and the aquifer(s) of concern.

N	D	V	S	
	X			G.2: An existing list of lakes where the state has established ordinary high water marks.

Technical Assistance Comments: This information is available in the public domain. The information may be used to determine the WHPA.

N	D	V	S	
	X	X	X	G.3: An existing list of permitted withdrawals from lakes and streams, including source, use, and amounts withdrawn.

Technical Assistance Comments: Only required if different from the DNR database. Surface water bodies may be in direct hydraulic connection with the aquifer(s) of concern and withdrawals may affect water levels in both the surface water and adjacent groundwater systems.

N	D	V	S	
	X			G.4: An existing list of lakes and streams for which state protected levels or flows have been established.

Technical Assistance Comments: This information is available in the public domain and may be used to determine hydraulic connections between surface water bodies and the aquifer(s) of concern.

N	D	V	S	
	X	X	X	G.5: An existing description of known water-use conflicts, including those caused by groundwater pumping.

Technical Assistance Comments: Please notify MDH of surface water/well interference problems of which the PWS is aware. Conflicts between use of groundwater resources and surface water bodies would indicate a hydrologic boundary that would need to be considered in delineating the WHPA.

H. GROUNDWATER QUANTITY

N	D	V	S	
	X	X	X	H.1: An existing list of wells covered by state appropriation permits, including amounts of water appropriated, type of use, and aquifer source.

Technical Assistance Comments: Please submit this information for wells not permitted by the DNR because this information may be useful in identifying the hydrologic boundary conditions that could affect the size and shape of the WHPA boundaries.

N	D	V	S	
	X	X	X	H.2: An existing description of known well interference problems and water-use conflicts.

Technical Assistance Comments: Please notify MDH of well interference problems of which the PWS is aware. Interference problems with other wells, if present, likely indicate a hydrologic boundary that would need to be considered in making the WHPA delineation.

N	D	V	S	
	X	X	X	H.3: An existing list of state environmental boreholes, including unique well number, aquifer measured, years of record, and average monthly levels.

Technical Assistance Comments: Only submit monthly water level measurements (with unique well numbers and dates) that are not in the public domain.

DATA ELEMENTS ABOUT WATER QUALITY

I. SURFACE WATER QUALITY

N	D	V	S	
X				I.1: An existing map or list of the state water quality management classification for each stream and lake.

Technical Assistance Comments:

N	D	V	S	
		X	X	I.2: An existing summary of lake and stream water quality monitoring data, including: 1. bacteriological contamination indicators; 2. inorganic chemicals; 3. organic chemicals; 4. sedimentation; 5. dissolved oxygen; and 6. excessive growth or deficiency of aquatic plants.

Technical Assistance Comments: This information can be used to evaluate surface water/groundwater interactions and aquifer water quality. Submit if the PWS has information that is not available in the public domain.

J. GROUNDWATER QUALITY

N	D	V	S	
	X	X	X	J.1: An existing summary of water quality data, including: 1) bacteriological contamination indicators; 2) inorganic chemicals; and 3) organic chemicals.

Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain because the information may help explain groundwater flow paths.

N	D	V	S	
	X	X	X	J.2: An existing list of water chemistry and isotopic data from wells, springs, or other groundwater sampling points.

Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain because the information may help explain groundwater flow paths.

N	D	V	S	
	X	X	X	J.3: An existing report of groundwater tracer studies.

Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain because the information may help explain groundwater flow paths.

N	D	V	S	
		X	X	J.4: An existing site study and well water analysis of known areas of groundwater contamination.

Technical Assistance Comments: Submit if the PWS has information on contaminant sources not available in the public domain because these reports may contain additional geologic or hydrogeologic information.

N	D	V	S	
X				J.5: An existing property audit identifying contamination.

Technical Assistance Comments:

N	D	V	S	
	X	X		J.6: An existing report to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminant spills and releases.

Technical Assistance Comments: Notify MDH of reports on spills or contaminant releases that are with the PWS or city but are not in the public domain. These reports do not need to be submitted, but MDH staff would like to review reports.

Summary of Data Request
Specific Data to be Provided to MDH by PWS

As discussed during the first Scoping Meeting on July 24, 2013, the public water supply (PWS) will supply the following information for Part I of their Wellhead Protection Plan to the Minnesota Department of Health. The number of the data element that refers to the information needed to prepare the Part I Report is listed in the parenthesis at the end of each request.

1) PWS well information: Use Tables 1 and 2, the well records for the PWS wells, and a map showing the locations of all the PWS wells, to review the accuracy of 1) all PWS well construction, 2) well locations, and 3) pumping information. (F.5)

   Table 1 lists well use and construction for each of the PWS wells. Have you reconstructed any wells? Are there well records for reconstructed wells?

   The enclosed map shows the locations of the primary public water supply wells. Please let us know if you feel the wells are not correctly located. These locations must be used to delineate your wellhead protection areas.

   Table 2 shows the available pumping information and indicates what information the PWS needs to provide for the delineation of the capture zone. Please provide 1) the pumping data for 2010 that was sent to the Minnesota Department of Natural Resources, 2) whether this rate was measured or estimated, and 3) the projected annual pumping amounts for the next five years.

2) Please provide a copy of any aquifer test or specific capacity information for the PWS wells that was obtained during well construction, maintenance, or repair. (B.1)

3) Is there an existing map of parcel and/or political boundaries that could be used for defining the Drinking Water Supply Management Area (DWSMA)? If you wish to use parcel lines, please provide the parcel identification number for each parcel boundary along with the map. Have the city boundaries changed? If the city boundaries have changed, please provide the new boundaries. The boundaries of the DWSMA may be larger if political boundaries are used instead of the parcel boundaries. (E.1 and E.2)

4) If there are private well records, soil boring reports, geophysical studies, or water level measurements in your files that MDH staff did not identify at the scoping meeting and that would be available for MDH staff to review and copy, please notify MDH. (B.2, B.3, B.4, and H.3)

5) Please identify reports that you have relating to leaks/contamination sites that may be of concern to your drinking water supply, that MDH may review and copy. (J.4)

6) If your files contain water chemistry data, such as bacteria, virus, inorganic, organic, or isotopic results from wells or other groundwater sampling points, not currently available to MDH that MDH may review and copy, please notify MDH. (J.1 and J.2)

7) Please identify reports that you have in your files relating to groundwater tracer studies that have been conducted. (J.3)

8) Please provide information about other high-capacity wells in your area that may not be permitted and are not listed on the attached Table 3. (H.1)

9) Please describe any conflicts over water use that the PWS has been involved with, such as 1) private wells that went dry (or well interference) or 2) springs or wetlands that were affected. Was the Department of Natural Resources involved in resolving the conflict? (G.5 and H.2)

10) Please describe the annual amount of water that is lost due to leaks in the distribution system. Can you identify specific parts of the distribution system where this loss occurs? (F.2)

11) If local precipitation information is not available in the public domain within a couple of miles and in the same geomorphic setting, please provide average monthly precipitation values from the wastewater treatment facility during the preceding five years. (A.2)

12) Please identify any other reports about surface water withdrawals or surface water monitoring data from lakes, streams, or wetlands that are not in the public domain that MDH staff could review and copy. (G.3 and I.2)

Table 1
Water Supply Well Information
City of Saint Louis Park

Local Well Name	Unique Number	Type	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed	Well Vulnerability	Aquifer
Well 3	206440	Primary	24	103	286	1939	Vulnerable	OSTP - St.Peter
Well 4	200542	Primary	24 x 18	304	490	1946	Vulnerable	OPCJ - Prairie Du Chien-Jordan
Well 5	203196	Out Long Term[1]	24 x 20	305	465	1905	Vulnerable	OPCJ - Prairie Du Chien-Jordan
Well 6	206457	Emergency[1]	24 x 20	303	482	1948	Vulnerable	OPCJ - Prairie Du Chien-Jordan
Well 7	206436	Out Long Term[1]	24 x 20	274	446	1952	Not Vulnerable	OPCJ - Prairie Du Chien-Jordan
Well 8	203678	Primary	24 x 16	314	507	1905	Not Vulnerable	OPCJ - Prairie Du Chien-Jordan
Well 9	206437	Out Long Term[1]	24 x 16	289	473	1956	Not Vulnerable	OPCJ - Prairie Du Chien-Jordan
Well 10	206442	Primary	24 x 16	316	500	1955	Vulnerable	OPCJ - Prairie Du Chien-Jordan
Well 11	206439	Primary	24 x 16	880	1093	1960	Not Vulnerable	CMTS - Mt.Simon
Well 12	206456	Primary	30 x 24 x 16	900	1095	1965	Not Vulnerable	CMTS - Mt.Simon
Well 13	206424	Primary	30 x 24 x 16	891	1045	1964	Not Vulnerable	CMTS - Mt.Simon
Well 14	227965	Primary	30 x 24 x 16	389	485	1965	Vulnerable	CJDN - Jordan
Well 15	215447	Primary	30 x 24	398	503	1905	Vulnerable	CJSL - Jordan
Well 16	203187	Primary	30 x 24	425	500	1973	Vulnerable	CJDN - Jordan
Well 17	147459	Out Long Term[1]	36 x 30 x 24 x 18 x 12	818	1085	1983	Not Vulnerable	CMTS - Mt.Simon

[1] The rules do not require to define a wellhead protection area is not defined for those wells.

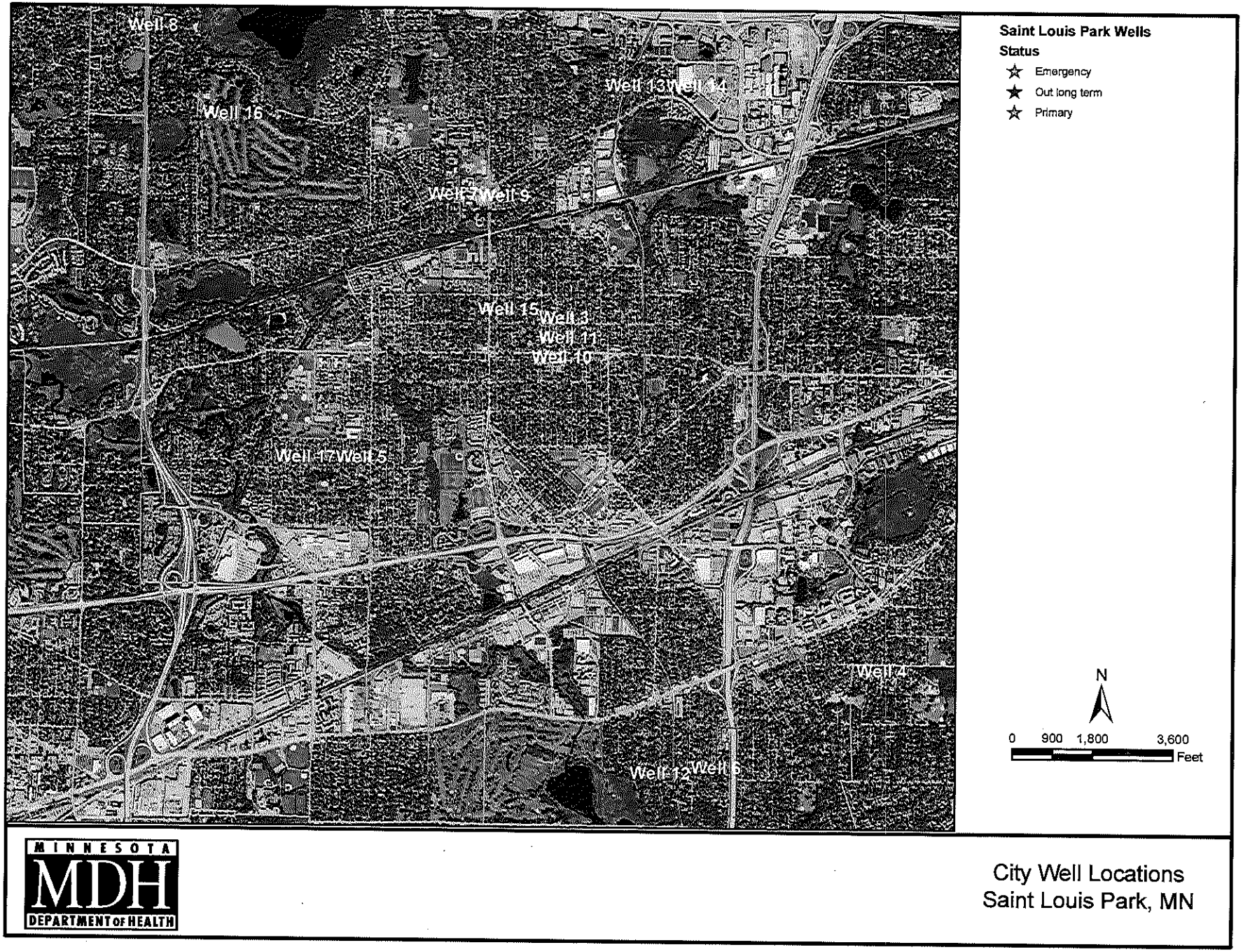
Table 2
Annual Volume of Water Pumped from Wells
City of Saint Louis Park

Well Name	Unique Number	Total Annual Withdrawal (gal/year)					Maximum Withdrawal 2008 - 2012 (gallons/year)	Projected 2016 Withdrawal (gallons/year)
		2008	2009	2010	2011	2012		
Well 3	206440	**13,304,000**	4,655,000	117,000	0	20,000	13,304,000	
Well 4	200542	483,350,000	513,012,000	**525,041,000**	521,918,000	443,539,000	525,041,000	
Well 5	203196	0	0	0	0	0	0	
Well 6	206457	188,000	**257,000**	246,000	184,000	471,000	257,000	
Well 7	206436	0	0	0	0	0	0	
Well 8	203678	292,233,000	296,189,000	**545,933,000**	530,319,000	457,559,000	545,933,000	
Well 9	206437	0	0	0	0	0	0	
Well 10	206442	**351,748,000**	206,959,000	133,248,000	245,767,000	331,570,000	351,748,000	
Well 11	206439	67,036,000	**122,233,000**	58,707,000	53,806,000	116,691,000	122,233,000	
Well 12	206456	357,570,000	**362,056,000**	307,158,000	213,246,000	187,409,000	362,056,000	
Well 13	206424	97,701,000	211,310,000	**228,064,000**	79,131,000	178,301,000	228,064,000	
Well 14	227965	**345,326,000**	214,874,000	82,696,000	185,172,000	200,316,000	345,326,000	
Well 15	215447	57,000	**55,240,000**	0	0	0	55,240,000	
Well 16	203187	371,318,000	**375,759,000**	273,452,000	262,047,000	306,562,000	375,759,000	
Well 17	147459	0	0	0	0	0	0	
Totals		2,379,831,000	2,362,544,000	2,154,662,000	2,091,590,000	2,222,438,000	2,924,961,000	

Source: The DNR State Water Use Database System (SWUDS), Permit Number Permit Number 1973-1007.

Table 3
Permitted High-Capacity Wells Within 2.0 miles
DNR State Water Use Database System (SWUDS)
City of Saint Louis Park

Unique Number	Well Name	DNR Permit Number	Aquifer	Use	Annual Volume of Water Pumped*	Daily Volume*
204068	Hopkins, City Of	1975-6245	OPDCCJDN	Municipal Waterworks	476.926	1.307
203613	Edina, City Of	1973-1119	CJDN	Municipal Waterworks	381.803	1.046
208399	Edina, City Of	1973-1119	OPDCCJDN	Municipal Waterworks	362.299	0.993
112228	Hopkins, City Of	1975-6245	OPDCCJDN	Municipal Waterworks	317.123	0.869
200561	Edina, City Of	1973-1119	OPDCCJDN	Municipal Waterworks	250.601	0.687
200564	Edina, City Of	1973-1119	OPDCCJDN	Municipal Waterworks	218.278	0.598
204054	Minnetonka, City Of	1979-6207	CJDN	Municipal Waterworks	110.731	0.303
208012	Minnetonka, City Of	1979-6207	CJDN	Municipal Waterworks	110.725	0.303
203614	Edina, City Of	1973-1119	CMTS	Municipal Waterworks	105.59	0.289
578922	Honeywell Inc	1998-6076	OPDCCJDN	Non-Metallic Processing	66.615	0.183
240630	Edina, City Of	1973-1119	OPDCCJDN	Municipal Waterworks	45.79	0.125
434042	St Louis Park, City Of	1990-6036	OSTP	Pollution Containment	30.402	0.083
204072	Oak Ridge Country Club	1966-1167	OPDCCJDN	Golf Course Irrigation	29.105	0.08
216050	St Louis Park, City Of	1988-6213	OPCJ	Pollution Containment	28.876	0.079
434045	St Louis Park, City Of	1987-6212	QBAA	Pollution Containment	25.821	0.071
538134	St Louis Park, City Of	1995-6047	QWTA	Pollution Containment	25.326	0.069
206588	Edina, City Of	1973-1119	PMHNPMFL	Municipal Waterworks	19.54	0.054
200534	Minikahda Club	1975-6248	OPCJ	Golf Course Irrigation	19.27	0.053
236585	Golden Valley Country Club	1986-6180	OPDC	Golf Course Irrigation	16.364	0.045
236157	Edina Country Club	1972-1231	OPDCCJDN	Golf Course Irrigation	15.135	0.041
207674	Edina, City Of	1973-1119	OPDCCJDN	Municipal Waterworks	14.608	0.04
534115	Golden Valley Country Club	1986-6180	OPDCCJDN	Golf Course Irrigation	14.514	0.04
203183	Minneapolis Golf Club	1986-6083	OPDCCJDN	Golf Course Irrigation	12.734	0.035
453805	Interlachen Country Club	1969-0490	OPCJ	Golf Course Irrigation	12.511	0.034
434044	St Louis Park, City Of	1987-6212	OPVL	Pollution Containment	10.323	0.028
223780	General Mills Inc	1960-0603	OPDCCJDN	Agricultural Processing	9.464	0.026
161443	Edina Country Club	1972-1231	OPDCCJDN	Golf Course Irrigation	4.908	0.013
161436	Minikahda Club	1975-6248	OPDCCJDN	Golf Course Irrigation	4.746	0.013
255948	Sun Valley Mobile Home Park	1985-6006	OSTP	Private Waterworks	3.564	0.01
216009	Minneapolis Park & Rec Board	1986-6125	OPDCCJDN	Golf Course Irrigation	3.185	0.009
224098	General Mills Inc	2007-0209	OPDCCJDN	Fire Protection	0.764	0.002



MINNESOTA MDH DEPARTMENT OF HEALTH

City Well Locations
Saint Louis Park, MN

Appendix B

Well Logs

Unique Well Number 147459

County Hennepin
Quad Hopkins
Quad Id 104B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 17

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	18	DABBAC	MDH 920.00 ft.

Well Address ST. LOUIS PARK 17

ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
DRIFT			0	105
DRIFT WITH LIMEROCK			105	115
SHALE	BLUE		115	124
ST. PETER SANDSTONE			124	227
SHALE	RED		227	275
SHAKOPEE LIMESTONE			275	282
SHAKOPEE LIMESTONE			282	400
SHAKOPEE LIMESTONE			400	405
JORDAN SANDSTONE			405	465
SHALE	RED/GRN		465	500
SHALE	RED/GRN		500	533
SHALE	RED/GRN		533	668
SHALE	RED/GRN		668	691
SANDSTONE W/SHALE LAYERS			691	718
SANDSTONE W/SHALE LAYERS			718	802
SANDSTONE W/SHALE LAYERS			802	805
SANDSTONE			805	1065
SANDSTONE			1065	1082
RED CLASTICS			1082	1085

Remarks
M.G.S. NO. 1979 M.G.S. NO.1979. GAMMA LOGGED 2-25-1988 & 6-24-1988.

First Bedrock OSTP
Last Strat PMSU
Aquifer Mt.Simon
Depth to Bedrock 115.00 ft.

Well Depth 1085.00 ft
Depth Completed 1085.00 ft
Date Well Completed 1983/05/20

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO

Diameter	in. from	to	ft.	lbs/ft
12			Depth 818	
36.00	0.00	115.00		
30.00	0.00	205.00		
24.00	0.00	278.00		
18.00	0.00	475.00		
12.00	0.00	818.00		

Hole Diameter (in.) 12.0(To)85.0

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 818.(to 1085.

Static Water Level
315.00 ft. Land surface Date measured 1983/04/27

Pumping Level (below land surface)
439.00 ft. after 120.00 hrs. pumping 1200.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Neat Cement From 0.0 To 818.0 ft. 510.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010

License Business Name **Lic. or Reg No.**
HOLLEN, G

Name of Driller **Date**

Unique Well Number 200542

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/24
Received Date

Well Name ST. LOUIS PARK 4

Township	Range	Dir	Section	Subsection	Field Located Elevation
28	24	W	7	BDADAC	MDH 900.00 ft.

Well Address ST. LOUIS PARK 4
41ST ST
ST LOUIS PARK MN 55416 Changed

Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN Changed

Description	Color	Hardness	From	To (ft.)
FILL			0	3
SAND & GRAVEL			3	76
PLATTEVILLE LIME			76	106
ST PETER SAND		SOFT	106	235
HARD SANDSTONE & SHALE		HARD	235	277
LIME		HARD	277	291
LIME		HARD	291	355
LIME MILKY CUTTINGS	WHITE		355	398
JORDAN SANDSTONE			398	445
JORDAN SANDSTONE & HARD S			445	455
JORDAN SANDSTONE & HARD S			455	470
ST. LAWRENCE			470	490

Remarks

First Bedrock OPVL
Last Strat CSTL
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 76.00 ft.

Well Depth 490.00 ft
Depth Completed 490.00 ft
Date Well Completed 1946/09/00

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 18 Depth 304
24.00 in. from 0.00 to 90.00 ft. lbs/ft
18.00 in. from 0.00 to 304.00 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 304.0 to 390.0

Static Water Level
85.00 ft. Land surface Date measured 1946/09/27

Pumping Level (below land surface)
121.00 ft. after 24.00 hrs. pumping 2560.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity 1200 g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number 203187

County Hennepin
Quad Hopkins
Quad Id 104B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2012/09/17
Received Date

Well Name ST. LOUIS PARK 16

Township	Range	Dir	Section	Subsection	Field Located	MDH
117	21	W	7	BBADBA	Elevation	917.00 ft.

Well Address ST. LOUIS PARK 16

ST LOUIS PARK MN 55416 Changed

Contact Address CITY OF ST. LOUIS PARI

ST LOUIS PARK MN 55416

Description	Color	Hardness	From	To (ft.)
SAND & GRAVEL			0	60
CLAY & BOULDERS			60	80
COARSE SAND & GRAVEL			80	105
BROKEN LIMESTONE			105	118
PLATTVILLE LIMESTONE			118	128
ST. PETER SANDSTONE			128	258
SHALE	RED		258	294
SHAKOPEE LIMESTONE			294	310
JORDAN SANDSTONE			310	495
ST. LAWRENCE SHALE			495	500

Remarks

First Bedrock OPVL
Last Strat CSTL
Aquifer Jordan
Depth to Bedrock 105.00 ft.

Well Depth	Depth Completed	Date Well Completed
500.00 ft	500.00 ft	1973/07/31

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 24 Depth 425

30.00 in. from 0.00 to 310.00 ft. lbs/ft
24.00 in. from 0.00 to 425.00 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 425.0 to 500.0

Static Water Level
125.00 ft. Land surface Date measured 1973/07/31

Pumping Level (below land surface)
238.00 ft. after hrs. pumping 2000.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Neat Cement From To ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Tri-state Well Co. 27118

License Business Name **Lic. or Reg No.**
BERTHIAUME, F

Name of Driller **Date**

Unique Well Number 203196

County Hennepin
Quad Hopkins
Quad Id 104B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 5

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	18	DABBAD	MDH 930.00 ft.

Well Address ST. LOUIS PARK 5

ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
SAND & GRAVEL			0	5
CLAY & BOULDERS			5	15
SAND & GRAVEL			15	103
COARSE GRAVEL			103	109
PLATTEVILLE LIME			109	120
ROCK & SHALE			120	132
SANDROCK			132	230
SHALE & ROCK			230	285
LIMEROCK			285	407
SANDSTONE			407	460
ST. LAWRENCE			460	465

Remarks

First Bedrock OPVL
Last Strat CSTL
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 109.00 ft.

Well Depth 465.00 ft
Depth Completed 465.00 ft
Date Well Completed 1947/00/00

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 20 Depth 305
24.00 in. from 0.00 to 115.00 ft. lbs/ft
20.00 in. from 0.00 to 305.00 ft. lbs/ft

Hole Diameter (in.) 20.0(To 465.0

Screen
Make Type
Diamter Slot Length Set

Open Hole(ft.) From to

Static Water Level
91.00 ft. Land surface Date measured 1947/00/00

Pumping Level (below land surface)
116.00 ft. after hrs. pumping 1380.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Neat Cement From To ft. 15.00 Cubic yards

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010

License Business Name **Lic. or Reg No.**
SHUEY, P.

Name of Driller **Date**

Unique Well Number 203678

County Hennepin
Quad Hopkins
Quad Id 104B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/29
Received Date

Well Name ST. LOUIS PARK 8

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	22	W	1	DACCBC	MDH 940.00 ft.

Well Address ST. LOUIS PARK 8

ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
PLATFORM			0	3
YELLOW CLAY, ROCKS & BOULI			3	38
RED CLAY & ROCKS		HARD	38	65
BROWN CLAY (GRAY) & ROCKS			65	97
SAND & GRAVEL (DIRTY)			97	108
CLAY, ROCKS & BROKEN LIMER			108	126
SHALE	YELLOW		126	132
SANDROCK & SHALE			132	179
SANDROCK			179	242
SHALE			242	259
SANDROCK		HARD	259	302
SHALE & SANDROCK			302	303
SHAKOPEE LIMEROCK		HARD	303	413
SANDROCK CLEAN		M.HARD	413	436
SANDROCK FINE	RED	HARD	436	464
SANDROCK SHALEY		V.HARD	464	482
SANDROCK COARSE	WHITE	M.HARD	482	486
SANDROCK FINE	WHITE	M.HARD	486	496
SHALEY SANDROCK			496	507

Remarks
COPIED FROM D.N.R.

First Bedrock OSTP
Last Strat CSTL
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 126.00 ft.

Well Depth 507.00 ft
Depth Completed 507.00 ft
Date Well Completed 1955/00/00

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 16 Depth 314
24.00 in. from 0.00 to 253.00 ft. lbs/ft
16.00 in. from 0.00 to 314.00 ft. lbs/ft

Hole Diameter (in.) 23.0(To 507.0

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 314.0 to 507.0

Static Water Level
95.00 ft. Land surface Date measured 1955/00/00

Pumping Level (below land surface)
130.00 ft. after hrs. pumping 0.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material From To 314.0 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Bergerson-Caswell 27058
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number 206424

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/26
Received Date

Well Name ST. LOUIS PARK 13

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	4	CCDACA	MDH 902.00 ft.

Well Address ST. LOUIS PARK 13

ST LOUIS PARK MN 55416 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55416

Description	Color	Hardness	From	To (ft.)
SAND, GRAVEL & ROCKS			0	58
CLAY AND BOULDERS			58	62
SAND AND CLAY			62	77
CLAY			77	86
ROCKS AND CLAY MIXED			86	94
PLATTEVILLE ROCK			94	101
ST. PETER SAND			101	212
RED SHALE AND ST. PETER SAI			212	222
BLUE SHALE & ST. PETER SANI			222	270
SHAKOPEE ROCK			270	386
JORDAN SANDSTONE			386	460
ST. LAWRENCE			460	490
FRANCONIA			490	655
DRESBACH			655	714
DRESBACH HARD RUBBER SHA			714	770
MT. SIMON SANDSTONE			770	778
SHALE + SANDSTONE			778	917
HINCKLEY			917	1040
RED CLASTIC			1040	1045

Remarks

First Bedrock OPVL
Last Strat PMSU
Aquifer Mt.Simon
Depth to Bedrock 94.00 ft.

Well Depth 1045.00 ft
Depth Completed 1045.00 ft
Date Well Completed 1964/07/01

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)

Diameter				Depth	
30.00	in. from	0.00	to 95.00 ft.		lbs/ft
24.00	in. from	0.00	to 212.00 ft.		lbs/ft
16.00	in. from	0.00	to 891.00 ft.		lbs/ft

Screen No

Make Type
Diamter Slot Length Set

Open Hole(ft.) From 891.0 to 1045.

Static Water Level
255.00 ft. Land surface Date measured 1964/07/01

Pumping Level (below land surface)
ft. after hrs. pumping g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Well known to be not From To ft. 105.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010

License Business Name **Lic. or Reg No.**
HOLLEN, G

Name of Driller **Date**

Unique Well Number 206436

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/26
Received Date

Well Name ST. LOUIS PARK 7

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	8	BDDAAC	MDH 905.00 ft.

Well Address ST. LOUIS PARK 7
2500 LOUISIANA AV
ST LOUIS PARK MN 55416 Changed

Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55416

Description	Color	Hardness	From	To (ft.)
SAND GRAVEL & BOULDERS			0	75
LIMEROCK			75	97
SHALE			97	100
SANDSTONE			100	210
SHALE & SANDSTONE			210	260
DOLOMITE			260	380
JORDAN SANDSTONE			380	420
FINE SAND & SHALE			420	430
JORDAN SAND			430	440
ST. LAWRENCE			440	446

Remarks

First Bedrock OPVL
Last Strat CSTL
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 75.00 ft.

Well Depth 446.00 ft
Depth Completed 446.00 ft
Date Well Completed 1952/05/09

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 20 Depth 274
24.00 in. from 0.00 to 80.00 ft. lbs/ft
20.00 in. from 0.00 to 274.00 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 274.0 to 446.0

Static Water Level
58.00 ft. Land surface Date measured 1952/05/09

Pumping Level (below land surface)
ft. after hrs. pumping 1200.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010
License Business Name Lic. or Reg No.
SHUEY, P.
Name of Driller Date

Unique Well Number 206437

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 9

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	8	BDDBAC	MDH 899.00 ft.

Well Address ST. LOUIS PARK 9
2500 NEVADA
ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
DRIFT			0	69
LIMESTONE			69	120
SHALE AND SANDSTONE			120	220
SHALE			220	275
LIMEROCK			275	339
SANDSTONE	RED		339	345
LIMEROCK			345	380
SANDSTONE			380	473

Remarks

First Bedrock OPSP
Last Strat CJDN
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 69.00 ft.

Well Depth 473.00 ft
Depth Completed 473.00 ft
Date Well Completed 1956/06/06

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 16 Depth 289
24.00 in. from 0.00 to 81.00 ft. lbs/ft
16.00 in. from 0.00 to 289.00 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 289.0 to 473.0

Static Water Level
70.00 ft. Land surface Date measured 1956/06/06

Pumping Level (below land surface)
ft. after hrs. pumping g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Neat Cement From To ft. 414.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010
License Business Name Lic. or Reg No.
LAFONTAINE, W
Name of Driller Date

Unique Well Number 206439

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 11

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	8	DCDBAB	MDH 920.00 ft.

Well Address ST. LOUIS PARK 11

ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK
5925 37TH ST W
MINNEAPOLIS MN 55426 Changed

Well Depth	Depth Completed	Date Well Completed
1093.00 ft	1093.00 ft	1960/11/01

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 16 Depth 880
24.00 in. from 0.00 to 103.00 ft. lbs/ft
16.00 in. from 0.00 to 880.00 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 880.0 to 1093.

Description	Color	Hardness	From	To (ft.)
GLACIAL DRIFT			0	101
LIMEROCK			101	120
SANDROCK			120	288
LIMEROCK			288	400
LIMEROCK			400	408
SANDROCK			408	498
SANDROCK			498	505
LIMEROCK & SHALE			505	530
SHALE	GREEN	HARD	530	683
CLEAN SANDROCK & SHALE		HARD	683	745
SHALE	GRAY	HARD	745	805
SHALE & SANDROCK	YELLOW		805	813
SHALE	GREEN		813	817
SANDROCK & SHALE			817	853
SANDROCK & SHALE		HARD	853	955
SANDROCK & SHALE	PNK/RED		955	1050
CLEAN COARSE SANDROCK			1050	1078
RED CLASTIC	RED		1078	1093

Static Water Level
221.00 ft. Land surface Date measured 1960/11/01

Pumping Level (below land surface)
355.50 ft. after hrs. pumping 1500.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Bergerson-Caswell 27058
License Business Name Lic. or Reg No.

Remarks
COPIED FROM D.N.R. M.G.S. NO.167. GAMMA LOGGED 2-24-1984.

First Bedrock OPVL
Last Strat PMSU
Aquifer Mt.Simon
Depth to Bedrock 101.00 ft.

Name of Driller Date

Unique Well Number 206440

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 3

Township	Range	Dir	Section	Subsection	Field Located	MDH
117	21	W	8	DCDBDB	Elevation	925.00 ft.

Well Address ST. LOUIS PARK 3
2924 IDAHO AV
ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
DRIFT			0	103
LIMEROCK			103	118
SANDROCK			118	230
SHALE	RED		230	245
SHALE			245	286

Remarks

First Bedrock OPVL
Last Strat OSTP
Aquifer St.Peter
Depth to Bedrock 103.00 ft.

Well Depth 286.00 ft
Depth Completed 286.00 ft
Date Well Completed 1939/08/00

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 24 Depth 103
24.00 in. from 0.00 to 103.00 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 103.0 to 286.0

Static Water Level
60.00 ft. Land surface Date measured 1959/00/00

Pumping Level (below land surface)
114.00 ft. after hrs. pumping 0.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Mccarthy Well Co. 27022
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number 206442

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
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Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 10

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	8	DCDCBC	MDH 925.00 ft.

Well Address ST. LOUIS PARK 10

ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
SAND & GRAVEL			0	83
CLAY			83	103
LIMEROCK			103	123
ST. PETER SANDROCK			123	288
SHAKOPEE			288	407
JORDAN SANDROCK			407	500

Remarks
GAMMA LOGGED 2-24-1984.

First Bedrock OPVL
Last Strat CJDN
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 103.00 ft.

Well Depth 500.00 ft
Depth Completed 500.00 ft
Date Well Completed 1955/09/15

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 16 Depth 316
24.00 in. from 0.00 to 106.00 ft. lbs/ft
16.00 in. from 0.00 to 316.00 ft. lbs/ft

Hole Diameter (in.) 23.0(To 500.0

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 316.0 to 500.0

Static Water Level
104.00 ft. Land surface Date measured 1955/09/15

Pumping Level (below land surface)
199.00 ft. after hrs. pumping 2005.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Neat Cement From To ft. 550.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Keys Well Co. 62012
License Business Name Lic. or Reg No.
JOHNSON, R.

Name of Driller Date

Unique Well Number 206456

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/29
Received Date

Well Name ST. LOUIS PARK 12

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	21	CDBDCD	MDH 910.00 ft.

Well Address ST. LOUIS PARK 12

ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
DRIFT			0	96
PLATTEVILLE			96	127
SHALE (GLENWOOD)			127	132
ST. PETER			132	292
SHAKOPEE			292	427
JORDAN			427	505
ST. LAWRENCE			505	550
FRANCONIA			550	695
IRONTON			695	725
GALESVILLE			725	745
EAU CLAIRE			745	832
MT. SIMON			832	983
HINCKLEY			983	1095

Remarks
M.G.S. NO. 279. OLD P.A. 63-0083.

First Bedrock OPVL
Last Strat CMTS
Aquifer Mt.Simon
Depth to Bedrock 96.00 ft.

Well Depth 1095.00 ft
Depth Completed 1095.00 ft
Date Well Completed 1965/08/00

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 16 Depth 900

30.00	in. from	0.00	to 99.00 ft.		lbs/ft
24.00	in. from	0.00	to 270.00 ft.		lbs/ft
16.00	in. from	0.00	to 900.00 ft.		lbs/ft

Hole Diameter (in.) 24.0(To)95.0

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 900.(to 1095.

Static Water Level
245.00 ft. Land surface Date measured 1965/08/00

Pumping Level (below land surface)
353.00 ft. after 1.00 hrs. pumping 1300.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Neat Cement From To 900.0 ft. 360.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Keys Well Co. 62012
License Business Name Lic. or Reg No.
KEMPER, R.
Name of Driller Date

Unique Well Number 206457

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/29
Received Date

Well Name ST. LOUIS PARK 6

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	21	CDBDBD	MDH 915.00 ft.

Well Address ST. LOUIS PARK 6

ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
SAND & GRAVEL			0	90
LIMEROCK			90	122
SHALE	BLUE		122	127
ST. PETER SAND		SOFT	127	290
SHAKOPEE LIME			290	417
JORDAN SANDSTONE			417	480
ST. LAWRENCE			480	482

Remarks

First Bedrock OPVL
Last Strat CSTL
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 90.00 ft.

Well Depth 482.00 ft
Depth Completed 482.00 ft
Date Well Completed 1948/02/19

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 20 Depth 303

24.00	in. from 0.00	to 107.50	ft.		lbs/ft
20.00	in. from 0.00	to 303.00	ft.		lbs/ft

Hole Diameter (in.)

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 303.0 to 482.0

Static Water Level
60.00 ft. Land surface Date measured 1948/01/19

Pumping Level (below land surface)
ft. after hrs. pumping g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Neat Cement From To ft. 24.00 Cubic yards

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity 1200 g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010

License Business Name **Lic. or Reg No.**
SHUEY, P.

Name of Driller **Date**

Unique Well Number 215447

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 15

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	8	DCDBAB	MDH 920.00 ft.

Well Address ST. LOUIS PARK 15

ST LOUIS PARK MN 55426 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55426

Description	Color	Hardness	From	To (ft.)
DRIFT			0	102
LIMESTONE			102	124
SANDSTONE			124	288
LIMESTONE			288	402
SANDSTONE			402	482
SHALE			482	503

Remarks

First Bedrock OPVL
Last Strat CSTL
Aquifer Jordan
Depth to Bedrock 102.00 ft.

Well Depth 503.00 ft
Depth Completed 503.00 ft
Date Well Completed 1969/00/00

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 24 Depth 398
30.00 in. from 0.00 to 102.00 ft. lbs/ft
24.00 in. from 0.00 to 398.00 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 398.0 to 503.0

Static Water Level
115.00 ft. Land surface Date measured 1977/00/00

Pumping Level (below land surface)
183.00 ft. after hrs. pumping 1200.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Bergerson-Caswell 27058
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number 227965

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/26
Received Date

Well Name ST. LOUIS PARK 14

Township	Range	Dir	Section	Subsection	Field Located Elevation
117	21	W	4	CCDACA	MDH 902.00 ft.

Well Address ST. LOUIS PARK 14

ST LOUIS PARK MN 55416 Changed

Contact Address CITY OF ST. LOUIS PARK

ST LOUIS PARK MN 55416

Description	Color	Hardness	From	To (ft.)
GLACIAL DRIFT			0	94
PLATTEVILLE LIMESTONE			94	98
GLENWOOD SHALE			98	101
ST. PETER SANDROCK			101	265
SHAKOPEE/ONEOTA DOLOMITE			265	375
CLEAN COARSE SANDROCK		HARD	375	410
SANDROCK	RED	V.HARD	410	420
SHALEY SANDROCK		HARD	420	440
FINE SANDROCK	TAN	HARD	440	450
FINE SANDROCK	WHITE	HARD	450	475
FINE SHALEY SANDROCK	GREEN	HARD	475	485

Remarks
CEDAR LAKE ROAD & ALABAMA AVE.

First Bedrock OPVL
Last Strat CSTL
Aquifer Jordan
Depth to Bedrock 94.00 ft.

Well Depth 485.00 ft
Depth Completed 485.00 ft
Date Well Completed 1965/02/15

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 16 Depth 389

30.00	in. from	0.00	to 94.00 ft.		lbs/ft
24.00	in. from	0.00	to 253.00 ft.		lbs/ft
16.00	in. from	0.00	to 389.00 ft.		lbs/ft

Hole Diameter (in.)

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 389.0 to 485.0

Static Water Level
80.00 ft. Land surface Date measured 1965/02/15

Pumping Level (below land surface)
129.50 ft. after hrs. pumping 1000.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO
Material Neat Cement From To ft. 710.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Bergerson-Caswell 27058
License Business Name Lic. or Reg No.

Name of Driller Date

Appendix C

Aquifer Test Plans

MINNESOTA MDH DEPARTMENT OF HEALTH
Environmental Health Division
Drinking Water Protection Section
Source Water Protection Unit
P.O. Box 64975
St. Paul, Minnesota 55164-0975

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

Public Water Supply ID:	12070050	PWS Name:	City of St. Louis Park, MN

Contact Information for Person Completing this Form

Name:	Erik J. Tomlinson, PG
Address:	Source Water Solutions, LLC
	221 McCarron St.
City, State, Zip:	St. Paul, MN 55113
Phone, Fax, e-mail:	Phone: 612.701.7343 Email: erik@sourcewater-solutions.com

Aquifer Properties Determination Methods

- [x] 1) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- [ ] 2) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- [ ] 3) A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). A test plan must be approved before conducting the test.
- [ ] 4) A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). A test plan must be approved before conducting the test.
- [ ] 5) An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- [ ] 6) Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- [x] 7) An existing published transmissivity value.

- Include all test data and analysis documentation with the estimated transmissivity, ft^2/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
- Attach detailed aquifer test plan for methods 3 or 4.

Submitted by:	Erik J. Tomlinson, PG	Prof. License:	PG46739	Date:	12/29/2014

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).

Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, **or** 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

Aquifer Name:	Jordan	☑ Confined	☐ Unconfined	☐ Fractured Rock

The attached aquifer test for Minnetonka Well #6 (Unique ID: 208012 (number is incorrect on pump test analysis)) (**Attachment 1**) was completed with MDH oversight and review. Although the pump test analysis report identifies the aquifer as PDCJ, the observation well where measurements were made is only open to the Jordan Aquifer. It has been determined that the values derived from this pump test are appropriate to represent the Jordan Aquifer. Representative aquifer values are best shown by the early pumping and recovery value from the observation well, giving an average T of 2,400 ft2/d, S of 0.000015, and r/B of 0.07. Aquifer thickness at Well #6 is 94 ft.

A starting horizontal hydraulic conductivity value proposed for use in the groundwater modeling for the Jordan aquifer is 25.5 ft/day.

A starting vertical hydraulic conductivity value proposed for use in the groundwater model for the Jordan aquifer is 2.55 ft/day.

Proposed New Test Information Summary

Pumped Well Name (Unique Number):	208012 (Minnetonka Well 6A)	**Test Duration (Hours):**	24 hours pumping, 32 recovery
Location: **X, Y (meters) UTM-Z15N or Lat-Lon (decimal degrees) datum: NAD83**	UTM-Z15N X:1532864.17 Y:16330554.46	**Pump Type:**	NA
		Discharge Rate:	1,000 gpm
Number of Observation Wells:	1 (Minnetonka Well 6)	**Flow Rate Measuring Device Type:**	Electronic Flow Meter

- A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

200542 (Well 04)	203187 (Well 16)				
203678 (Well 08)					
206442 (Well 10)					
227965 (Well 14)					
215447 (Well 15)					

Reviewed by:	**Approved:** ◯ **Yes** ◯ **No**	**Approval Date:**

Memo

Date: December 13, 2005

To: Steve Robertson / Project File

From: Betty Wheeler

Subject: Pumping Test of St. Louis Park Well 11 (206439) on 10/07/2003

Test ID: 2220

The pumping test performed on Well 11 (206439) was conducted as described below, Tables 1 and 2. The data were analyzed using standard methods cited in the references. Analysis graphs are presented in Appendix 1 and are summarized in Table 3.

Table 1. Aquifer Test Information

Test Location	St. Louis Park 11
Well Owner	City of St. Louis Park
Test Conducted By	SEH
Aquifer	CMTS
Confined / Unconfined	Confined
Date/Time Monitoring Start	10/06/2003 09:00:00 (approximately)
Date/Time Pump off Before Test	10/05/2003 afternoon
Date/Time Test Start	10/07/2003 08:41
Date/Time Recovery Start	10/09/2003 09:21
Date/Time Test Finish	10/11/2003 11:00
Flow Rate	1,203
WL Data Collection Method	Pressure transducer / datalogger
Number of Observation Wells	1

Test Type:

☒ **Constant Rate** ☐ **Variable Rate** ☐ **Recovery** ☐ **Step Drawdown**

☐ **Other (Describe)** _____

☐ **Data scanned** ☒ **Data entered into database**

Table 2. Wells Monitored for the Test

Well Name	Unique Well No.	Radial Distance	Static Water Levels			Aquifer
			Start	Mid-test	End	
Pumped Well: St. Louis Park 11	206439	NA	NA	NA	NA	CMTS
Ob Wells: St. Louis Park 17	147459	5,700 ft.	385	392.6	385.2	CMTS

Table 3. Analysis Results

Unique Well No.	Transmissivity ft^2/day	Storage Coefficient	Analysis Method	Time Period Emphasis	Remarks
Pumped Well: 206439	NA	NA			
Ob Wells: 147459	1,970	1.7E-4	Theis	Mid- to Late Time	

Note 1: The water levels in the pumped well (206439) could not be determined because the well's casing was inaccessible.

Note 2: The pressure transducer in the observation well (147459) malfunctioned during the pumping phase of the test, so the data was unusable. The transducer was serviced at that point, so the groundwater level data collected during the recovery phase of the test was usable.

Representative Aquifer Characteristics:

Transmissivity: 1,970 ft^2/day

Storage Coefficient: 1.7E-4

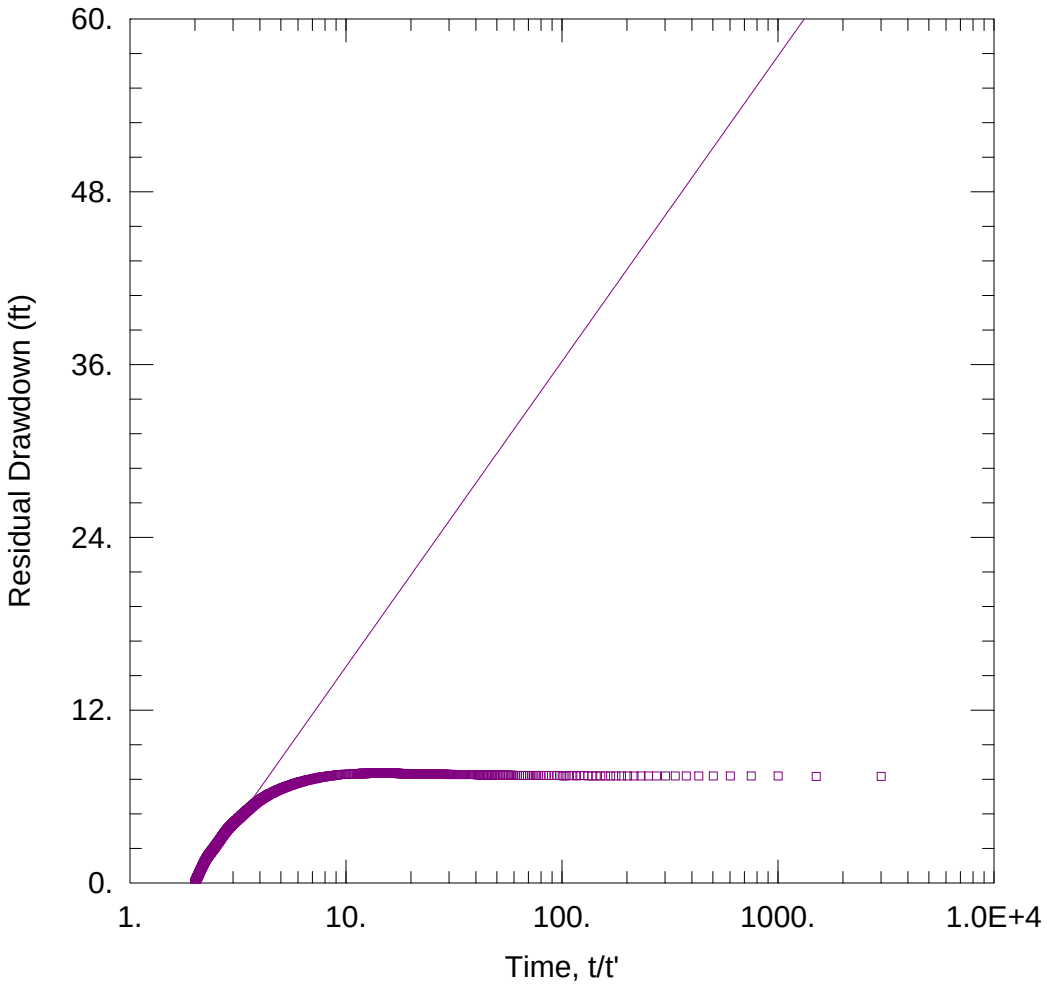
References

Confined Aquifer

Early-Time: (Log-log)

Non-Leaky

Theis, C.V., April 1935, “The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage,” Trans. American Geophysical Union, 16th Annual Meeting, pp. 519-24.



CITY OF ST LOUIS PARK

Data Set: O:\...\Pumping Test of St. Louis Park Well 11 (206439) - Obswell Well 17 (147459) - Theis Recovery.ac
Date: 09/02/14 Time: 08:40:52

PROJECT INFORMATION

Company: SEH
Project: Mt Simon Aquifer
Location: City of St Louis Park
Test Well: Well 11 (206439)
Test Date: October 9, 2003

AQUIFER DATA

Saturated Thickness: 263. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 11 (206439)	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ 147459 - Well 17	5700	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 1970. ft^2/day S/S' = 1.96

MINNESOTA MDH DEPARTMENT OF HEALTH
Environmental Health Division
Drinking Water Protection Section
Source Water Protection Unit
P.O. Box 64975
St. Paul, Minnesota 55164-0975

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

Public Water Supply ID:	12070050	PWS Name:	City of St. Louis Park, MN

Contact Information for Person Completing this Form

Name:	Erik J. Tomlinson, PG
Address:	Source Water Solutions, LLC
	221 McCarron St.
City, State, Zip:	St. Paul, MN 55113
Phone, Fax, e-mail:	Phone: 612.701.7343 Email: erik@sourcewater-solutions.com

Aquifer Properties Determination Methods

- [x] 1) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- [ ] 2) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- [ ] 3) A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). A test plan must be approved before conducting the test.
- [ ] 4) A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). A test plan must be approved before conducting the test.
- [ ] 5) An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- [ ] 6) Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- [x] 7) An existing published transmissivity value.

- Include all test data and analysis documentation with the estimated transmissivity, ft^2/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
- Attach detailed aquifer test plan for methods 3 or 4.

Submitted by:	Erik J. Tomlinson, PG	Prof. License:	PG46739	Date:	12/29/2014

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).

Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, **or** 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

Aquifer Name:	CMTS	☑ Confined	☐ Unconfined	☐ Fractured Rock

The attached aquifer test for St. Louis Park Well 11 (Unique ID: 206439) (**Attachment 1**) was completed by SEH in 2003 and approved by the MDH for use in St. Louis Park's original WHPP. Although there were issues with the pumping phase of the test, the test recovery phase yielded representative data. Analysis of the recovery phase of Municipal Well 17, using the Theis (1935) solution, yielded a transmissivity value of 1,970 ft2/day and a storativity value of 0.00017.

The thickness of the CMTS aquifer at St. Louis Park Well 17 is 263 feet. A starting Kh of 7.49 ft/day and Kv of 0.749 for the CMTS aquifer is proposed.

Proposed New Test Information Summary

Pumped Well Name (Unique Number):	206439 (St. Louis Park Well 11)	**Test Duration (Hours):**	48 hours pumping, 48 recovery
Location: X, Y (meters) UTM-Z15N or Lat-Lon (decimal degrees) datum: NAD83	UTM-Z15N X: 471027 Y: 4977590	**Pump Type:**	NA
		Discharge Rate:	1,184-1,368 gpm (1,200 avg)
Number of Observation Wells:	1 (St. Louis Park 17)	**Flow Rate Measuring Device Type:**	Electronic Flow Meter

- A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

206439 (Well 11)	203187 (Well 16)				
206456 (Well 12)					
206424 (Well 13)					
227965 (Well 14)					
215447 (Well 15)					

Reviewed by:	**Approved:** ◯ Yes ◯ No	**Approval Date:**

Memo

Date: May 22, 2014

To: St. Louis Park WHP Project File (PWSID: 1270050)

From: Justin Blum

Subject: Analysis of the Meadowbrook Golf Course 2 (802162) Production and Pumping Tests, May 1 - 6, 2014, Prairie du Chien - Jordan Aquifer

Test No. 2462

The pumping test performed on Meadowbrook Golf Course 2 (802162) was conducted as described below and summarized in Tables 1 and 2. The data were analyzed using standard methods cited in the references. Analysis graphs are presented in Appendix 1 and are summarized in Table 3. Appendix 2 contains observations, field notes, and any other documentation.

Result Summary

Conceptual model: leaky confined - radial porous media flow

Representative aquifer values:

Transmissivity (T):	15,500	ft^2/day
Aquifer Thickness (b):	254	Feet
Hydraulic Conductivity (k):	58.9	ft/day
Storativity (S):	3.1e-4	
Leakage (L):	--	Feet
Hydraulic Resistance (c):	--	Days

Boundaries: leakage, fracture/conduit flow

Remarks:

Open conduits and/or bedding-plane fractures within the dolostone - sandstone aquifer transmit pumping stresses very quickly over a wide area. Other pumping wells influence water levels in later portions of test, particularly at the distant obwell. Transmissivity is fairly well constrained, +/- 20%, but there is significant uncertainty in the storativity because of the secondary porosity developed within the aquifer system.

Test Type:

☒ Constant Rate ☐ Variable Rate ☐ Recovery ☐ Step Drawdown ☐ Other (Describe)

☐ Data scanned ☒ Data entered

Table 1. Aquifer Test Information

Test No.	2462
Test Location	Meadowbrook Golf Course Irrigation 2
Well Owner	Minneapolis Park Board
Test Conducted By / For	Traut Well Drilling
Aquifer	Prairie du Chien –Jordan
Confined / Unconfined	Confined
Data Collection Methods	Manual, transducer
Number of Observation Wells	2
Date/Time Monitoring Start	04/18/2014 12:20
Production Test	
Date/Time Start	05/02/2014 09:49
Step Rates (units)	500, 800. 1100, 1400, 1700 gpm
Step Times	10:30, 11:30, 12:31, 13:31, 15:03
Date/Time End	05/02/2014 16:57
Constant Rate Test	
Date/Time Pump off Before Test	05/02/2014 16:57
Date/Time Pumping Start	05/05/2014 09:30:05
Date/Time Recovery Start	05/06/2014 09:35:01
Date/Time Test Finish	05/08/2014 09:10
Flow Rate (units)	1100 gpm

Table 2. Wells Monitored During the Test

Well Name (Unique Well No.)	Radial Distance (feet)	Static Water Levels (feet below measuring point)			Change in Water Level (feet)	Aquifer
		Start	Mid-test	End		
Pumped Well:						
GC 2 (802162)	1	82.0	95.85	89.20	13.85	Prairie du Chien -Jordan
Ob Wells:						
GC 1 (216009)	133	84.60	98.16	87.00	13.56	Prairie du Chien –St. Lawrence
MH (216067)	2072	81.33	86.98	81.15	5.65	Prairie du Chien -Jordan

Table 3. Analysis Results

Transient Analysis					
Well Name (Unique Well No.)	**Transmissivity, T (ft^2/day)**	**Storage Coefficient, S**	**Analysis Method**	**Time Period Emphasis**	**Plot No. Remarks**
Pumped Well:					
GC 2 (802162)	12,950		Theis	20-400 minutes	A1-1 poor match
Ob Wells:					
GC 1 (216009)	12,000	7.2e-5	Theis	20-400 minutes	A1-2
MH (216067)	18,700	2.8e-5	Theis	5-400 minutes	A1-3
Distance Drawdown Analysis	--	--	Theis t/r^2	pumping	A1-4 poor match to Theis curve
	18,700	2.8e-5	Theis t/r^2	Pumping	A1-5 adjusted radial distance
GC 1 (216009)	15,600	1.6e-5	Cooper-Jacob	2-400 minutes	A1-6 projected drawdown to 10k min
GC 2 (216009) GC 1 (216009)	**15,470**	**3.1e-4**	Agarwal recovery	2-300	A1-9, r = 20 ft.

Steady-state Analysis				
Transmissivity, T (ft^2/day)	**Characteristic Leakage, L (feet)**	**Hydraulic Resistance, c (days)**	**Analysis Method**	**Plot No. Remarks**
10,900	13,500	16,800	de Glee	A1-7, low T - unreasonable large L
19,200	47,000	114,800	de Glee	A1-8, reasonable T - absurdly large L

Test Description

Purpose of test: production and constant rate tests were performed by Traut Well to qualify a new irrigation well for Meadowbrook Golf Course, St. Louis Park. The MDH Source Water Protection Unit considered the test of this new well to be a rare opportunity to support wellhead protection efforts of St. Louis Park and adjacent communities.

Test setup: Traut monitored the new irrigation well manually and with a transducer during the tests. Two existing wells were instrumented with transducer-data logger equipment by MDH for water level monitoring, Table 2 and Appendix 2.

Hydrogeologic setting: leaky confined bedrock aquifer, fractured and karsted. The Prairie du Chien-Jordan Aquifer System is extensively used for drinking water and industrial/commercial supply in Hennepin County.

Well construction: the well was blasted and bailed during construction and development to enhance the production capability. Approximately 150 to 200 cubic yards of sand were removed from the borehole, resulting in an effective radius of the pumped well that is substantially larger than the original borehole radius.

Other interfering wells: because of the heavy use of the Prairie du Chien-Jordan Aquifer System, the daily fluctuation in static water levels is large - even in times of low demand. Therefore, a 'static' level is known only within a reasonable range in this aquifer system. The long pre-test monitoring record from the Methodist Hospital well (216067) documents this variability. During the fourteen days prior to the test, the mean water elevation in this

well was 808.9 ft. (MSL). The daily variation in water elevation was +/- 0.78 feet with a standard deviation of 0.39 feet.

Weather conditions: a large precipitation event, 3+ inches of rainfall, occurred during the pre-test monitoring period. This recharge event is reflected in the arithmetic plot of water elevations, Appendix 2. Total April precipitation in the Metro Area was the second highest on record. During the test period the weather was clear and cool.

Data collection, reporting, and analysis:

Data were collected with little problem from wells that were accessible for measurement. Time synchronization between the three data loggers was the most problematical issue. In the field, time of day of the Traut data logger differed from MDH time by more than 8 minutes. However, this was corrected by Traut when the data were transferred from the data logger. The subsequent adjustment to match time of MDH loggers (GPS-time) was small, +13 seconds.

Cable stretch of transducers was on the order of 0.2 feet and could be assumed to have occurred before the start of the test because of the influence of the production (step) test on transducer position within the vent tube and the length of pre-test monitoring.

There is intimate connection between the pumped well and the nearest obwell that complicates the analysis of these data. The obwell reacted within tenths of seconds to any disturbance in the pumped well. This is assumed to result from conduits within the Prairie du Chien Group, bedding-plane fractures, and well development techniques employed by the drillers.

Transient analyses

- Theis analyses generally show the expected increase in transmissivity with radial distance from the pumped well. However, the storage coefficient calculated from transient methods (plots A1-1, 6) of 10^{-5} is representative of a highly confined system. The leaky system that is known to exist in this area is expected to produce storativity values in the range of 10^{-4}. Also, a storativity of 10^{-5} is sufficiently isolated from precipitation events that no detectable recharge should occur as a result of infiltration. This is contradicted by pretest monitoring data, Appendix 2.

- The poor match to the Theis curve on A1-4 demonstrates 1) the enhanced efficiency of the pumped well and 2) the apparent negative efficiency in the nearby obwell. Both of these effects are removed when an identical radial distance of 20 feet is used to adjust the plots, A1-5. This is a further demonstration of the interconnection of the boreholes.

- The response in the most distant obwell determines the storage coefficient on plot A1-5. In order to obtain a minimum reasonable storage coefficient of 10^{-4}, this well would have to be located ~700 feet from the pumped well, 1/3 of the actual radial distance. The magnitude of this difference in length indicates an inhomogeneity which can have a large scale effect such as; conduit flow and/or bedding-plane fractures, rather than grain-size variation or other types of depositional fabric which tend to have more local effects.

Steady-state analyses

- For the steady-state analysis, drawdown was projected to 10,000 minutes of pumping, plot A1-6. These values were used for the distance-drawdown plots, A1-7 & 8. The steady-state analyses are problematical. On A1-7, when actual radial distance is used – T is unrealistically low and the characteristic leakage factor is quite large for this setting; neither value is acceptable. Whereas on A1-8, the T is reasonable but the leakage factor is truly unreasonably large (physically impossible).

The recovery analysis, plot A1-9, produces a more reasonable transmissivity and storage coefficient that is considered representative of the aquifer properties in this area, assuming a radial distance of 20 feet. However, the characteristic leakage factor is not provided by this type of analysis.

Evaluation of Test Results

Hydraulic response affected by:

- Well construction techniques and the geological character of aquifer materials cause a very large effective radius of the pumped well;
- The connection between the pumped well and nearest obwell was such that the hydraulic response of the obwell was essentially identical to that of the pumped well, even though the radial distance between the wells was 133 feet.
- Open conduits and/or bedding-plane fractures within the dolostone - sandstone aquifer transmit pumping stresses very quickly over a wide area.
- Other pumping wells influenced water levels in later portions of test, particularly at the distant obwell.

Consistency with conceptual model:

Neither of the distance-drawdown analyses can be considered to produce reasonable results because the storage coefficient and characteristic leakage factor are representative of more highly confined systems. In a highly confined system, pumping stress is transmitted very efficiently over a wide area. In Hennepin County, this aquifer system is leaky (semi-confined). Therefore, modification of both the transient or steady-state conceptual models to incorporate fracture/conduit flow is required to accurately represent aquifer conditions within the Prairie du Chien –Jordan system.

The fact that the standard porous media conceptual models do not produce consistent results is implies a low level of confidence for predictive modeling of this aquifer system, particularly when flow models do not incorporate other flow types. Improved understanding of this flow system (fracture flow analysis) is not possible without many more wells and a great deal of testing.

Representative aquifer properties best represented by: the Agarwal recovery analysis, plot A1-9. Based on this storativity and other tests performed in this aquifer system, the characteristic leakage factor is roughly estimated to be in the range of 1000 to 3000 feet and certainly no larger.

References:

Agarwal, R.G., (1980) A new method to account for producing time effects when drawdown type curves are used to analyze pressure buildup and other test data. SPE Paper 9289, presented at the 55th SPE Annual Technical Conference and Exhibition, Dallas, Texas, September 21–24, 1980.

Cooper, H.H. and Jacob, C.E. (1946) A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well-filed History, Trans. American Geophysical Union, V. 27, pp. 526 – 534.

deGlee, G. (1930) Over grondwaterstroomingen bij wateronttrekking door middle van putten. Ph.D. thesis, Delft Technische Hogeschool, Delft.

Jacob, C. E., (1947) Drawdown Test to Determine the Effective Radius of Artesian Wells, Trans. ASCE, pp.1047-70

deGlee Method [English] in:
Kruseman and De Ridder, (1991) Analysis and Evaluation of Pumping Test Data (2nd Edition), Publication 47, International Institute for Land Reclamation and Improvement, P.O. Box 45, 6700 AA Wageningen, The Netherlands, pp. 76-78.

Hantush, M. S., (1960) Modification of the Theory of Leaky Aquifers, Journal of Geophysical Research, Vol. 65, pp. 3713-25.

Theis, C. V., (1935) The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage, Trans. American Geophysical Union, 16th Annual Meeting, April, 1935, pp. 519-24.

Appendix 1

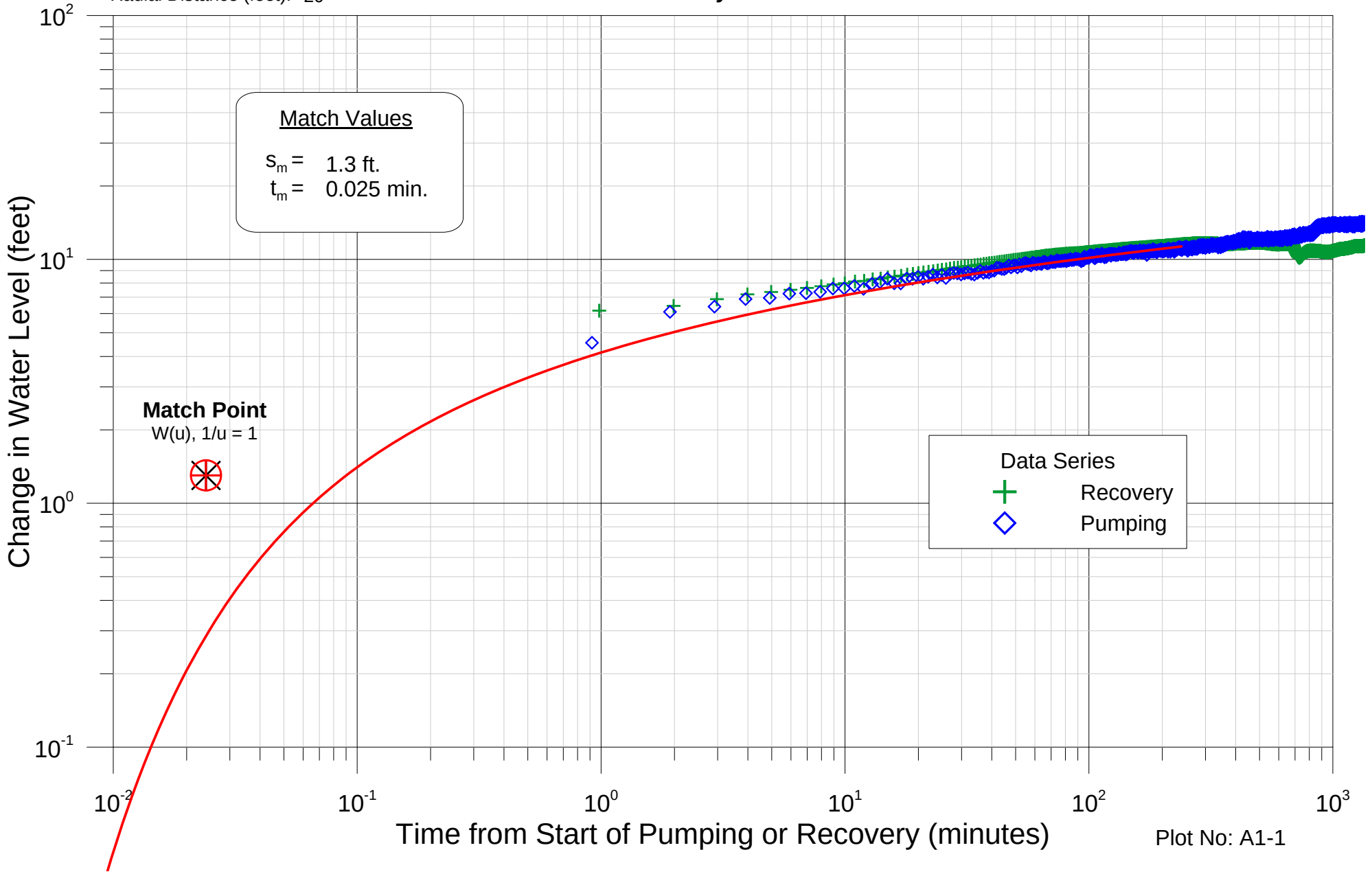
Graphical Analysis

MDH Test No: 2462
Pumped Well: GC 2 (802162)
Obwell: --
Test Date: 5/5/2014
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1100
Radial Distance (feet): 20

$T = 15.3 \bullet Q \bullet W_{(u)} / s_m$
$S = T \bullet t_m \bullet 1/u / r^2 \bullet 360$

$T = 15.3 * 1100 / 1.3 = 12946.2$ ft²/day
S = Not Applicable

Theis Analysis



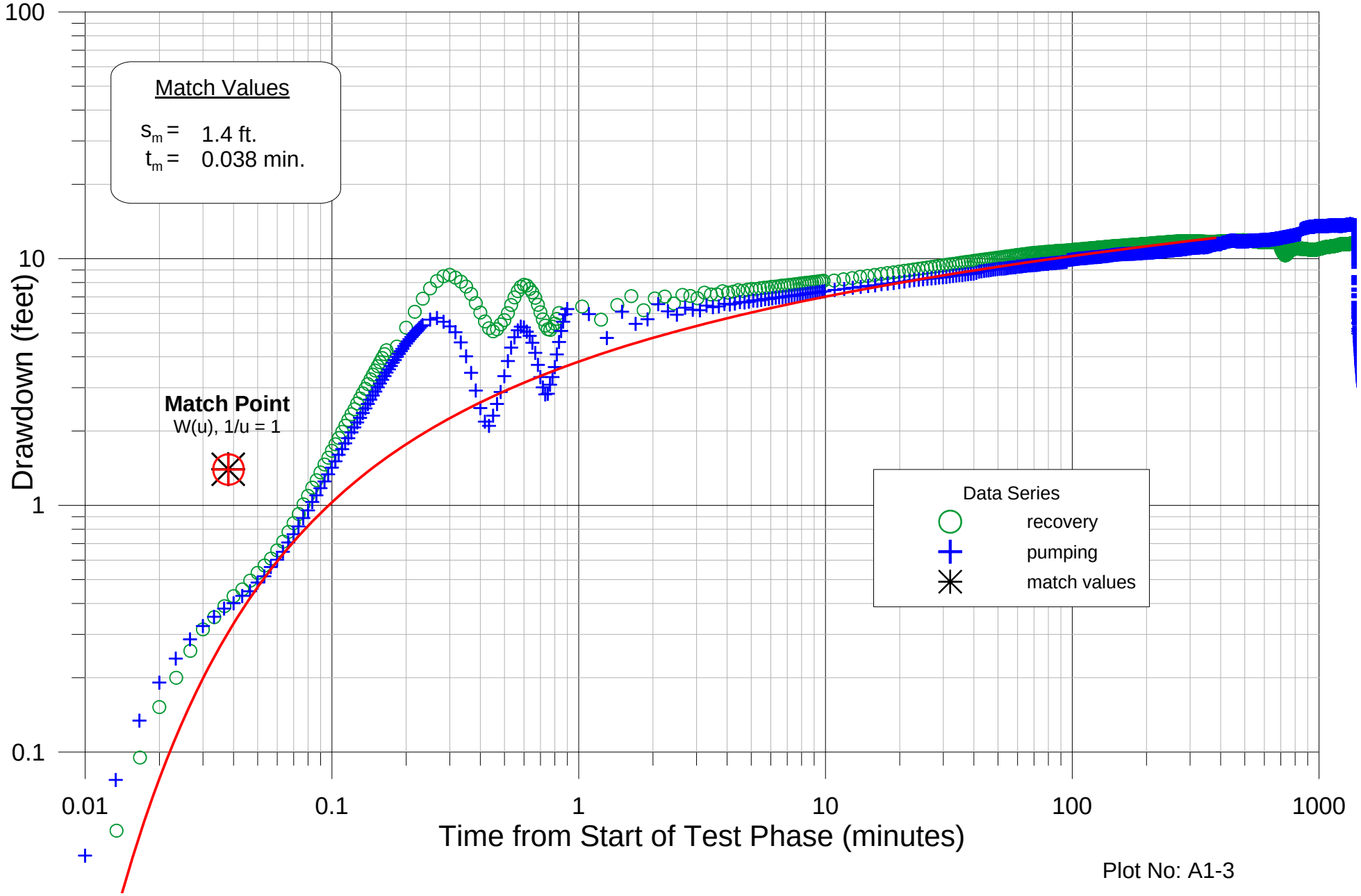
Plot No: A1-1

MDH Test No: 2462
Pumped Well: GC 2 (802162)
Obwell: GC 1 (216009)
Test Date: 5/5/2014
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1100
Radial Distance (feet): 133

$T = 15.3 \bullet Q \bullet W_{(u)} / s_m$
$S = T \bullet t_m \bullet 1/u / r^2 \bullet 360$

$T = 15.3 * 1100 / 1.4 = 12021.4\ ft^2/day$
$S = 12021.4 * 0.038 / (133^2 * 360) = 7.17355e-005$

Theis Analysis



Plot No: A1-3

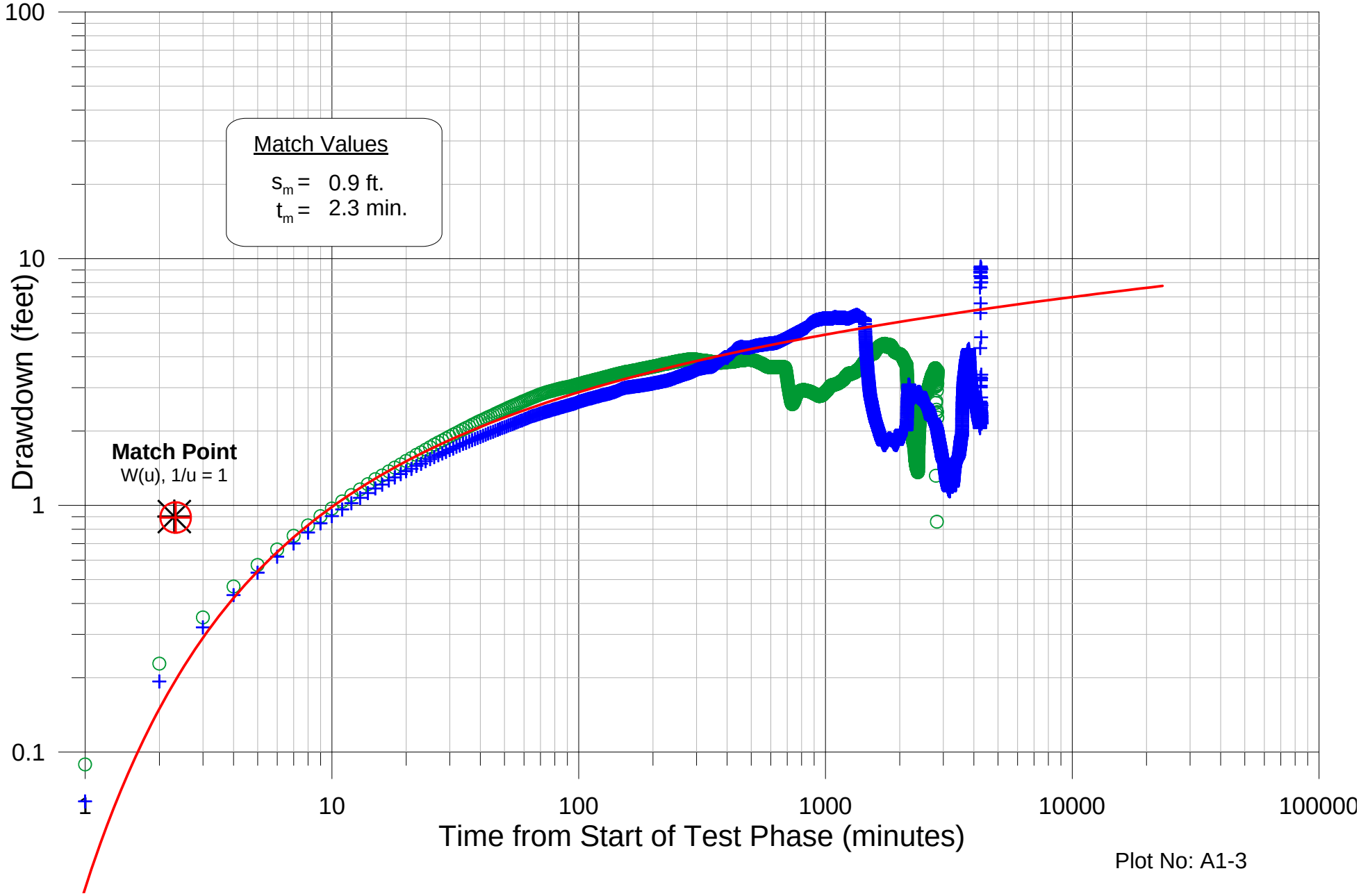
MDH Test No: 2462
Pumped Well: GC 2 (802162)
Obwell: MH (216067)
Test Date: 5/5/2014
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1100
Radial Distance (feet): 2072

Theis Analysis

$T = 15.3 \bullet Q \bullet W_{(u)} / s_m$

$S = T \bullet t_m \bullet 1/u / r^2 \bullet 360$

T = 15.3 * 1100 / 0.9 = 18700 ft²/day
S = 18700 * 2.3 / (2072^2 * 360) = 2.78283e-005



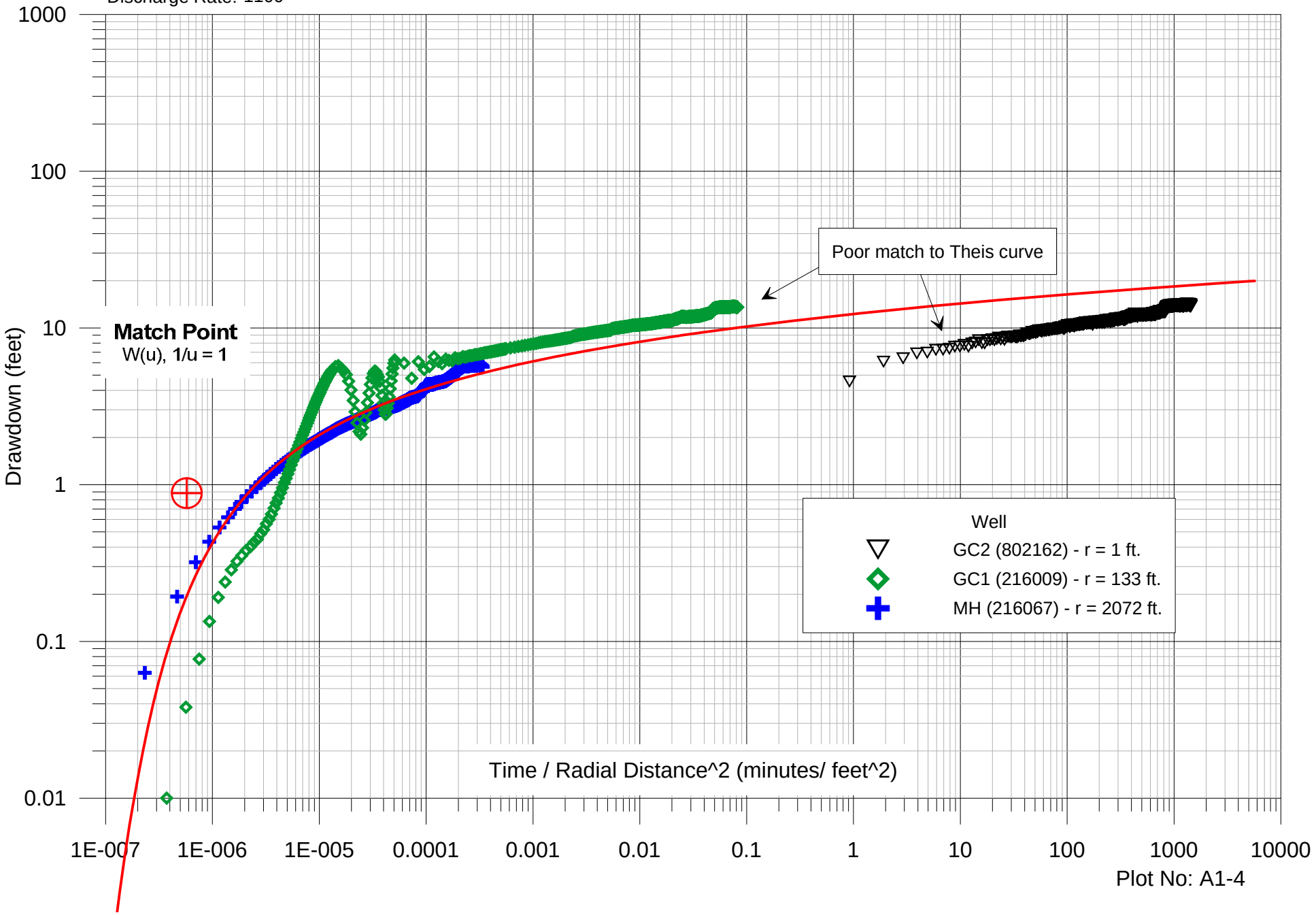
Plot No: A1-3

MDH Test No: 2462
Pumped Well: GC 2 (802162)
Test Date: 5/5/2014
Data Series: Pumping
Discharge Rate: 1100

Theis Distance-Drawdown Analysis
- actual radial distance

$T = 15.3 \bullet Q \bullet W_{(u)} / s_m$

$S = T \bullet t_m \bullet 1/u / 360$

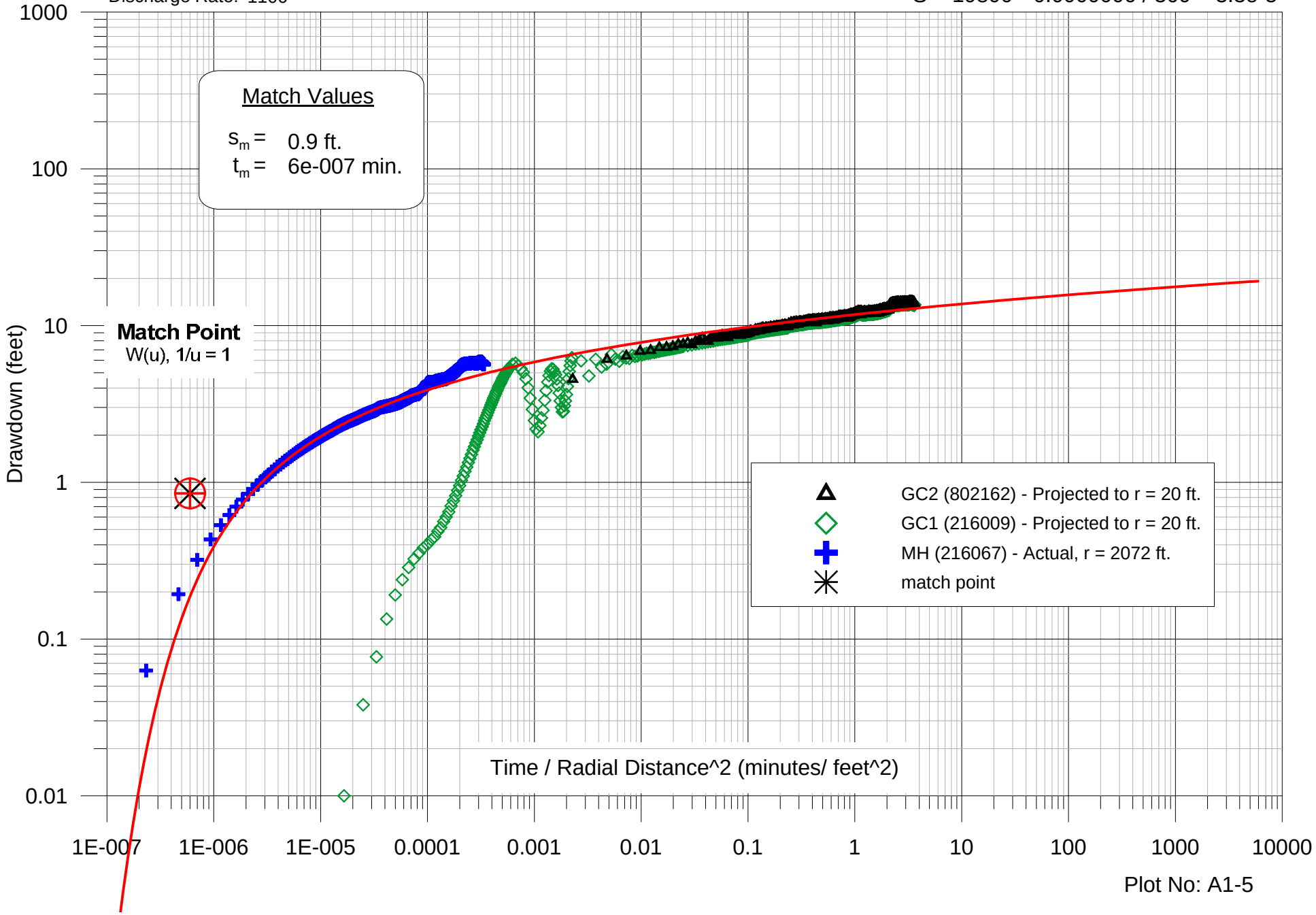


Plot No: A1-4

MDH Test No: 2462
Pumped Well: GC 2 (802162)
Test Date: 5/5/2014
Data Series: Pumping
Discharge Rate: 1100

Theis Distance-Drawdown Analysis
Projected to r = 20 ft.

$T = 15.3 \bullet Q \bullet W_{(u)} / s_m$
$S = T \bullet t_m \bullet 1/u / 360$
$T = 15.3 * 1100 / 0.9 = 19800\ ft^2/day$
$S = 19800 * 0.0000006 / 360 = 3.3e\text{-}5$



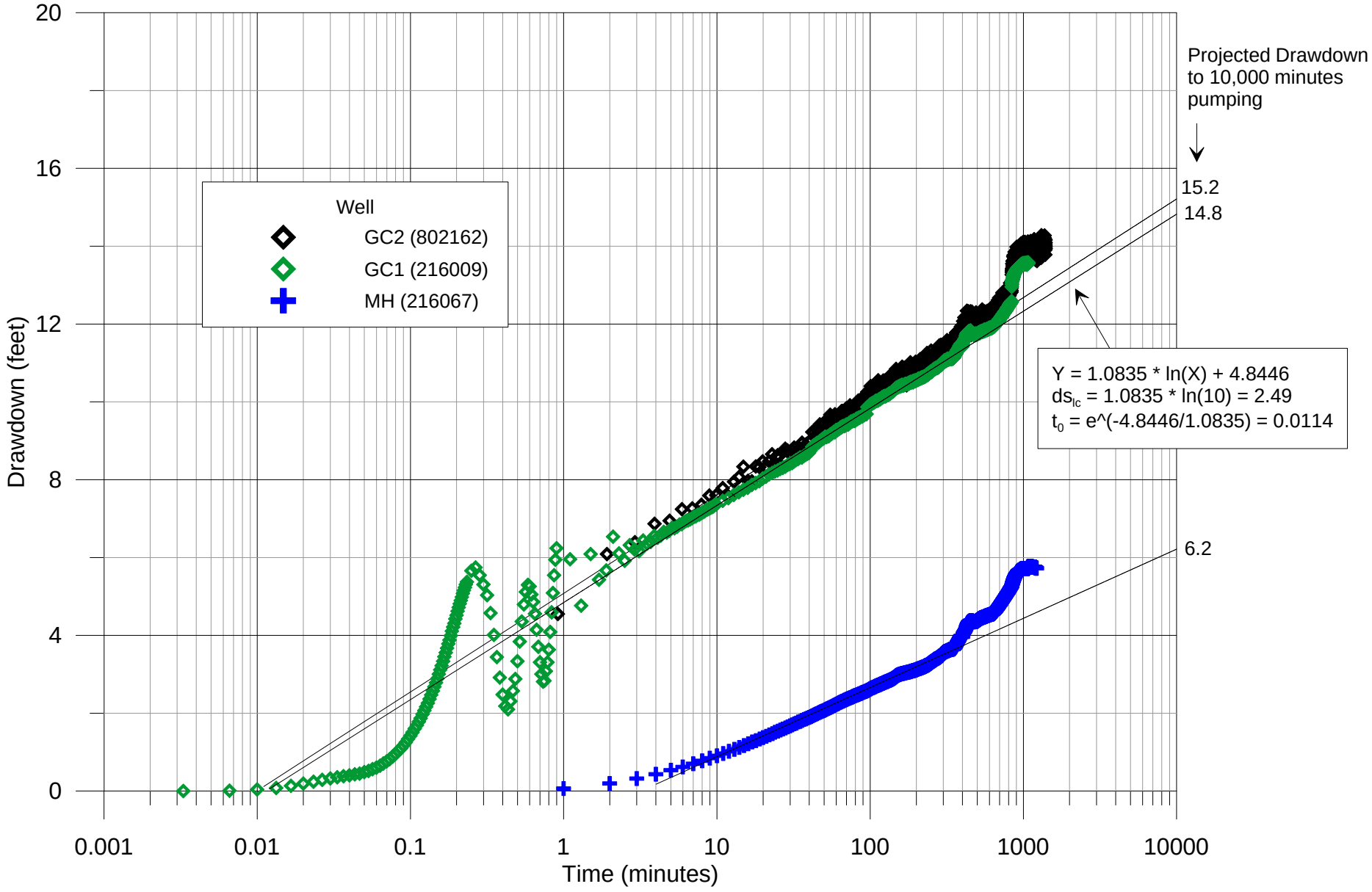
Plot No: A1-5

MDH Test No: 2462
Pumped Well: GC 2 (802162)
Test Date: 5/5/2014
Data Series: Pumping
Discharge Rate: 1100 gpm

$T = (2.303 * 1440 / 7.48 / 4 / pi()) * Q / ds'_{lc}$
$S = T * t_0 / (r^2 * 640)$

$T = 35.3 * 1100 / 2.49 = 15600\ ft^2/day$
$S = 15600 * 0.01143 / (133^{\wedge 2} * 640) = 1.6e\text{-}5$

Cooper-Jacob Analysis

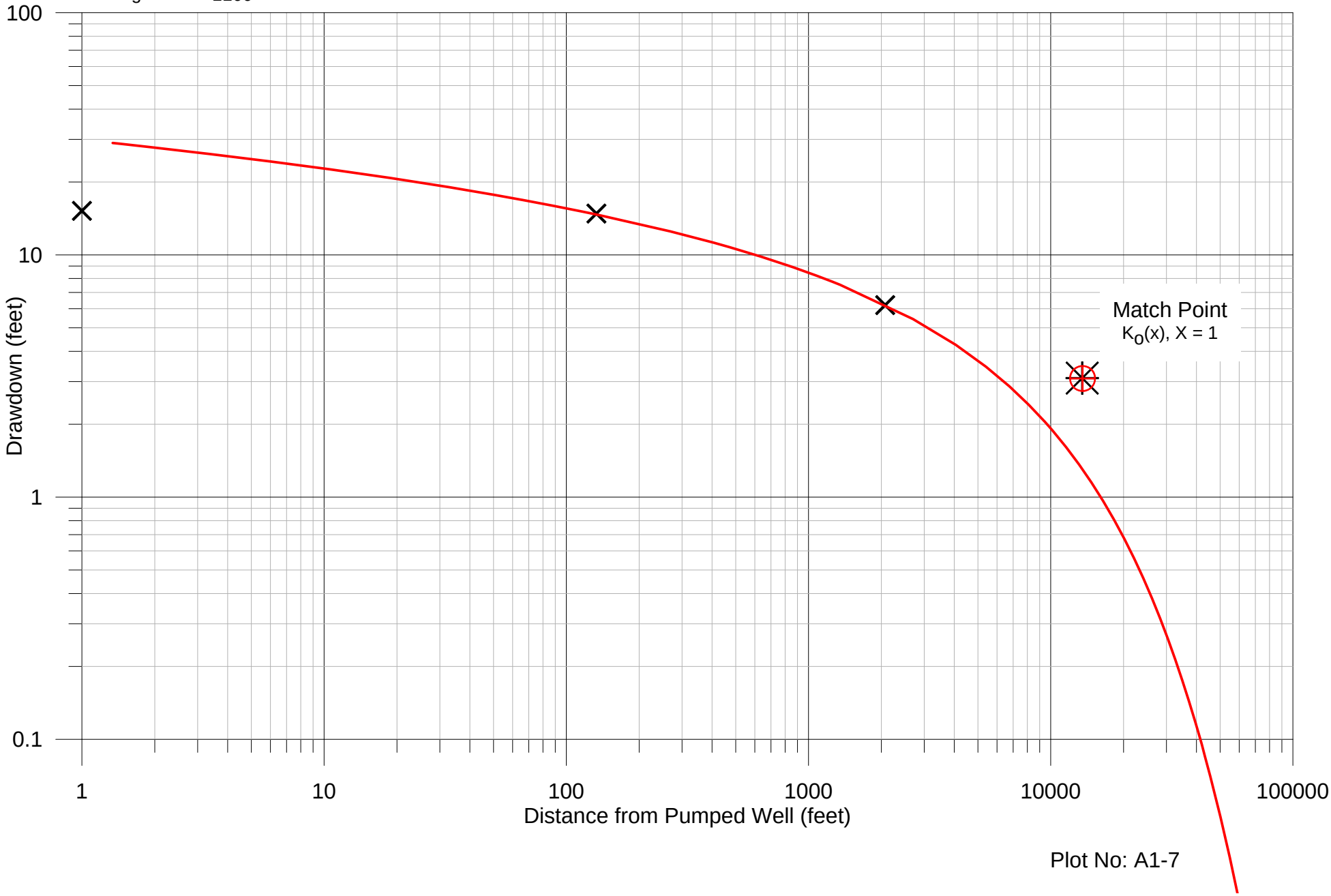


Plot No: A1-6

MDH Test No: 2462
Pumped Well: GC 2 (802162)
Test Date: 5/5/2014
Data Series: Pumping
Discharge Rate: 1100

de Glee Analysis
projected pumping to 10,000 minutes

T = 30.6 1100 / 3.1 = 10858.1 ft^2/day
L = 13500
c = (13500^2/10858.1) = 16784.8 days

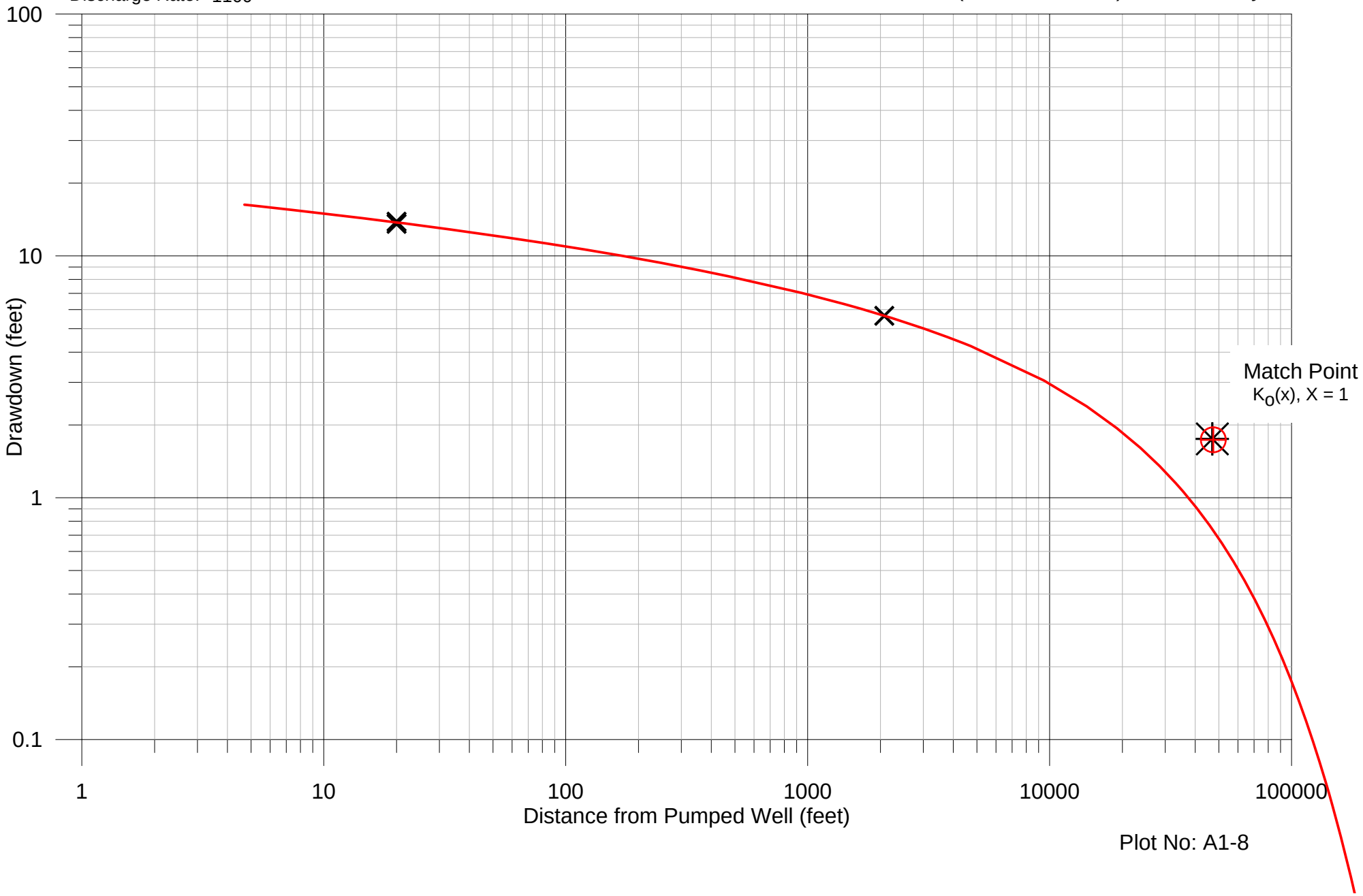


Plot No: A1-7

MDH Test No: 2462
Pumped Well: GC 2 (802162)
Test Date: 5/5/2014
Data Series: Pumping
Discharge Rate: 1100

de Glee Analysis
adjusted radial distance and
projected pumping to 10,000 minutes

T = 30.6 1100 / 1.75 = 19234.3 ft^2/day
L = 47000
c = (47000^2/19234.3) = 114847 days

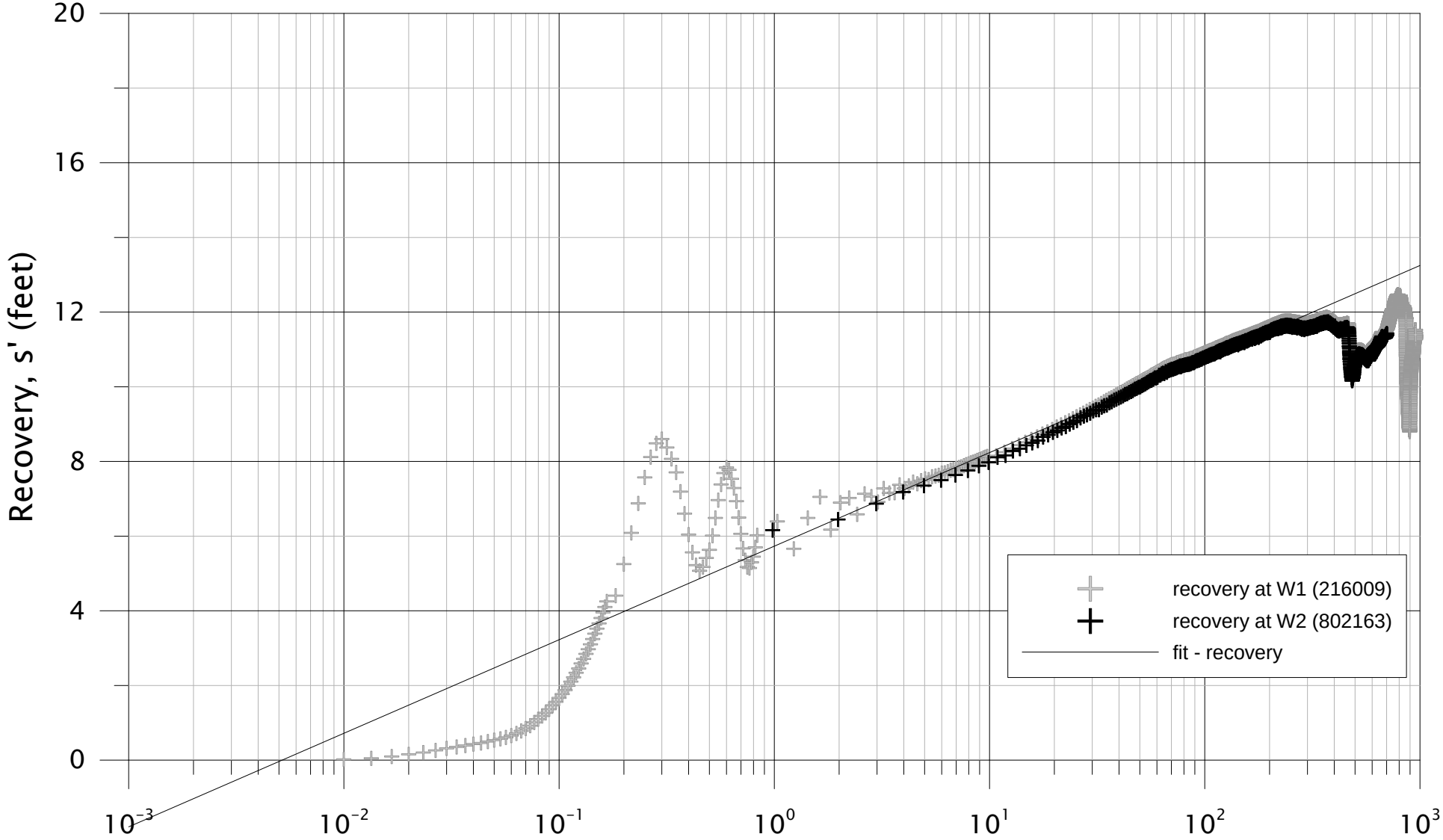


Plot No: A1-8

Q = 1100 gpm
Fit = 1.0884 * ln(X) + 5.7296
ds'_{lc} = 1.0884 * ln(10) = 2.51
t_0 = e^(-5.7296/1.0884) = 0.00517

Test of Meadowbrook 2 (802162)
05/05/2014
Recovery

$T = (2.303 * 1440 / 7.48 / 4 / pi()) * Q / ds'_{lc}$
$S = 2.25 * T * t_0 / (r^2 * 1440)$
$T = 35.3 * 1100 / 2.51 = 15470\ ft^2/day$
$S = 2.25 * 15470 * 0.00517 / (20^2 * 1440) = 3.1e-4$



Agarwal Equivlalent Time

t_p=pumping time (fixed), t'=elapsed recovery time

$(t_p * t') / (t_p + t')$

Plot No: A1-9

Appendix 2

Documentation

MINNESOTA MDH DEPARTMENT of HEALTH
Source Water Protection Unit
Drinking Water Protection Section
P.O. Box 64975
St. Paul, Minnesota 55164-097

Test No. **2462**

Aquifer Test Information

A – Test Information		
Test Location **Meadowbrook Golf Course 2**	Well Owner **Minneapolis Park Board**	Test Conducted By **Traut Well Drilling / MDH**
Aquifer **Prairie du Chien-Jordan**	Confined/Unconfined **confined**	Flow Rate (Units) **1100 gpm**
Date/Time - Monitoring Start **04/18/2014 12:51:06**	Pump Type **submersible**	Flow Rate Measuring Device **turbine**
Date/Time - Test Start **05/05/2014 09:30:05**	Drop Pipe Length (Pump Intake)	Totalizer: End **68535050**
Date/Time - Recovery Start **05/06/2014 09:35:01**	Pumped Well Inner Casing Diameter	Totalizer: - Start **66926450**
Date/Time - Test Finish **05/08/2014 09:10**	Pump Pre-lube Time: **NA**	= Total Pumped (Units) **1608600**

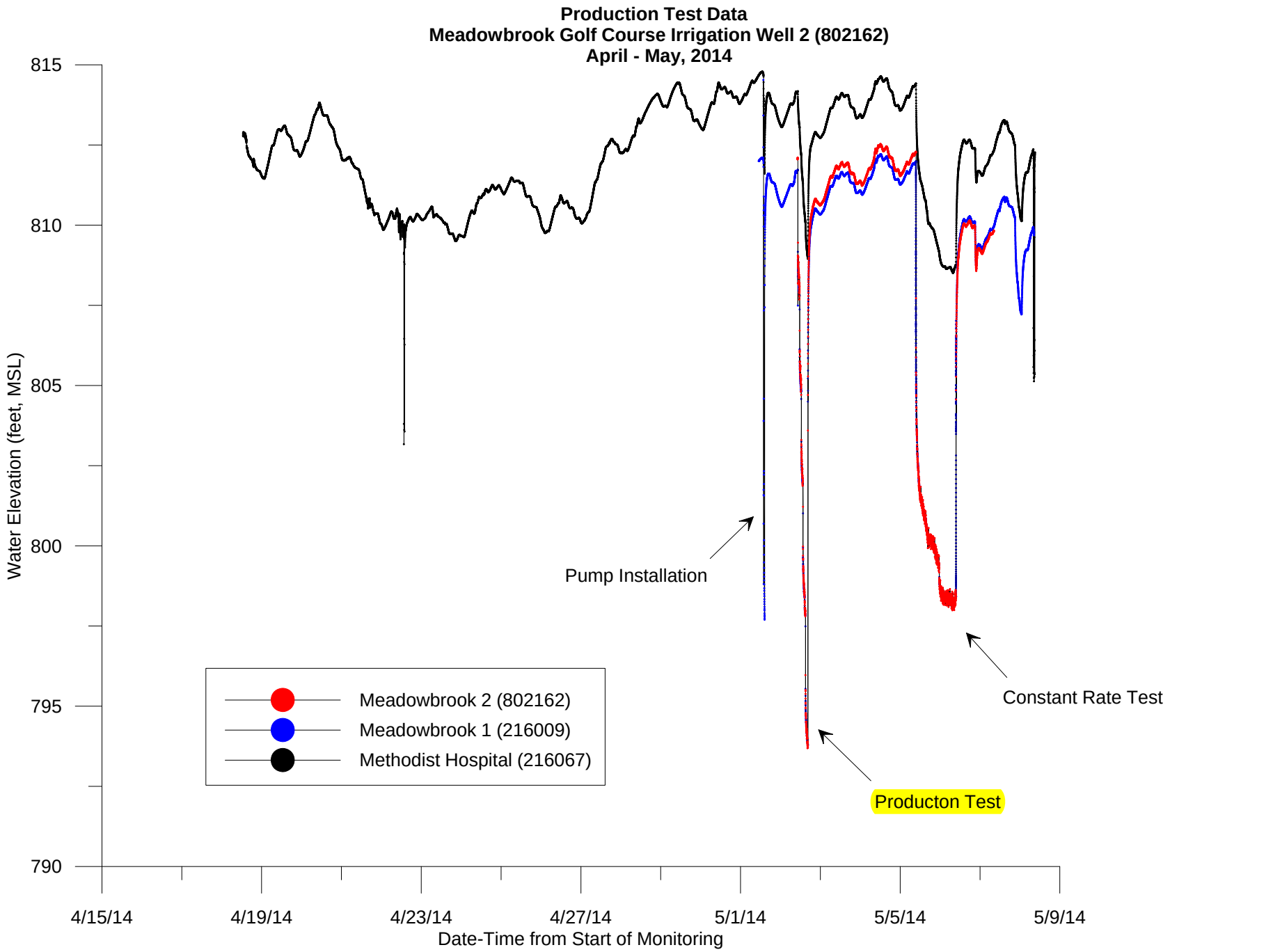
B – Well Information

Well Name (Unique Number)	Location		Radial Distance (feet)	Ground Surface Elevation (ft.) GSE	Measuring Point Desc. GSE + (stick-up)	Open Interval (feet, MSL)	Aquifer
	Easting (m)	Northing (m)					
Meadowbrook GC 2 **(802162)**	417218	4974638	~20	894.5	+ 3.27 ft. Vent Tube	from 634 to 380	Prairie du Chien - Jordan
Meadowbrook GC 1 **(216009)**	417229	4974599	133	893.6	+~ 1 ft. Vent Tube	from 582 to 337	Prairie du Chien –St. Lawrence
Methodist Hospital **(216067)**	417392	4975245	2072	891.1	+~ 2 ft. Vent Tube	from 636 to 406	Prairie du Chien - Jordan
						from to	
						from to	

C – Data Collection

Data File Name: Well Name_Unique Number	Data Logger Type, SN:	Probe Id., Range (psi)	Installation		Removal		Difference	
			Static WL	Transducer Setting	Static WL	Transducer Setting	Static WL	XD Setting
GC2_802162.xslx	Traut in-situ troll	SN:118832 100 psi	82	181.8				
GC1_216009.xlsx	MDH box 3 Hermit 1K	9 - 30 psi	84.60	-55.72	87.00	XD_r -53.85 XD_o -53.52	2.40	2.20
MH_216067.xslx	MDH box 5 Hermit 3K	4 - 20 psi	81.33	-19.57	81.15	XD_r -19.81 XD_o -same	-0.17	0.24

Test Notes: 150 to 200 yd^3 blasted & bailed from well during development. GSE from Lidar +1 ft. to account for fill at wellhead for drilling platform.


Production Test Data
Meadowbrook Golf Course Irrigation Well 2 (802162)
April - May, 2014
Water Elevation (feet, MSL)
815
810
805
800
795
790
4/15/14
4/19/14
4/23/14
4/27/14
5/1/14
5/5/14
5/9/14
Date-Time from Start of Monitoring
Pump Installation
Constant Rate Test
Producton Test
Meadowbrook 2 (802162)
Meadowbrook 1 (216009)
Methodist Hospital (216067)
MDH, May - 2014

STEP TEST

PROJECT: MEADOWBROOK GOLF COURSE Well # N/A Uniq # 802162

Test By: BRIAN TRAUT Job # 3010588

Meter Reading Beginning: _____

Meter Reading Ending: _____

Well Information: Transducer set at: _____ ft. (From Grade)

Length of Casing: _____

Length of Screen: _____ Hp of Pump: _____

Total Well Depth: _____ Model of Pump: _____

Static Water Level: _____ ft (From Grade)

Well Capacity: _____ GPM @ _____ PWL _____ **G.P.F.D.D.**

Date	Time	AM	PM	GPM	PWL	Sand/Gal	COMMENTS
1/2/2001	12:34	X	X	123	12'3"	4" c/g	This is a sample
5/2/2014	2:45		X	1400	96.47	clear/few grains	
	3:01		X		96.73		
	3:03		X	1700		clear	
	3:07		X		99.47	1/32" c/g clear	
	3:17		X		99.84		
	3:48		X		100.48		
	4:30		X	1700	100.87	1/32" c/g clear	
	4:31		X	SHUT DOWN			
	4:34		X		89.02		
	4:42		X		87.20		
	4:57		X		85.97		

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

NOTE: On RECOVERY need: 5-1 minute checks 2-30 minute checks
5-5 minute checks 1-per hour as needed

Notes:

STEP TEST

PROJECT: MEADOWBROOK GOLF COURSE Well # N/A Uniq # 802162

Test By: BRIAN TRAUT Job # 3010588

Meter Reading Beginning: 66504500

Meter Reading Ending: 66926500

Well Information: Transducer set at: 181.8 ft. (From Grade)

Length of Casing: 260' from grade

Length of Screen: N/A Hp of Pump: 150

Total Well Depth: 465' Model of Pump: AMERICAN MARSH

Static Water Level: 82.2' ft (From Grade)

Well Capacity: 1700 GPM @ 101 PWL 89 **G.P.F.D.D.**

Date	Time	AM	PM	GPM	PWL	Sand/Gal	COMMENTS
1/2/2001	12:34	X	X	123	12'3"	4" c/g	This is a sample
5/2/2014	9:49	X					
	10:30	X		500			
	10:36	X				clear/few grains	
	10:40	X			85.35		
	10:54	X			85.65		
	11:00	X			85.85		
	11:15	X			86.00		
	11:30	X		800	88.70	clear/few grains	
	11:41	X			89.08		
	12:29		X		89.61		
	12:31		X	1100			
	12:35		X		91.46	clear/few grains	
	12:40		X		91.69		
	1:00		X		92.14		
	1:16		X		92.59		
	1:29		X		92.45		
	1:31		X	1400			
	1:35		X		94.96	clear/few grains	
	1:47		X		95.62		
	2:09		X		95.80		
	2:12		X		95.00		
	2:24		X		95.99		
	2:31		X		95.98		
	2:36		X		96.04		

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

NOTE: On RECOVERY need: 5-1 minute checks 2-30 minute checks

5-5 minute checks 1-per hour as needed

Notes:

24-HR TEST PUMP

PROJECT: MEADOWBROOK GOLF COURSE Well # N/A Uniq # 802162

Test By: BRIAN TRAUT Job # 3010588

Meter Reading Beginning: 66926500

Meter Reading Ending: 68535000

Well Information: Transducer set at: 181.8 ft. (From Grade)

Length of Casing: 260'

Length of Screen: N/A Hp of Pump: 150

Total Well Depth: 465 Model of Pump: AMERICAN MARSH

Static Water Level: 82' (From Grade)

Well Capacity: 1100 GPM @ 90.34 PWL 76.55 **G.P.F.D.D.**

Date	Time	AM	PM	GPM	PWL	Sand/Gal	COMMENTS
1/2/2001	12:34	X	X	123	12'3"	4" c/g	This is a sample
5/5/2014	9:00	X					
	9:30	X		1100			
	9:32	X			88.78	clear, few grains fo sand	
	9:40	X			90.04		
	10:10	X					
	10:17	X			91.58		
	11:06	X			92.36		
	3:22		X		93.81		
	11:30		X		95.33		
5/6/2014	8:36	X		1100	96.27		
	9:35	X		SHUT DOWN			
	9:36	X			90.34		
	9:45	X			87.90		

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

NOTE: On RECOVERY need: 5-1 minute checks 2-30 minute checks

5-5 minute checks 1-per hour as needed

Notes:

Minnesota Unique Well No.

802162

County Hennepin
Quad Minneapolis South
Quad ID 104A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 03/26/2014
Update Date 04/21/2014
Received Date

Well Name MEADOWBROOK GOLF COURSE

Township	Range	Dir	Section	Subsections	Elevation
117	21	W	20	DACCAD	893.5 ft.

Elevation Method LiDAR 1m DEM (MNDNR)

Well Depth	Depth Completed	Date Well Completed
465 ft.	465 ft.	

Drilling Method --

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No From Ft. to Ft.

Use Irrigation

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
18 in. to ft.	lbs./ft.	
24 in. to ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
104 ft. from Land surface Date Measured 04/01/2014

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Geological Material	Color	Hardness	From	To

REMARKS
GAMMA, CALIPER, & MULTI TOOL LOGGED 4-1-2014. M.G.S. NO. 5385.
LOGGED FOR COUNTY ATLAS.
0-71 QUUU, 71-81 OPVL, 81-87 OGWD, 87-253 OSTP, 253-375 OPDC, 375-469 CJDN.

Grouting Information Well Grouted? ☐ Yes ☐ No

Located by: Minnesota Geological Survey **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner **Input Date:** 04/02/2014

System: *UTM - Nad83, Zone15, Meters* **X:** 471218 **Y:** 4974638

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Cuttings Yes **Borehole Geophysics** Yes

First Bedrock

Last Strat

Aquifer

Depth to Bedrock ft.

Well Contractor Certification

Mark J Traut Wells, Inc.	1404	BRIAN/JOSH
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report

802162

Printed 5/7/2014
HE-01205-07

Unique Well Number 216009

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2014/03/26
Received Date

Well Name MEADOWBROOK GOLF COURSE

Township	Range	Dir	Section	Subsection	Field Located	
117	21	W	20	DACCDD	MGS	
					Elevation	890.00 ft.

Well and Contact Address MEADOWBROOK GOLF COURSE

ST LOUIS PARK MN Changed

Description	Color	Hardness	From	To (ft.)
COARSE SAND & GRAVEL			0	74
LIMEROCK			74	82
SHALE			82	90
SANDROCK			90	92
SANDROCK			92	190
SHALE	RED		190	200
SANDROCK			200	252
SHAKOPEE DOLOMITE			252	253
SHAKOPEE DOLOMITE			253	375
SANDROCK			375	376
SANDROCK			376	440
SANDROCK & SHALE			440	465
SHALE	GRAY		465	502

Remarks
GAMMA LOGGED 1-13-05 BY JIM TRAEN

First Bedrock OPVL
Last Strat CSTL
Aquifer Multiple
Depth to Bedrock 74.00 ft.

Well Depth 502.00 ft
Depth Completed 502.00 ft
Date Well Completed 1935/06/27

Drillhole Angle

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use Public Supply/non-community

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 12 Depth 257
16.00 in. from 0.00 to 77.00 ft. lbs/ft
12.00 in. from 77.00 to 257.00 ft. lbs/ft

Hole Diameter (in.)
12.0(To 502.0

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 257.0 to 502.0

Static Water Level
55.00 ft. Land surface Date measured 1935/06/27

Pumping Level (below land surface)
ft. after hrs. pumping g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Minnesota Geological Survey MGS

License Business Name **Lic. or Reg No.**

Name of Driller **Date**

Unique Well Number 216067

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2014/04/14
Received Date

Well Name METHODIST HOSPITAL

Township	Range	Dir	Section	Subsection	Field Located	MGS
117	21	W	20	ADACAD	Elevation	890.00 ft.

Well and Contact Address METHODIST HOSPITAL

ST LOUIS PARK MN Changed

Description	Color	Hardness	From	To (ft.)
DRIFT			0	85
PLATTEVILLE LIMESTONE			85	94
ST. PETER SANDSTONE			94	257
PRAIRIE DU CHIEN			257	262
PRAIRIE DU CHIEN			262	368
PRAIRIE DU CHIEN			368	377
JORDAN FORMATION			377	466
ST. LAWRENCE FORMATION			466	485

Remarks

U.S.G.S. W-48 U.S.G.S. W-48 OLD P.A. 66-5517 127104A 1172120ADACA GAMMA LOGGED & TV 2-11-1989.

First Bedrock OSTP
Last Strat CSTL
Aquifer Multiple
Depth to Bedrock 94.00 ft.

Well Depth 485.00 ft
Depth Completed 485.00 ft
Date Well Completed

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use Public Supply/non-community

Casing Type
Drive Shoe? ☐ YES ☐ NO
Diameter 20
Depth 255
20.00 in. from 0.00 to 255.00 ft. lbs/ft

Hole Diameter (in.)

Screen No
Make
Type
Diamter Slot Length Set

Open Hole(ft.) From 255.0 to 485.0

Static Water Level
69.00 ft. Land surface Date measured 1978/06/12

Pumping Level (below land surface)
ft. after hrs. pumping g.p.m.

Wellhead Completion
Pitless adapter manufacturer _____ Model _____
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO

Nearest Known Source of Contamination
_____ feet _____ Direction _____ Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed _____
Manufacture's name _____
Model number _____ HP 0.00 Volts _____
Length of drop pipe _____ Material _____ Capacity _____ g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Mccarthy Well Co. 27022
License Business Name Lic. or Reg No.

Name of Driller Date

MINNESOTA MDH DEPARTMENT OF HEALTH
Environmental Health Division
Drinking Water Protection Section
Source Water Protection Unit
P.O. Box 64975
St. Paul, Minnesota 55164-0975

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

Public Water Supply ID:	12070050	PWS Name:	City of St. Louis Park, MN

Contact Information for Person Completing this Form

Name:	Erik J. Tomlinson, PG
Address:	Source Water Solutions, LLC
	221 McCarron St.
City, State, Zip:	St. Paul, MN 55113
Phone, Fax, e-mail:	Phone: 612.701.7343 Email: erik@sourcewater-solutions.com

Aquifer Properties Determination Methods

- [x] 1) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- [ ] 2) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- [ ] 3) A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). A test plan must be approved before conducting the test.
- [ ] 4) A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). A test plan must be approved before conducting the test.
- [ ] 5) An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- [ ] 6) Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- [x] 7) An existing published transmissivity value.

- Include all test data and analysis documentation with the estimated transmissivity, ft^2/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
- Attach detailed aquifer test plan for methods 3 or 4.

Submitted by:	Erik J. Tomlinson, PG	Prof. License:	PG46739	Date:	12/29/2014

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).

Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, **or** 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

Aquifer Name:	CMTS	☑ Confined	☐ Unconfined	☐ Fractured Rock

The attached aquifer test for St. Louis Park Well 11 (Unique ID: 206439) (**Attachment 1**) was completed by SEH in 2003 and approved by the MDH for use in St. Louis Park's original WHPP. Although there were issues with the pumping phase of the test, the test recovery phase yielded representative data. Analysis of the recovery phase of Municipal Well 17, using the Theis (1935) solution, yielded a transmissivity value of 1,970 ft2/day and a storativity value of 0.00017.

The thickness of the CMTS aquifer at St. Louis Park Well 17 is 263 feet. A starting Kh of 7.49 ft/day and Kv of 0.749 for the CMTS aquifer is proposed.

Proposed New Test Information Summary

Pumped Well Name (Unique Number):	206439 (St. Louis Park Well 11)	**Test Duration (Hours):**	48 hours pumping, 48 recovery
Location: X, Y (meters) UTM-Z15N or Lat-Lon (decimal degrees) datum: NAD83	UTM-Z15N X: 471027 Y: 4977590	**Pump Type:**	NA
		Discharge Rate:	1,184-1,368 gpm (1,200 avg)
Number of Observation Wells:	1 (St. Louis Park 17)	**Flow Rate Measuring Device Type:**	Electronic Flow Meter

- A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

206439 (Well 11)	203187 (Well 16)				
206456 (Well 12)					
206424 (Well 13)					
227965 (Well 14)					
215447 (Well 15)					

Reviewed by:	**Approved:** ◯ Yes ◯ No	**Approval Date:**

Analysis of the Minnetonka #6A (208021) Pumping Test
August 15, 1994
Confined Prairie du Chien - Jordan Aquifer

Introduction

The MDH was requested to assist in the delineation of wellhead protection areas by the City of Minnetonka, Minnesota, around the public water supply wells serving the community. An important part of the delineation process is to determine aquifer properties at the well site as accurately as possible. This is normally accomplished by performing a pumping test. Because of the need to test most public water supply wells, the MDH agreed to help with the pumping test as a part of technical assistance for communities, and program and staff development.

The pumping test conducted by the MDH at Minnetonka #6A was conducted as described below. The only problem in conducting the test was that data from the first three minutes of the recovery period were lost. The results were analyzed using standard nonequilibrium and semisteady-state methods, cited in references. Data plots are included in Appendix 1 and test results are summarized on Table 1. The analysis shows that the aquifer responds as generally expected from the geologic setting.

Description of the Test

One nearby public supply well, #6 (204054), was used as a monitoring point for this test because there was no access to the pumped well for water level measurements. There were no other nearby wells to cause well interference for this test. All wells were turned off at 12:00 on August 12, 1994, providing a sixty-eight hour resting period before the start of the test. A pressure transducer was placed in Well 6A at this time to obtain background readings.

The test started at 08:40 on August 15, 1994. Well #6A was pumped at an average rate of 1000 gallons per minute. The flowmeter on the well was not used because the flowmeter data was recorded electronically and displayed at the Minnetonka City public works offices.

The pump was turned off at 08:50 on August 16, 1994 to start the recovery period. The recovery was extended to 16:43 on August 17th and about 90 percent of full recovery was obtained.

Summary of Results

A transmissivity value of 2,400 ft^2/day and a storativity value of 0.000015 are chosen as being representative of aquifer properties in the area of the well field for the capture zone analysis.

The results are also consistent with the conceptual model of a confined aquifer receiving water from adjacent leaky layers.

Problems with the Analysis

None of the problems that occurred during this test affected the analysis and the analysis is quite straight forward.

References:

Jacob, C. E. and Lohman, S. W., (1952) Nonsteady Flow to a Well of Constant Drawdown in an Extensive Aquifer. Trans. American Geophysical Union, Vol. 33, No. 4, August. 1952. pp. 559-69.

Theis, C. V., (1935) The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage, Trans. American Geophysical Union, 16th Annual Meeting, April. 1935. pp. 519-24.

Table 1.

Minnetonka #6A Pumping Test
August 15, 1994

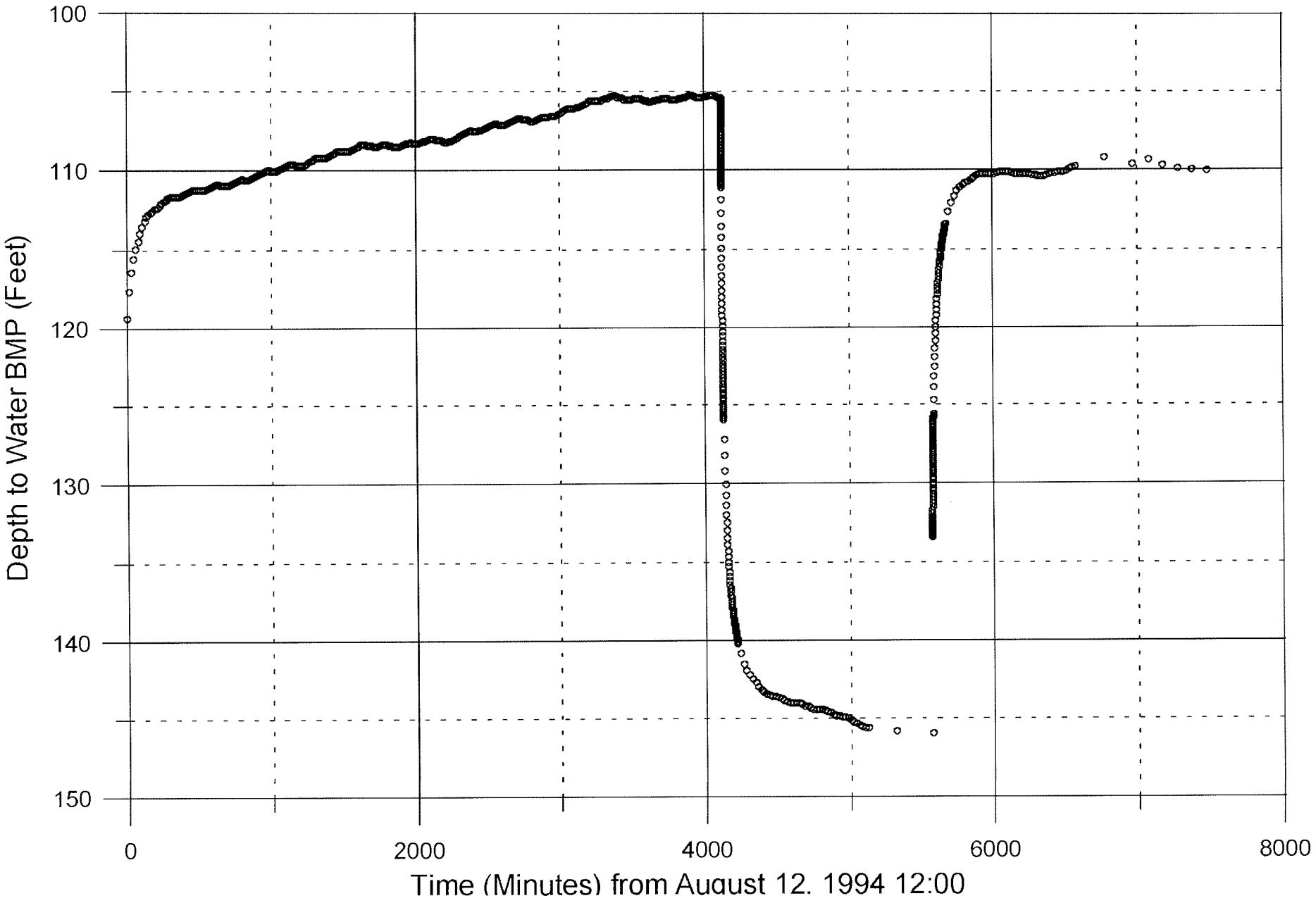
	Transmisivity T (gpd/ft)	Storage Coefficient S	Time Period Emphasized	Analysis Method
	---	---	---	---
Pumping Well #6A (208012)	No data			
Observation Wells				
#6 (204054)	2,360	0.000015	Early Pumping	Theis
	11,800		Late Pumping	Jacob
	2,510	0.000015	Early Recovery	Theis
	5,430		Late Recovery	Jacob t/t'

Representative aquifer values are best shown by the early pumping and recovery value from the observation well, giving an average T of 2,400, S of 0.000015, and r/B of 0.07.

Appendix 1.

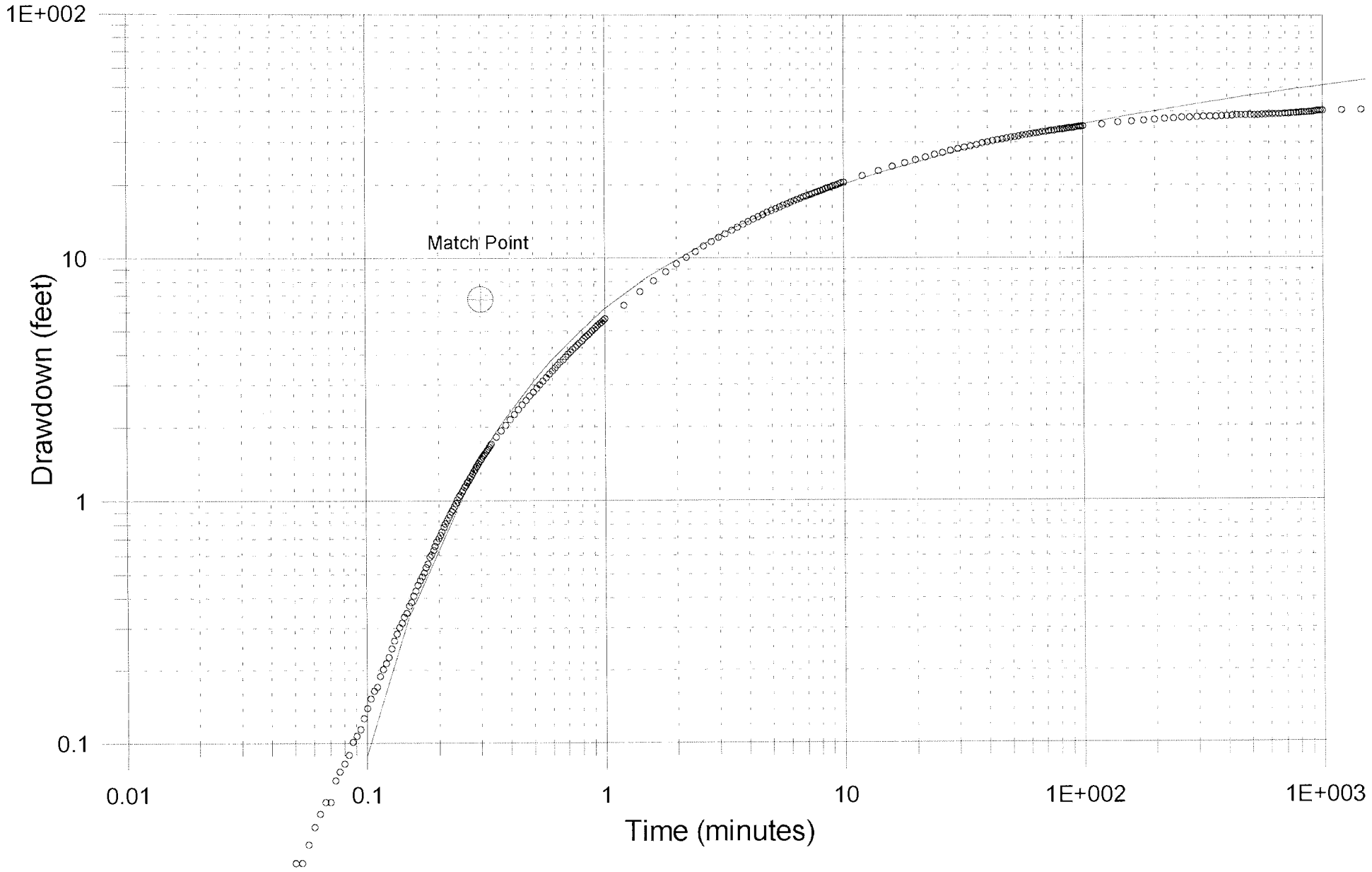
Graphical Analysis

Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994



Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994
Pumping Data

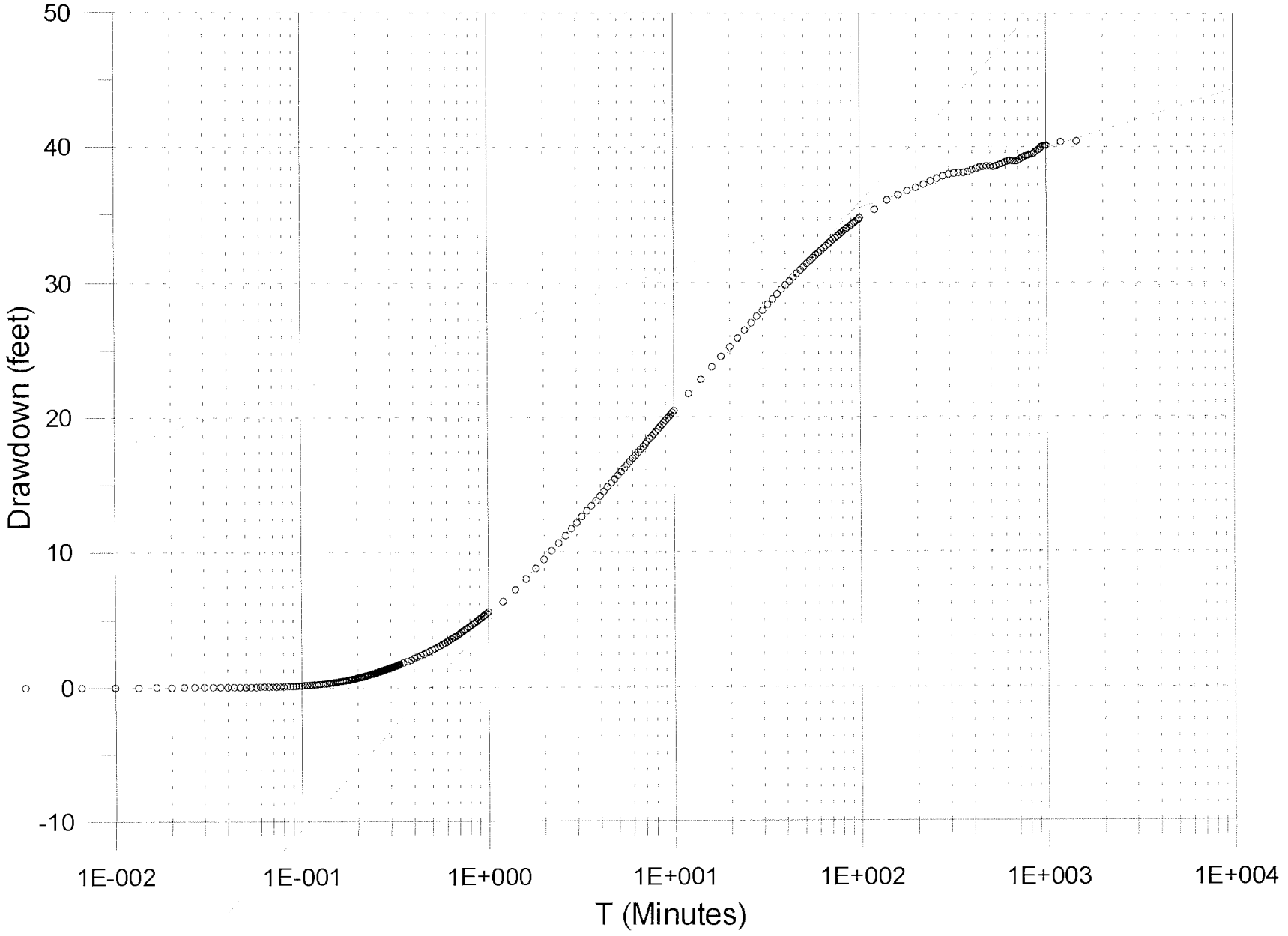
T = 15.32 1000 1/ 6.5 = 2,360 ft^2/day
S = 2,360 0.3 1 / (359)^2 360 = 0.000015

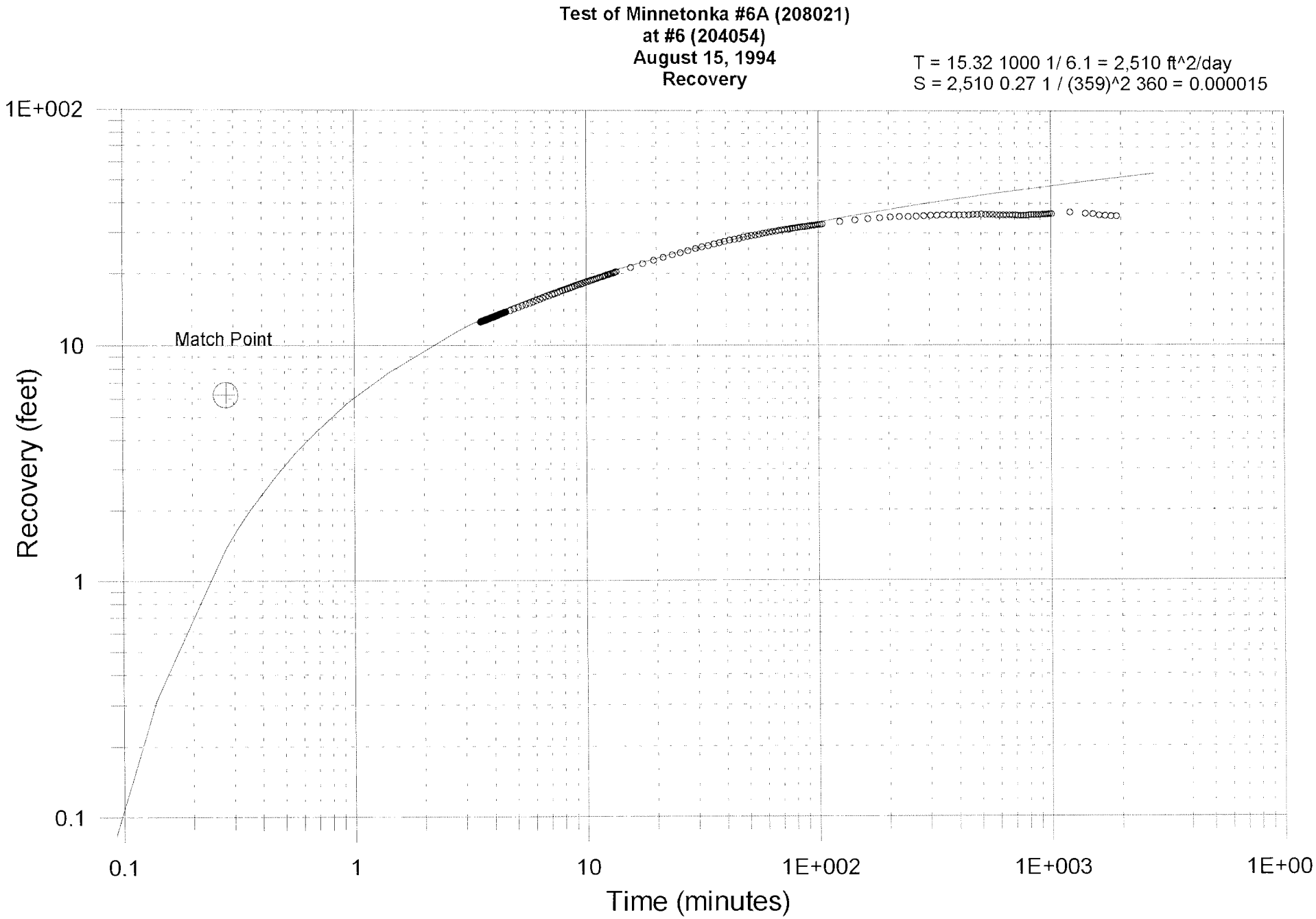


Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994
Pumping

T1 = 35.3 1000 / 15.7 = 2,250 ft^2/day
S1 = 2,250 0.5 / 359^2 640 = 0.00013

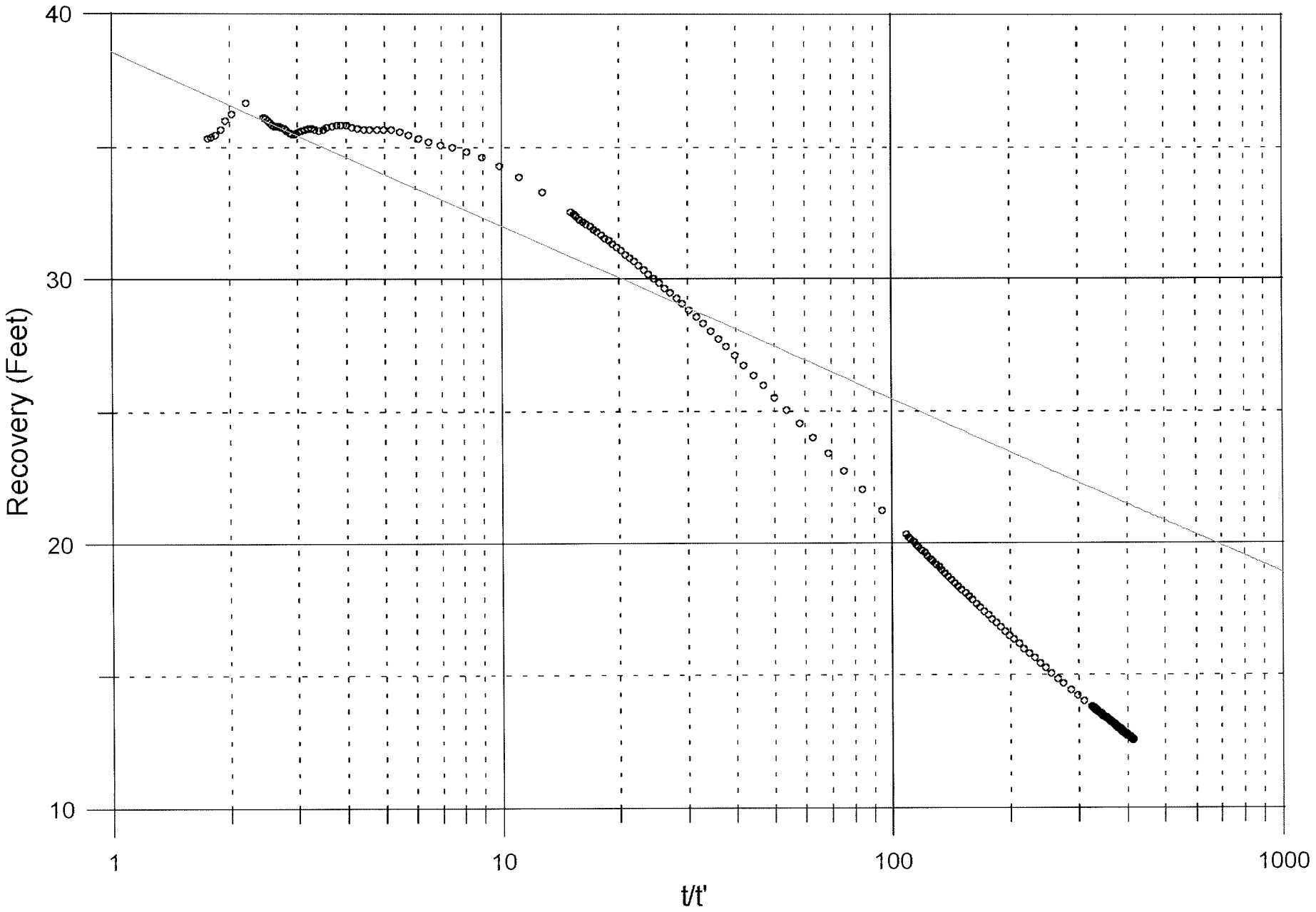
T2 = 35.3 1000 / 3 = 11,800 ft^2/day




Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994
Recovery
T = 15.32 1000 1/ 6.1 = 2,510 ft^2/day
S = 2,510 0.27 1 / (359)^2 360 = 0.000015
Match Point
Recovery (feet)
1E+002
10
1
0.1
0.1
1
10
1E+002
1E+003
1E+00
Time (minutes)

Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994

T = 35.3 1000 / 6.5 = 5,430 ft^2/day



Unique No. 00208012

County Name Hennepin

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2005/06/22

Entry Date 1991/08/24

Township Name	Township	Range	Dir	Section	Subsection
	117	22	W	12	CDCBCD

Well Depth	Depth Completed	Date Well Completed
486 ft.	486 ft.	1967/07/00

Well Name MINNETONKA 6A

Drilling Method

Contact's Name MINNETONKA 7
10701 CEDAR LAKE RD
MINNETONKA MN

Drilling Fluid

Well Hydrofractured? Yes No
From ft. to ft.

Use Community Supply (municipal)

Casing **Drive Shoe?** Yes No

Hole Diameter

Casing Diameter **Weight(lbs/ft)**

24 in. to 114 ft.
20 in. to 315 ft.
16 in. to 341 ft.

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
DRIFT			0	104
SHALE			104	112
LIMEROCK			112	121
SHALE			121	136
SANDROCK		SOFT	136	248
SHALE			248	261
SANDROCK			261	304
SHAKOPEE BROKEN			304	315
SHAKOPEE SANDY			315	392
JORDAN SANDROCK			392	485
SHALE			485	486

Screen **Open Hole** From ft. to ft.

Make Type

Static Water Level 86 ft. from Land surface Date 1967/07/00

PUMPING LEVEL (below land surface)

157 ft. after hrs. pumping 1571 g.p.m.

Well Head Completion

Pitless adapter mfr Model
Casing Protection 12 in. above grade
At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? Yes No

Nearest Known Source of Contamination

ft. direction. type

Well disinfected upon completion? Yes No

Pump Not Installed Date Installed

Mfr name
Model HP 0 Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? Yes No

Was a variance granted from the MDH for this Well? Yes No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

CASING: 024 TO 0114;020 TO 0315;016 TO 0341;012 TO 0397.

USGS Quad: Hopkins Elevation: 912
Aquifer: CJDN Alt Id: 79-6207

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012

License Business Name
Name of Driller

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00204054

County Name Hennepin

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2004/12/29

Entry Date 1991/08/24

Township Name	Township	Range	Dir	Section	Subsection
	117	22	W	12	CDCBDB

Well Depth		Depth Completed		Date Well Completed
488	ft.	488	ft.	1967/06/00

Well Name MINNETONKA 6

Contact's Name MINNETONKA 6
10701 CEDAR LAKE RD
MINNETONKA MN

Drilling Method

Drilling Fluid

Well Hydrofractured? Yes No

From ft. to ft.

Use Community Supply (municipal)

Casing **Drive Shoe?** Yes No

Hole Diameter

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
DRIFT			0	101
LIMEROCK			101	117
SHALE			117	133
SANDROCK		SOFT	133	248
SHALE			248	261
SANDROCK		SOFT	261	310
SHAKOPEE BROKEN			310	322
SHAKOPEE SANDY			322	392
JORDAN		SOFT	392	435
JORDAN SHALE			435	442
JORDAN			442	486
SHALE			486	488

Casing Diameter **Weight(lbs/ft)**

24	in. to	103	ft.	
23	in. to	52	ft.	
19	in. to	165	ft.	
0	in. to	394	ft.	

Screen

Make Type

Open Hole From ft. to ft.

Static Water Level 90 ft. from Land surface Date 1967/06/00

PUMPING LEVEL (below land surface)

160 ft. after 2 hrs. pumping 2103 g.p.m.

Well Head Completion

Pitless adapter mfr Model

Casing Protection 12 in. above grade

At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? Yes No

Nearest Known Source of Contamination

ft. direction. type

Well disinfected upon completion? Yes No

Pump Not Installed Date Installed

Mfr name

Model HP 0 Volts

Drop Pipe Length ft. Capacity g.p.m

Type

Any not in use and not sealed well(s) on property? Yes No

Was a variance granted from the MDH for this Well? Yes No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

16" CASING FROM 312' TO 394'.

CASING: 024 TO 0103;020 TO 0320;016 TO 0394.

CASING: 026 TO 0103;020 TO 0320;016 TO 0394.

USGS Quad: Hopkins Elevation: 915

Aquifer: CJDN Alt Id: 79-6207

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012

License Business Name

Name of Driller

Report Copy

Unique No. 00204054	MINNESOTA DEPARTMENT OF HEALTH	Update Date 2004/12/29
County Name Hennepin	**WELL AND BORING RECORD**	Entry Date 1991/08/24
	Minnesota Statutes Chapter 1031	

Township Name	Township	Range	Dir	Section	Subsection	Well Depth		Depth Completed		Date Well Completed
	117	22	W	12	CDCBDB	488	ft.	488	ft.	1967/06/00

Well Name MINNETONKA 6 **Lic. Or Reg. No.** 62012 **Name of Driller**

USGS Quad Hopkins **Elevation** 915 **Aquifer** CJDN **Alternative Id** 79-6207

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
DRIFT			0	101	QUUU	DRFT		
QUUU = Unknown deposit type	DRFT = Drift							
LIMEROCK			101	117	OPVL	LMSN		
OPVL = Platteville	LMSN = Limestone							
SHALE			117	133	OGWD	SHLE		
OGWD = Glenwood	SHLE = Shale							
SANDROCK		SOFT	133	248	OSTP	SNDS		
OSTP = St.Peter	SNDS = Sandstone							
SHALE			248	261	OSTP	SHLE		
OSTP = St.Peter	SHLE = Shale							
SANDROCK		SOFT	261	310	OSTP	SNDS		
OSTP = St.Peter	SNDS = Sandstone							
SHAKOPEE BROKEN			310	322	OPDC	DLMT		
OPDC = Prairie Du Chien Group	DLMT = Dolomite							
SHAKOPEE SANDY			322	392	OPDC	DLMT		
OPDC = Prairie Du Chien Group	DLMT = Dolomite							
JORDAN		SOFT	392	435	CJDN	SNDS		
CJDN = Jordan	SNDS = Sandstone							
JORDAN SHALE			435	442	CJDN	SHLE		
CJDN = Jordan	SHLE = Shale							
JORDAN			442	486	CJDN	SNDS		
CJDN = Jordan	SNDS = Sandstone							
SHALE			486	488	CSTL	SHLE		
CSTL = St.Lawrence	SHLE = Shale							

Unique No. 00208012	MINNESOTA DEPARTMENT OF HEALTH	Update Date 2005/06/22
County Name Hennepin	**WELL AND BORING RECORD**	Entry Date 1991/08/24
	Minnesota Statutes Chapter 1031	

Township Name	Township	Range	Dir	Section	Subsection	Well Depth		Depth Completed		Date Well Completed
	117	22	W	12	CDCBCD	486	ft.	486	ft.	1967/07/00

Well Name MINNETONKA 6A **Lic. Or Reg. No.** 62012 **Name of Driller**

USGS Quad Hopkins **Elevation** 912 **Aquifer** CJDN **Alternative Id** 79-6207

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
DRIFT			0	104	QUUU	DRFT		
QUUU = Unknown deposit type	DRFT = Drift							
SHALE			104	112	OPVL	SHLE	LMSN	
OPVL = Platteville	SHLE = Shale				LMSN = Limestone			
LIMEROCK			112	121	OPVL	LMSN		
OPVL = Platteville	LMSN = Limestone							
SHALE			121	136	OGWD	SHLE		
OGWD = Glenwood	SHLE = Shale							
SANDROCK		SOFT	136	248	OSTP	SNDS		
OSTP = St.Peter	SNDS = Sandstone							
SHALE			248	261	OSTP	SHLE		
OSTP = St.Peter	SHLE = Shale							
SANDROCK			261	304	OSTP	SNDS		
OSTP = St.Peter	SNDS = Sandstone							
SHAKOPEE BROKEN			304	315	OPDC	DLMT		
OPDC = Prairie Du Chien Group	DLMT = Dolomite							
SHAKOPEE SANDY			315	392	OPDC	DLMT		
OPDC = Prairie Du Chien Group	DLMT = Dolomite							
JORDAN SANDROCK			392	485	CJDN	SNDS		
CJDN = Jordan	SNDS = Sandstone							
SHALE			485	486	CSTL	SHLE		
CSTL = St.Lawrence	SHLE = Shale							

"Djerrari, Amal (MDH)"
<Amal.Djerrari@state.mn.us>
05/10/2010 08:59 AM

To Erik Tomlinson <etomlinson@sehinc.com>
cc
bcc
Subject Jordan T

For Follow Up: Normal Priority
History: This message has been forwarded.

Hi Erik
Here is the aquifer test report for Minnetonka Well 7 (6A in the report). Although the report says that the aquifer is the Prairie du Chien/Jordan, in fact both wells (6 and 7) are open to the Jordan only. I think you could use this value for the Jordan.
I had a look at your minutes. They look good, except that you did not mention the calibration. You should look at how the model represents heads in observation wells at the regional level, but more importantly verify the calibration at the local level.
I checked also the refinement that Barr did. They used the refine grid command in GWV, using a spacing of 20 m as a base. You can do the same and use a 1.35 ratio for adjacent cells.
Let me know if you have any question.
Amal


mtka_aquifer_test.pdf

Appendix D

Model Files (CD)

Appendix E

GIS Shapefiles (CD)

Appendix F

Vulnerability Assessments

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #10 UNIQUE WELL #: 00206442

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 8 QUARTERS: DCDB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1955	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	316	5
Well Depth	:	500	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	800	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4 08/14/1991	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		15
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS

Very low rating is based on the presence of the Glenwood and St. Peter confining layers. Drift rating is L-2. VULNERABLE RATING BASED ON TRITIUM DATA FROM OTHER CITY WELLS.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #11 UNIQUE WELL #: 00206439

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 8 QUARTERS: DCDB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Mt. Simon	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	14	
Geologic Data From	:	Well Record	
Year Constructed	:	1960	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	880	0
Well Depth	:	1093	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			NOT VULNERABLE
Surface Water Characteristics?			NOT VULNERABLE
Maximum nitrate detected	:	.1 01/15/1987	NOT VULNERABLE
Maximum tritium detected	:	<.8 07/23/2009	NOT VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	A	-20
Wellhead Protection Score	:		-5
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #12 UNIQUE WELL #: 00206456

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 21 QUARTERS: CDBD

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Mt. Simon	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	12	
Geologic Data From	:	Well Record	
Year Constructed	:	1965	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	900	0
Well Depth	:	1095	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			NOT VULNERABLE
Surface Water Characteristics?			NOT VULNERABLE
Maximum nitrate detected	:	<.4 04/12/1990	NOT VULNERABLE
Maximum tritium detected	:	<.8 12/17/2009	NOT VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	A	-20
Wellhead Protection Score	:		-5
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #13 UNIQUE WELL #: 00206424

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 4 QUARTERS: CCDA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Mt. Simon	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	14	
Geologic Data From	:	Well Record	
Year Constructed	:	1964	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	891	0
Well Depth	:	1045	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4 04/12/1990	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	A	-20
Wellhead Protection Score	:		-10
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #14 UNIQUE WELL #: 00227965

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 4 QUARTERS: CCDA

CRITERIA		DESCRIPTION		POINTS
Aquifer Name(s)	:	Jordan		
DNR Geologic Sensitivity Rating	:	Low		20
L Score	:	1		
Geologic Data From	:	Data Inferred From Nearby Wells		
Year Constructed	:	1964		
Construction Method	:	Cable Tool/Bored		0
Casing Depth	:	389		5
Well Depth	:	485		
Casing grouted into borehole?		Yes		0
Cement grout between casings?		Yes		0
All casings extend to land surface?		No		10
Gravel - packed casings?		No		0
Wood or masonry casing?		No		0
Holes or cracks in casing?		Unknown		0
Isolation distance violations?				0
Pumping Rate	:	1000		10
Pathogen Detected?				0
Surface Water Characteristics?				0
Maximum nitrate detected	:	<.4 04/12/1990		0
Maximum tritium detected	:	10.1		VULNERABLE
Non-THMS VOCs detected?		cis-1,2-Dichloroethene	06/06/1992	VULNERABLE
		Trichloroethene (TCE)	06/06/1992	
		trans-1,2-Dichloroethene	06/06/1992	
Pesticides detected?				0
Carbon 14 age	:	M		0
Wellhead Protection Score	:			45
Wellhead Protection Vulnerability Rating	:			VULNERABLE
Vulnerability Overridden	:			

COMMENTS
L score is taken from the geologic log of city well # 13.

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #15 UNIQUE WELL #: 00215447

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 8 QUARTERS: DCDB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan-St. Lawrence	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	0	
Geologic Data From	:	Data Inferred From Nearby Wells	
Year Constructed	:	1969	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	402	0
Well Depth	:	503	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<1 08/01/1975	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS

Very low rating is based on the presence of the Glenwood and St. Peter confining layers. VULNERABLE BASED ON TRITIUM DATA FROM OTHER CITY WELLS.

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #16 UNIQUE WELL #: 00203187

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 7 QUARTERS: BBAA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1973	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	425	0
Well Depth	:	500	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			NOT VULNERABLE
Surface Water Characteristics?			NOT VULNERABLE
Maximum nitrate detected	:	.06 07/18/2006	NOT VULNERABLE
Maximum tritium detected	:	3 12/17/2009	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		10
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS

Very low rating is based on the presence of the Glenwood and St. Peter confining layers. Drift score is L-2. VULNERABLE RATING BASED ON TRITIUM DATA FROM OTHER CITY WELLS.

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #3 UNIQUE WELL #: 00206440

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 8 QUARTERS: DCDB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	St. Peter	
DNR Geologic Sensitivity Rating	:	High	0
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1939	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	103	10
Well Depth	:	286	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	900	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<1 08/01/1975	0
Maximum tritium detected	:	1.3 07/23/2009	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		25
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS
High score is based on the well is cased only to the top of the Platteville and open hole into the St. Peter.

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #4 UNIQUE WELL #: 00200542

COUNTY: Hennepin TOWNSHIP NUMBER: 28 RANGE: 24 W SECTION: 7 QUARTERS: BDAD

CRITERIA		DESCRIPTION		POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan		
DNR Geologic Sensitivity Rating	:	Very low		0
L Score	:	0		
Geologic Data From	:	Well Record		
Year Constructed	:	1946		
Construction Method	:	Cable Tool/Bored		0
Casing Depth	:	304		5
Well Depth	:	503		
Casing grouted into borehole?		Yes		0
Cement grout between casings?		Yes		0
All casings extend to land surface?		Yes		0
Gravel - packed casings?		No		0
Wood or masonry casing?		No		0
Holes or cracks in casing?		Unknown		0
Isolation distance violations?				0
Pumping Rate	:	900		10
Pathogen Detected?				0
Surface Water Characteristics?				0
Maximum nitrate detected	:	.31 04/16/2013		0
Maximum tritium detected	:	Unknown		0
Non-THMS VOCs detected?		Vinyl chloride	11/02/1996	VULNERABLE
Pesticides detected?				0
Carbon 14 age	:	Unknown		0
Wellhead Protection Score	:			15
Wellhead Protection Vulnerability Rating	:			VULNERABLE
Vulnerability Overridden	:			Jim Walsh

COMMENTS
Very low score is based on the presence of the Glenwood and basal St. Peter confining layers. VULNERABLE BASED ON TRITIUM DATA FROM OTHER CITY WELLS.

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #6 UNIQUE WELL #: 00206457

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 21 QUARTERS: CDBD

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	1	
Geologic Data From	:	Well Record	
Year Constructed	:	1948	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	303	5
Well Depth	:	482	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4 04/12/1990	0
Maximum tritium detected	:	9.5 12/17/2009	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		15
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS
Very low rating is based on the presence of the Glenwood and basal St.Peter confining layers. Previous tritium result of 8.0 TU on 12/17/1991.

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MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1270050 TIER: 2
SYSTEM NAME: Saint Louis Park WHP RANK:
WELL NAME: Well #8 UNIQUE WELL #: 00203678

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 22 W SECTION: 1 QUARTERS: DACD

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	10
L Score	:	10	
Geologic Data From	:	Well Record	
Year Constructed	:	1955	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	314	5
Well Depth	:	507	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4 04/12/1990	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		30
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS

Appendix G

Fracture Flow Calculations

Well 16

Description	Inflow	Outflow	
Xmin	493.23	24.69	
Xmax	472.52	12.93	
Y top	626.81	10.18	
Y bottom	448.78	38.74	
Z top	612.24	0.00	
Z bottom	64.29	1.41	
Recharge	0.00	0.00	
ET	0.00	0.00	
Constant Head	0.00	0.00	
River	0.00	0.00	
Lake	0.00	0.00	
Drain	0.00	0.00	
GHB	0.00	0.00	
Well	490.81	3,121.63	2,630.82
Stream	0.00	0.00	
Storage	0.00	0.00	
TOTAL	3,208.68	3,209.58	
ERROR	-0.03		
% from OPDC		19.61%	23.27%

Well 14

Description	Inflow	Outflow
Xmin	893.37	0.00
Xmax	407.01	269.95
Y top	797.99	0.00
Y bottom	603.26	180.10
Z top	863.38	0.00
Z bottom	65.98	0.91
Recharge	0.00	0.00
ET	0.00	0.00
Constant Head	0.00	0.00
River	0.00	0.00
Lake	0.00	0.00
Drain	0.00	0.00
GHB	0.00	0.00
Well	0.00	3,181.06
Stream	0.00	0.00
Storage	0.00	0.00
TOTAL	3,631.00	3,632.02
ERROR	-0.03	
% from OPDC		27.14%

Well# = 10
X = 470,979.000, Y = 4,977,506.000

5 Year Pumping Volume (1825 days)

Pumping Volume (Q):	2,938.50	m3/day	103,772.15	cu.ft./day	539.076	gal./min.	776,269.57 gal./day
Water Producing Zone Thickness (L):	36.271	m	119	ft.			
Effective Porosity (n):	0.056						
Original (Calculated) Radius:	916.736	m	3,007.67	ft.			

1st Bearing from Well = 310° from North.

2nd Bearing from Well = 320° from North.

Well# = 4
X = 473,203.000, Y = 4,975,132.000

5 Year Pumping Volume (1825 days)

Pumping Volume (Q):	5,061.00	m3/day	178,727.53	cu.ft./day	928.455	gal./min.	1,336,974.75 gal./day
Water Producing Zone Thickness (L):	36.881	m	121	ft.			
Effective Porosity (n):	0.056						
Original (Calculated) Radius:	1,193.11	m	3,914.40	ft.			

1st Bearing from Well = 310° from North.

2nd Bearing from Well = 320° from North.

Well# = 8
X = 468,215.000, Y = 4,979,510.000

5 Year Pumping Volume (1825 days)

Pumping Volume (Q):	5,465.70	m3/day	193,019.37	cu.ft./day	1,002.70	gal./min.	1,443,885.18 gal./day
Water Producing Zone Thickness (L):	33.528	m	110	ft.			
Effective Porosity (n):	0.056						
Original (Calculated) Radius:	1,300.41	m	4,266.45	ft.			

1st Bearing from Well = 315° from North.

2nd Bearing from Well = 325° from North.

Well# = 14
X = 471,881.000, Y = 4,979,130.000

5 Year Pumping Volume (1825 days)

Pumping Volume (Q):	863.4	m3/day	30,490.68	cu.ft./day	158.393	gal./min.	228,086.15 gal./day
Water Producing Zone Thickness (L):	33.528	m	110	ft.			
Effective Porosity (n):	0.056						
Original (Calculated) Radius:	516.85	m	1,695.70	ft.			

1st Bearing from Well = 300° from North.

2nd Bearing from Well = 310° from North.

Unique Well# = 8
X = 468,215.000, Y = 4,979,510.000

5 Year Pumping Volume (1825 days)

Pumping Volume (Q):	5,465.70	m3/day	193,019.37	cu.ft./day	1,002.70	gal./min.	1,443,885.18 gal./day
Water Producing Zone Thickness (L):	33.528	m	110	ft.			
Effective Porosity (n):	0.056						
Original (Calculated) Radius:	1,300.41	m	4,266.45	ft.			
New Radius:	1,358.89	m	4,458.29	ft.			

Unique Well# = 16
X = 468,730.000, Y = 4,978,917.000

5 Year Pumping Volume (1825 days)

Pumping Volume (Q):	612.24	m3/day	21,621.05	cu.ft./day	112.317	gal./min.	161,736.70 gal./day
Water Producing Zone Thickness (L):	40.843	m	134	ft.			
Effective Porosity (n):	0.056						
Original (Calculated) Radius:	394.333	m	1,293.74	ft.			
New Radius:	394.333	m	1,293.74	ft.			

OVERLAP SUMMARY INFORMATION

Original (Calculated) Area for Well# :	5,312,671.94	m2	57,185,069.44	sq.ft.
New Area for Well# :	5,801,185.69	m2	62,443,382.63	sq.ft.
Original (Calculated) Area for Well# :	488,513.75	m2	5,258,313.19	sq.ft.
New Area for Well# :	488,513.75	m2	5,258,313.19	sq.ft.
Overlap Area to Well# :	488,513.75	m2	5,258,313.19	sq.ft.
Overlap Area to Well# :	0	m2	0	sq.ft.
Total Overlap Area:	488,513.75	m2	5,258,313.19	sq.ft.

UP-GRADIENT EXTENSION (UGE)
(area beyond the New Areas of both Wells)
(area beyond the New Areas of both Wells)
Bearing from Well# = 320° from North +/- 10°.
Bearing from Well# = 320° from North +/- 10°.

Up-Gradient Extension Area:	7,115,784.19	m2	76,593,589.40	sq.ft.

Wetland Management Plan

City of St. Louis Park Wetland Management Plan

Prepared for:

City of St. Louis Park

WSB

City of St. Louis Park

Wetland Management Plan

August 13, 2001

Prepared by:

WSB & Associates, Inc.
4150 Olson Memorial Highway
Minneapolis, MN 55422
(763)541-4800

TABLE OF CONTENTS

I. Executive Summary

Wetlands provide many benefits and, as such, are important resources to a community. They provide critical habitat for many types of birds, mammals, amphibians, reptiles, invertebrates, and plants. Wetlands can also act to improve water quality and provide water quantity control by storing water during storm events. Wetlands allow for groundwater interactions, whether it be recharge or discharge. Additionally, wetlands provide aesthetic value, nature observation areas, and areas for education and scientific research. Because of the importance of wetlands and the role wetlands play within a community, they must be considered during development review and city-wide planning in order to balance protection for these wetlands and development and growth of the city.

Section II provides the introduction and purpose of the Wetland Management Plan (WMP). It includes a description of existing resources, a discussion of the development within the City, and outlines the intent of this Plan. The WMP encompasses wetlands within the City that have been identified on the National Wetland Inventory (NWI).

Section III discusses the regulatory framework for wetlands. This section provides information of the role of the Minnehaha Creek Watershed District and Bassett Creek Watershed Management Organization as the Local Government Unit (LGU) for the Wetland Conservation Act and also provides a brief overview of other agency jurisdiction over wetlands, including the Department of Natural Resources (DNR), U.S. Corps of Engineers, the Minnesota Pollution Control Agency (MPCA).

The methods used to inventory and classify the wetlands within the City of St. Louis Park are contained in **Section IV**. The Minnesota Routine Assessment Method (MnRAM) version 2.0 (**Appendix B**) was used to identify the functions and values of the wetlands. This section also outlines the Circular 39 and Cowardin method of wetland classification. Wetlands within St. Louis Park were classified using both methods. No wetlands were delineated as part of these procedures.

Section V provides the results of the wetland inventory and assessment and provides classification of the wetlands. Wetland Types 2, 3, 4, and 5 are represented within the City of St. Louis Park. All of these wetlands receive stormwater from the storm sewer system. Detailed information about each wetland is included in **Appendix C.**

Section VI provides information on enforcement, appeals, and the amendment procedure for this Plan.

II. Introduction and Purpose

A. Description of Existing Resources

The City of St. Louis Park is located in the southeast quadrant of Hennepin County. There are approximately 38 wetlands within the City. All known National Wetland Inventory (NWI) wetlands within the City were evaluated with the exception of those areas where permission to access the site was either not granted or the site could not be accessed due to safety issues.

Wetlands and other natural resources of special interest exist within the City of St. Louis Park. These include Minnehaha Creek, Twin Lake, Bass Lake, and Westwood Lake. Westwood Lake is located within the Westwood Nature Center, an environmental education facility. A more detailed description of the City's existing resources can be reviewed in the Comprehensive Water Resource Management Plan.

B. Extent of Development

The City of St. Louis Park is fully developed and as such, most of the wetlands receive directed stormwater. Due to the fully developed nature of the City, little space is available to pretreat stormwater prior to discharge to wetlands. However, as areas redevelop, it is the intent of the City to provide pretreatment as feasible as outlined by the functions and values of the wetlands.

C. Intent of plan

The intent of the City of St. Louis Park WMP is to provide a means for the City to manage its wetlands. This plan provides guidelines for wetland management and assistance with Wetland Conservation Act. By evaluating the functions and values of wetlands, the City can more effectively evaluate the impact of redevelopment on the resource and the potential for restoration of wetland functions and values. This plan is not intended to replace rules or policies of the Watershed Districts.

III. Existing Regulatory Framework

The current regulatory framework for wetlands in Minnesota involves a variety of agencies. These agencies include the Department of Natural Resources (DNR), U.S. Corps of Engineers, and Watershed Districts. A brief discussion of the regulatory agencies and their jurisdiction is outlined below:

A. Department of Natural Resources

Public Waters and Wetlands are those that are regulated by the Minnesota Department of Natural Resources (DNR) at and below the ordinary high water level (OHW). The location of these wetlands can be found on the DNR Protected Waters and Wetland Maps. Any water appropriation from or impact to a public water may require a permit from the DNR. The DNR Protected Waters and Wetlands are shown in **Appendix C**. The DNR Area Hydrologist can be contacted for more information on DNR regulations at (651) 772-7910.

B. U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers regulates the discharge of dredged or fill materials to wetlands and other water bodies through Section 404 of the Clean Water Act. Any impact, including filling, draining, or excavation, may require a permit from the Corps. Wetland delineations are also subject to U.S. Corps of Engineer approval. The area regulatory branch can be contacted for additional information of the Corps regulations at (651) 290-5375. Depending on the size and extent of the wetland impact, the Corps may involve the Minnesota Pollution Control Agency (MPCA). The MPCA can be contacted to obtain more information at (651) 296-8852.

GP/LOP-98MN

The GP/LOP-98-MN replaces all Nationwide Permits (NWPs) under Section 404 of the Clean Water Act within Minnesota. The GP/LOP-98-MN went into effect on January 31, 2000. The intent of this permit it to create a more streamlined procedure by which projects will be covered under a General Permit (GP) or Letter of Permission (LOP). The MPCA has provided 401 certification for most of the GP/LOP-98-MN permit with a few exceptions.

The GPs are intended to be non-reporting and cover the following projects:

- Projects that impact 400 sf or less of wetland

- Projects that impact 1/3 acre or less of wetland for maintenance activities
- Projects that are currently eligible for authorization under some Corps existing, non-controversial, non-reporting NWPs.

The LOPs require submission of an application and confirmation of approval in writing from the Corps. Eligible projects include projects that affect between 400 sf and 2 acres of wetland (or less than 5 acres of wetland for a road improvement project). The LOP eligible projects that affect more than 10,000 sf of wetland are subject to interagency review similar to the existing NWP review process.

Projects that affect more than 2 acres of wetland (or more than 5 acres for public road improvements and upgrades on existing roads), all projects in calcareous fens, or a project that affects Federal Wild and Scenic River would require Individual Permit review procedures.

For more information, the Corps of Engineers can be contacted at (651) 290-5375 or access their website at www.mvp.usace.army.mil.

C. Wetland Conservation Act

The Wetland Conservation Act (WCA) was first passed in 1991 and has been subsequently amended. The Board of Water and Soil Resources (BWSR) published MN Rules 8420 in accordance with the Wetland Conservation Act laws.

The intent of the WCA is to achieve a "no net loss" of wetlands in Minnesota. Therefore, the Wetland Conservation Act prohibits the filling and/or draining of wetlands unless the activity is exempt or wetlands are replaced by restoration/creation of wetland areas of at least equal public value.

The WCA is administered by Local Government Units (LGU's). The Minnehaha Creek Watershed District (MCWD) and Bassett Creek Watershed Management Organization (BCWMO) act as the LGU for any wetland filling or draining within the City boundaries. Information about the MCWD can be obtained by calling (952)471-0590 or at their website at www.minnehahacreek.org. Information about the BCWMO rules can been obtained by calling (763)541-8210.

IV. Wetland Inventory Methods

A. Background Information

Mapping for the City was initially reviewed to identify potential areas where wetlands may exist within the City. The City of St. Louis Park Comprehensive Water Resource Management Plan (2000) had identified and provided a limited evaluation of the wetlands within the City. The wetlands identified within the Water Resource Management Plan were based on wetlands shown on the National Wetland Inventory Map (NWI). The NWI was used to identify the wetland locations for the City's WMP.

After potential locations of wetlands were identified in the office on the NWI, these locations were field verified for their presence. The presence or absence of a wetland was determined using the criteria for a wetland set forth in the 1987 Manual for Delineating and Identifying Jurisdictional Wetlands (U.S. Corps of Engineers, 1987).

It is important to note that wetland edges were not delineated as part of this project. A wetland delineation would need to be performed as part of any potential impact or development activity near the wetland. In addition, the absence of a wetland from this plan does not necessarily mean that a wetland is not present on the site. Additionally, only the large wetlands complexes associated with Minnehaha Creek were evaluated rather than the entire Minnehaha Creek stream system.

B. Existing Typing Systems for Wetlands

Outlined below are the two different wetland typing systems that are utilized in Minnesota.

- Circular 39 adapted from *Wetlands of the United States*
- Cowardin System adapted from *Classification of Wetlands and Deepwater Habitats of the United States*

Circular 39

The Circular 39 was developed in 1956 by the U.S. Fish and Wildlife Service. This system breaks wetlands into eight categories. This system is a simple, quick way to categorize wetlands. These categories include the following:

Type 1: Seasonally flooded basin or floodplain
Type 2: Wet meadow

Type 3: Shallow marsh
Type 4: Deep marsh
Type 5: Shallow open water
Type 6: Shrub swamp
Type 7: Wooded swamp
Type 8: Bog

Cowardin System

The Cowardin System was developed in 1979 also by the U.S. Fish and Wildlife Service. This system is more precise than the Circular 39 system. Cowardin describes wetlands using a tier system with each tier describing the wetland in more detail. The tier system is outlined as follows:

Tier 1 - Systems
Marine (not used in Minnesota)
Estuarine (not used in Minnesota)
Riverine
Lacustrine
Palustrine

Tier 2 - Subsystems
Riverine - Tidal, lower perennial, upper perennial, intermittent
Lacustrine - limnetic, littoral
Palustrine - no subsystems

Tier 3 - Classes
Rock
Unconsolidated bottom
Streambed
Aquatic bed
Emergent
Scrub-shrub
Forested
Open Water
Moss-Lichen

Finally, modifiers are added to the description to identify the type of water regime. These modifiers include the wetland being saturated, temporarily flooded, permanently flooded, etc. Other modifiers can be used as well that describe water chemistry, soil type, and whether the wetland has been ditched or farmed, etc.

An example of a Cowardin described wetland would be a PEMCd wetland. This classification indicates that the wetland has been described as palustrine (P) with emergent vegetation (EM) that is seasonally flooded (C) and has been affected by ditching or draining (d).

C. Wetland Functions and Values Assessment

After background information about the location of a potential wetland was obtained and the wetland was field verified, a functions and values assessment was performed and a photograph of the wetland was taken for reference.

Functions and values of each wetland were evaluated using Minnesota Routine Assessment Method (MnRAM) 2.0. MnRAM was developed by the Interagency Wetland Group. MnRAM evaluates wetland functions and values based on the following categories in accordance with Wetland Conservation Act Rules:

- Floral diversity and integrity
- Water quality protection
- Fish and wildlife habitat
- Flood/stormwater attenuation
- Groundwater interaction
- Shoreline protection
- Aesthetic/recreation/education and science
- Commercial uses

A copy of MnRAM 2.0 can be found in **Appendix B.**

Due to the lack of available groundwater information, the groundwater interaction function of the wetlands within the City of St. Louis Park was not evaluated. Commercial uses were also not evaluated during this assessment since none of the wetlands within the City perform this function.

V. Wetland Inventory and Classification Results

A. Overview of MnRAM Results

Approximately 36 wetlands within the City of St. Louis Park were evaluated using MnRAM 2.0 as discussed in **Section IV.** Wetland types 2, 3, 4, and 5 are represented within the City limits. Detail about the results of the evaluation can be seen in **Appendix C.**

All of the wetlands show signs of impact by stormwater or other disturbance. Nearly all of the wetlands receive direct storm water from the storm sewer system. There is very little opportunity to provide treatment for storm water adjacent to many of these wetlands due to the fully developed nature of the City. Retrofitting the storm sewer system is not feasible or cost effective on a city-wide basis.

B. Wetland Management Classification

Based on the MnRAM Assessment, the location of the wetlands, the size of the wetlands, and any special uses for the wetlands, the City has placed wetlands into Manage I or Manage II classifications. Manage I wetlands are of higher quality, special purpose, and are located primarily on public land. These wetlands include Westwood Lake, Bass Lake, and Meadowbrook Lake. The remainder of the wetlands within the City have been placed in the Manage II category.

Manage I wetlands will be managed as follows:

- A 20 foot minimum buffer around the perimeter of wetlands will be implemented, where feasible, by eliminating mowing activities. Wider buffer widths will be implemented in accordance with Watershed District standards if wetlands are proposed to be impacted by filling or draining.

- Perimeter stormwater treatment systems will be allowed where upstream treatment cannot be provided. Grit chamber systems will be constructed upon redevelopment if a perimeter system cannot be constructed. Maintenance to remove accumulated sediment is anticipated to occur on an "as-needed" basis.

Manage II wetlands will be managed as follows:

- Continue to utilize wetlands for stormwater management as wetlands are used in their present condition.

- A 10 foot buffer around the perimeter of wetlands will be encouraged through public education efforts. Wider buffer widths will be implemented in accordance with Watershed District standards if wetlands are proposed to be impacted by filling or draining.

In the management of surface water and wetlands for all wetlands, the City anticipates the following:

- Upon redevelopment, developers will be required to pretreat stormwater from the site in accordance with the Comprehensive Water Resource Management Plan. **Section IV and Appendix U** of the Comprehensive Water Resource Management Plan outline treatment requirements for redevelopment.

- As flood problem areas are addressed (as outlined in the Comprehensive Water Resource Management Plan), functions and values improvements may be incorporated as feasible and cost effective in the design of these improvements.

- Remove sediment from the storm sewer systems and existing treatment basins as outlined in the Comprehensive Water Resource Management Plan (**Appendix J**).

- The City will implement the NPDES Phase II program as outlined in the Comprehensive Storm Water Management Plan to meet the guidelines from the Minnesota Pollution Control Agency.

- The City will continue its public education program to educate residents about the importance of wetlands, how to improve water quality, and landscaping alternatives available for residents with property abutting water / wetlands.

- The development of a wetland buffer and stormwater management ordinance will be investigated as part of the implementation of the Comprehensive Water Resource Management Plan.

- As opportunities arise to pretreat stormwater prior to discharge or complete other improvements to enhance wetland functions and values, the City will evaluate and implement these opportunities as funding is available based on the functions and values assessment.

- The City will develop a no or low phosphorous ordinance.

- The City will investigate the use of biological control of purple loosestrife as part of the implementation of this plan.

- The City Council has determined that the City will not purchase homes or private property to provide pretreatment for water bodies. The displacement of residents and businesses is not feasible for the City. Retrofitting the storm sewer system is not economically or physically possible.

It is anticipated that the Minnehaha Creek Watershed District will complete functions and values assessment of the wetlands within the City in the next few years. The City will review the results of these assessments and will amend the plan, if necessary, after receiving the results.

C. Public Education Plan

As part of the implementation of the Wetland Management Plan (and the Water Resources Management Plan), a public education plan has been developed. The implementation of this plan is anticipated to include the following:

- Expand water quality monitoring through citizen volunteers to 5-7 more lakes/wetlands within the City.
- Provide articles in the *Sun Sailor* and *Park Perspective* paper and newsletter about water quality, wetlands, buffers, and other water resource related topics.
- Expand the water resource related information available on the City's Internet site.
- Create and/or show water resource / wetland informational videos on the City's cable access channel.
- Utilize existing neighborhood groups for wetland and neighborhood clean-up days, shoreline restoration projects, or other projects identified through the neighborhood groups.

C. Potential Wetland Mitigation / Restoration Locations

Wetlands and adjoining upland and wetlands that could be enlarged or restored within the City were evaluated for their potential to be possible locations for wetland mitigation or wetland improvement areas. To determine if an area had the potential for wetland mitigation or restoration, the following factors were taken into account:

- Open space existed adjacent to the wetland where the wetland could be expanded, or
- Portions of the wetland could be restored through revegetating a disturbed wetland and/or reestablishing hydrology of a partially drained wetland, or
- Wetlands were degraded and an improvement project could be undertaken if the funding were available.

This plan did not take into account if the land owner was willing to sell the land, nor was a feasibility study undertaken to determine if other outstanding factors may play a role in the use of these lands for wetland mitigation. The following wetlands have been identified as potential areas for improvement/restoration projects if funding becomes available:

1. **Lamplighter Pond - Wetland No. 8**: Lamplighter Pond has been expanded in the City's past to hold stormwater. This wetland experiences significant flooding during large storm events. There is no buffer adjacent to most of the wetland and the slope of the wetland below the normal water level is too steep to allow emergent vegetation to become established. Steps that could be taken to improve the Pond could include establishment of a buffer adjacent to the wetland and re-grading the side slopes below the normal water level to a create a more gradual shelf that would encourage emergent vegetation growth. This wetland could also benefit from other shoreline restoration through planting the buffer and emergent area with native species.

2. **Wolfe Park Pond - Wetland No. 39 :** While a water quality project has been completed in the past near Wetland # 39, the wetland itself has no buffer and no emergent vegetation. This wetland could benefit from a shoreline restoration project and measures to reduce the goose population from disrupting the vegetation. By establishing a buffer of taller grass, the geese may be deterred from disrupting the upland vegetation.

3. **South Twin Lakes - Wetland No. 2:** There is existing space adjacent to this wetland that could be used, if needed, to expand the wetland for wetland credit. This option does not include an analysis as to if the land is available or if the project would be feasible to construct or if public support is available .

4. **Oak Lake - Wetland No. 34:** There is existing space adjacent to this wetland that could be used, if needed, to expand the wetland for wetland credit. This option does not include an analysis as to if the land is available, if the project would be feasible to construct, or if public support is available.

5. **Wetland No. 4:** There is existing space adjacent to this wetland that could be used, if needed, to expand the wetland for wetland credit. This option does not include an analysis as to if the land is available, if the project would be feasible to construct, or if public support is available

6. **Water Quality Improvement Projects:** With the implementation of expanded water quality monitoring, the need for water quality improvement projects could be identified. It is anticipated that the results of the monitoring will be evaluated as the data becomes available. If the need for a water quality project is identified, it could be undertaken provided that funding is available. This could include providing pretreatment prior to discharge to a wetland or retrofitting existing treatment facilities.

7. **Purple Loosestrife Control**: The City is currently undertaking a program to use biocontrol agents to reduce the purple loosestrife within selected areas within the City.

Appendix D shows the locations of these areas.

VI. Enforcement and Amendments

It is the intention of the City of St. Louis Park to have this Wetland Management Plan reviewed and approved by the Board of Water & Soil Resources (BWSR) and adopted as part of the Comprehensive Water Resource Management Plan. Once approved, no significant changes to this Plan can be made without the approval of BWSR. Significant changes to this Plan shall be made known to the following parties:

- The Mayor, City Council, City Staff, and City Engineer
- Minnehaha Creek Watershed District (MCWD)
- Bassett Creek Watershed Management Organization (BCWMO)
- Board of Water and Soil Resources

The intent of this plan is to provide guidelines for management of wetlands within the City. This plan is not intended to replace the rules of the MCWD and BCWMO. If impacts to wetlands are proposed and/or redevelopment occurs, the project is subject to the St. Louis Park Comprehensive Water Resource Management Plan and the MCWD and BCWMO rules and policies.

The City will review the Watershed District wetland functions and values assessments when completed, and will amend the Plan, if necessary, after receiving the results.

Appendix A

List of Technical Panel Members & Citizen Members

Technical Advisory Panel

Doug Snyder, Board of Water and Soil Resources
Wayne Barstad, DNR Ecological Services
Jack Frost, Metropolitan Council
Glenda Spiotta, Minnehaha Creek Watershed District
Andrea Moffatt, WSB & Associates (for the City)

Citizen Input

To obtain public input, a letter was sent to residents within 150' of a wetland summarizing the Wetland Management Plan, its potential impact on the City, and inviting participation in a public meeting. An article on the *Park Perspective* and *Sun Sailor* was also published that provided information about the Wetland Management Plan and invited participation in a public meeting. The meeting was held May 23, 2001 and was attended by 14 interested residents. The comments provided by these residents are included in this Appendix.

WSB
& Associates, Inc.

Memorandum

To: *Honorable Mayor and City Council*
Carlton Moore
City of St. Louis Park

From: *Andi Moffatt, WSB & Associates*

Date: *July 2, 2001*

Re: *Wetland Management Plan*
WSB Project No. 1007-35

The purpose of this memo is to provide a summary of the comments that were received as part of the public meeting that was held on May 23, 2001 to discuss the City's Wetland Management Plan and provide a recommendation to the City about the Plan.

The City Council requested on February 12, 2001 that extra efforts be taken to inform residents about the Wetland Management Plan and its potential impact on the City. In order to inform the public about the Wetland Management Plan and public meeting, articles were published in the *Park Perspective* newsletter and the *Sun Sailor* paper. Residents within 150' of a wetland were sent letters in the mail inviting them to the attend the meeting. The meeting was attended by 14 interested residents. The comments provided by these residents are outlined below:

1. A suggestion was made for the City to provide an incentive to homeowners to create a buffer strip around the wetland. This could be in the form of the City purchasing the plant material for residents who were interested in creating a buffer strip.

2. A suggestion was made that wider buffer widths be incorporated into the Plan. Currently the Plan states that city-owned wetlands will have a 10 foot buffer and owners who have wetlands within their property would be encouraged to have 5 foot buffers. (Please note that the Minnehaha Creek Watershed District has wider buffer widths depending on the size of the wetland. These widths would go into effect if a permit is required by the MCWD for erosion control, wetland impact, floodplain impact, or stormwater management.)

3. A suggestion was made to have organized neighborhood clean-up days to clean up wetland areas.

4. Many of the residents indicated they were willing to participate in wetland clean-up projects or wetland buffer planting projects but need the technical information on the best way to create buffers and need assistance in organizing the neighborhoods.

4150 Olson
Memorial Highway
Suite 300
Minneapolis
Minnesota
55422
763-541-4800
763-541-1700 FAX

5. A suggestion was made to control the purple loosetrife in the wetlands. The residents were informed that the Plan currently provides for the City to investigate the use of biological control to eradicate the purple loosetrife plants.

6. Support for a low/no phosphorous ordinance was indicated by many of the residents.

7. A question was asked as to whether the DNR could stock fish in Cobble Crest Pond.

8. A question was asked if the City would allow a resident to hire a 3rd party to treat a lake. Mr. Moore indicated that if a resident were to give a formal proposal for such a project, the City would review it.

9. A suggestion was made to develop more detailed management plans for each wetland within the Manage I category, which includes Westwood Lake, Bass Lake, and Meadowbrook Lake.

Additionally, comments were received from the Metropolitan Council and the Department of Natural Resources, who have been involved in the development of the Wetland Management Plan. These agencies encouraged the City to provide a more aggressive approach to improve the water quality of the Manage I wetlands, increase the buffer widths, and include plans to restore the functions and values of some of the poorer quality wetlands. The comment letters from the agencies are enclosed for your information and review.

In order for the City to complete the Wetland Management Plan and submit it for Board of Water and Soil Resources approval (BWSR), as required by Minnesota Rules 8420, we recommend the following changes to the Plan:

- To respond to Comment #1, #2, and the agency comments, increase the buffer widths for the city-owned Manage I wetlands from 10 feet to 20 feet and encourage homeowners to create buffer widths of 10 feet or greater. Discussion can be added to the Plan that as part of implementation of the Plan, the City will investigate providing incentives to homeowners to create buffers around wetlands as part of the public education plan.

- To respond to Comments #3 and #4, add discussion about the City's public education plan which could include utilizing neighborhood groups to complete wetland clean-up projects.

- To respond to the agency comments, add discussion regarding wetlands that are of poor quality but have the potential to be restored to a higher

quality wetland. This would include outlining steps that could be taken to improve the wetland quality if funds were available and identifying wetlands that would benefit from such a project.

- In response to Comment # 5, the Wetland Management Plan currently contains a plan to address purple loosestrife within wetlands. No additional changes are needed to address this issue.

- In response to Comment #6, the a no/low phosphorous ordinance is part of the implementation of the Stormwater Management Plan. No additional changes are needed to address this issue.

- In response to Comments #7 and #8, the Wetland Management Plan is not intended to address stocking fish or allowing residents to treat lakes. These items could be addressed through a different process with the City, if the City Council so chooses.

- In response to Comment #9, developing detailed lake management plans is beyond the scope of the Wetland Management Plan. However. The development of these plans could be included as part of the implementation of the Wetland Management Plan. If the City Council so chooses, development of detailed lake management plans can be added to the Wetland Management Plan as part of an implementation task.

We recommend revising the Plan to increase buffer widths, expand the discussion of the City's public education/involvement process, and add discussion about the potential to restore some of the poorer quality wetlands within the City as outlined above prior to submission of the Wetland Management Plan for BWSR approval. If these items are not addressed, it is anticipated that approval of the Plan by BWSR may not be secured. Once the Plan is revised, it is anticipated that the City's Comprehensive Surface Water Management Plan with the Wetland Management Plan could be presented to the City Council for adoption.

If you have any questions, please feel free to contact us at (763)541-4800.

Metropolitan Council
Improve regional competitiveness in a global economy

Environmental Services

February 1, 2001

Andi Moffatt
Wetland Biologist
WSB and Associates
4150 Olson Memorial Highway, Suite 300
Minneapolis MN 55422

RE: City of St. Louis Park Wetland Management Plan

Dear Mr. Moffatt:

Thank you for sending the Metropolitan Council a copy of the draft of the St. Louis Park Wetland Management Plan.

Obviously, given the fully developed urban condition of the City, opportunities for managing the wetlands to improve their condition are extremely limited. Council staff is pleased to see that the City will use any re-development opportunities to improve the quality of the runoff before it is discharged to the wetlands.

Staff would recommend, however, that where a wetland is within publicly owned land, such as a park, and also for those wetlands classified as "Managed I" class, the City pursue a more aggressive approach to improve the quality of these resources. For Example the City of Richfield has been able to pursue a runoff improvement program for Wood Lake, a small urban lake with numerous stormwater discharges and extremely limited areas along the shoreline. Grants may be available for such work. You may wish to contact Jack Frost about such opportunities. Jack can be reached at 651-602-1078 or via e-mail: jack.frost@metc.state.mn.us

Staff would also recommend that whenever possible the City adopt somewhat more generous standards for the width of buffers. A five-foot buffer in the case of the "Manage II" class will provide little in terms of either wildlife protection or runoff improvement.

Again, thank you for the opportunity to comment. If you wish to discuss these comments, please contact me at 651-602-1145, or feel free to contact Jack Frost the Watershed Coordinator for your area.

Sincerely,

Marcel R. Jouseau, Manager
Environmental Planning and Resources Management

Post-it® Fax Note 7671	Date 02-01-01	# of pages ▶ 1 of 1
To Andi Moffatt	From Marcel Jouseau	
Co./Dept	Co	
Phone #	Phone # 651-602-1145	
Fax # 763-541-1700	Fax #	

Cc. Jack Frost, MCES Watershed Coordinator

Metro Region
1200 Warner Road
Saint Paul, MN 55106

651-772-7940

January 30, 2001

Ms. Andi Moffatt
WSB & Associates
4150 Olson Memorial Highway
Suite 300
Minneapolis, MN 55422

RE: City of St. Louis Park Draft Wetland Management Plan

Dear Ms Moffatt;

Andi, thanks for the opportunity to review this draft plan. In general, it looks good and it's pretty much what I had expected. I have just a few minor comments.

1. You'll recall that in September I indicated that I'd like to see a "restore" management classification included in the plan. What I was looking for was some stronger acknowledgment that opportunities exist for the restoration of the diminished functions of otherwise medium to high quality wetlands. Perhaps a separate classification is asking too much, considering the small number of wetlands and the extent of development in St. Louis Park. So, short of that, I'd recommend the inclusion of language stating that, given the values of wetlands (as stated in Section I), the City will make every effort to restore functions and values as the opportunities arise. The third sentence in Section IIC could be amended to read, "By evaluating the functions and values of wetlands, the City can more effectively evaluate the impact of redevelopment on the resource and the potential for restoration of wetland functions and values." This adds a perspective that goes beyond the situations within which wetland mitigation is needed and signals the City's recognition that restoration is an important end it itself.

2. It appears that Appendix B is intended to contain a number of items, only one of which (the MnRAM) is included. Missing are the outlines for Circular 39 and the Cowardin methods and the DNR Protected Waters and Wetlands. The protected waters and wetlands are listed in Appendix C, so it may not be necessary to repeat that information in Appendix B.

3. The proposed 10 foot minimum buffer for Manage I wetlands and 5 foot buffer for Manage II wetlands are insufficient for providing protection from adjacent land uses. If you look at other

wetland plans, i.e., City of Eden Prairie or City of Rosemount, you'll see minimum buffers of 60-75 feet for high quality wetlands and 10-25 feet for low quality wetlands. I assume that existing development conditions limit buffer width, but it would be good if these minimum widths could be increased.

Thank you again. If you'd like to discuss these comments, please give me a call at 651-772-7940.

Sincerely,

Wayne Barstad
Regional Environmental Assessment Ecologist

c: Kathleen Wallace, Regional Director
Doug Norris, Wetlands Coordinator

Appendix B
St. Louis Park MnRAM 2.0

MINNESOTA ROUTINE ASSESSMENT METHOD
FOR EVALUATING WETLAND FUNCTIONS (MnRAM) -
Version 2.0

GENERAL INFORMATION:

Project Number or Name: **1007-35**					Wetland Number:	
Name of Wetland Owner (if necessary):						
Location: County: **Hennepin**	Section __ ;	¼	¼	¼ Township	Range	
Major Watershed: **Miss. Rvr - Metro**	Minor Watershed:			Local Government Unit: **MCWD**		
Evaluator(s): **A. Moffatt**				Date(s) of Site Visit(s): **August , 2000**		

SCOPE AND LIMITATIONS:

1. Description of **temporal factors** of this assessment due to seasonal considerations and/or existing hydrologic and climatologic conditions (e.g., after heavy rains, snow or ice cover, frozen soil, during drought period, during spring flood, during bird migration). Circle those that apply and list others (use back of page if necessary):

2. Description of the **Wetland Assessment Area:** the project site, the wetland, wetland portion or wetland complex being evaluated. (If the evaluation area consists of more than one wetland type it may be necessary to complete an assessment for more than one **Wetland Assessment Area.**) (Use back of page if necessary):

   Wetland #

3. Description of the **Wetland Comparison Domain:** the geographic area (e.g., the political boundary, major or local watershed boundary or ecoregion subsection) used for functional comparison. Briefly explain the reason(s) for the choice of the Wetland Comparison Domain. The Wetland Comparison Domain should generally be of a size so as to include some relatively undisturbed Reference Standard Wetlands. (Use back of page if necessary.):

   City of St. Louis Park

4. Describe the **purpose** of this assessment: i. regulatory/impact determination; ii. replacement/mitigation design; iii. restoration; iv. monitoring; v. inventory/planning/classification; vi. educational; vii. other

   #iv and #v

* *Functional level is based on a comparison with a REFERENCE STANDARD WETLAND. A REFERENCE STANDARD WETLAND is a wetland judged to have the highest level of overall sustainable functional capacity for a particular type (based on a classification system such as Circular 39, Cowardin/NWI or HGM) within the Wetland Comparison Domain. See page 1 for more information about Reference Standard Wetlands.*

SITE DESCRIPTION

I. HYDROLOGIC SETTING

A. Describe the hydrogeomorphology of the wetland (check those that apply):

___ Depressional
___ Riverine (within the river/stream banks)
___ Lacustrine Fringe (edge of deepwater areas)
___ Extensive Peatland
___ Slope
___ Floodplain
___ Other _____

B. The hydrology source is primarily: Ground water only Surface water only
See Appendix B Both (Surface and Ground water) Unknown

Additional Observations/Descriptions: _____
_____
___

C. Has the hydrology of (a.) the wetland, or (b.) the wetland's immediate watershed, been substantially altered by excavation, ditching, tiles, dams, culverts, pumping, diversion of surface flow, or changes to runoff within the immediate watershed (circle those that apply)?

a.) Yes ___ No___ If Yes; when and how?
b.) Yes ___ No___ If Yes; when and how?

D. Does the wetland have discernable inlets or outlets? ____ If Yes, describe each inlet and outlet.
inlets: _____
outlets: _____

E. Does the wetland have standing water? _____ If yes, maximum depth (if known)? _____
Approximately how much of the wetland is inundated? _____% Date of observation ___/___/____

F. What is the predominant hydroperiod (seasonal water level pattern) of the wetland(s)?

___ Permanently Inundated (surface water present all year in every year)
___ Intermittently Exposed (surface water present all year, except during severe droughts)
___ Semi-Permanently Inundated (surface water present throughout growing season in most years)
___ Seasonally Inundated (surface water present for extended periods in early growing season but absent by end of the growing season in most years)
___ Temporarily Inundated (surface water present for brief periods during the growing season, water table usually below soil surface)
___ Permanently Saturated (surface water seldom present but substrate permanently saturated except during severe drought)
___ Saturated (surface water seldom present but substrate saturated for extended periods during the growing season)

III. SOILS

General Description of Soil(s) from Soil Survey and on Site:

	Adjacent UPLAND Area	WETLAND Area
Soil Survey Classification(s): Is the area an inclusion? Y N U		
Soil texture and drainage characteristics		
Soil disturbed? If yes, describe below.		
Field Observations:		

V. SURROUNDING LAND USES

A. What is the estimated area of the wetland's immediate watershed in acres (*optional*)? _____

B. Describe the surrounding land uses in the table:

LAND-USE	Estimated % of Wetland's Immediate Watershed (Can be >100%)
Developed (Industrial/Commercial/Residential)	
Agricultural: cropland	
Agricultural: feedlots	
Agricultural: grazing	
Forested	
Grassed (without grazing)	
Recreation areas/parks	
Highways/Roads	
Mining (specify type)	
Water and wetlands	
Other (specify)	

Step 2: Consult the high, moderate and low quality descriptions for the appropriate plant community. Read the descriptions in that order before making a decision as to which is most applicable. Also, read the following description for "exceptional" quality plant communities applicable to all communities.

Exceptional Quality:
Plant communities undisturbed, or sufficiently recovered from past disturbances, such that they represent pre-European settlement conditions. Non-native plant species are absent or, if present, constitute a minor percent cover of the community. Rare, threatened and/or endangered species (consider both State and Federal listings) may be present. Unique features (e.g., patterned peatlands, virgin prairie, old growth forests) may also be present. Page numbers below refer to *"Wetland Plants and Plant Communities of MN and WI", 2nd Edition, (USACOE - St. Paul District; Eggers and Reed).*

I. **SHALLOW, OPEN WATER COMMUNITIES** (page 28)

High Quality: Diverse aquatic bed communities dominated by 3 or more species of native aquatic plants such as pondweeds, water lilies, bladderworts, wild celery, duckweeds, water crowfoots, native milfoils, etc.

Moderate Quality: Dominated by 1 or 2 species of native aquatic plants.

Low Quality: Dominated by Eurasian water milfoil; or no aquatic vegetation present.

II.A. and B. **DEEP AND SHALLOW MARSHES** (page 51-53)

High Quality: Dominated by a diverse assemblage (3 or more species) of native aquatic plants (e.g., bur-reeds, bulrushes, arrowheads, cattails, sweet flag, pondweeds). Cattails comprise less than 40 percent cover. Purple loosestrife absent or comprises less than 5 percent cover.

Moderate Quality: Dominants include at least 2 species of native aquatic plants, often arranged in a band or interspersed as patches. Purple loosestrife, if present, comprises less than 25 percent cover. Cattail, if present, comprises 40 to 85 percent cover.

Low Quality: Purple loosestrife comprises more than 25 percent cover; or cattail comprises more than 85 percent cover.

III. A. **SEDGE MEADOWS** (page 86)

High Quality: Stands of sedges with 5 or more species of native forbs. Grazing, haying, artificial drainage, stormwater input, excavation and/or impoundment absent or minimal. Reed canary grass, purple loosestrife and/or stinging nettle absent or cumulatively comprise less than 5 percent cover. Buckthorn absent or comprises less than 10 percent cover.

Moderate Quality: Stands of sedges subjected to moderate degree of the disturbances listed above. Two to 4 species of native forbs present. Reed canary grass, purple loosestrife and/or stinging nettle cumulatively comprise less than 40 percent cover. Buckthorn absent or comprises less than 30 percent cover.

Low Quality: Stands of sedges highly impacted by grazing, haying, artificial drainage, stormwater input and/or cropping. Reed canary grass, purple loosestrife and/or stinging nettle cumulatively comprise more than 40 percent cover; and/or buckthorn, if present, comprises greater than 30 percent cover.

with minimal disturbances such as artificial drainage, peat mining, filling, impoundment, stormwater input (especially salt), etc.

Moderate Quality: Community moderately impacted by the disturbances listed above.

Low Quality: Community highly impacted by the disturbances listed above. Indicators could include die-out of sphagnum mosses and/or invasion by buckthorn, aspen, stinging nettle, dewberry, cattail, etc.

IV.B. **CONIFEROUS BOGS** (page 175)

High Quality: Stands of tamarack and/or black spruce undisturbed or minimally disturbed by artificial drainage, peat mining, logging, filling, impoundment, stormwater input, etc.

Moderate Quality: Stands of tamarack and/or black spruce moderately impacted by disturbances listed above.

Low Quality: Majority of stands of tamarack and/or black spruce dead or dying due to highly disturbed condition. Substantial invasion by buckthorn, aspen, stinging nettle, dewberry, cattail, etc.

V.A. **SHRUB-CARRS** (page 180)

High Quality: Community undisturbed or minimally disturbed by artificial drainage, grazing, filling or impoundment. Dominated by native shrubs (e.g., dogwoods, willows) with a groundlayer stratum composed of five or more species of native grasses, sedges, rushes and/or forbs. Buckthorn, honeysuckle and/or box elder, if present, cummulatively comprise less than 10 percent cover. Reed canary grass, if present, comprises less than 10 percent cover.

Moderate Quality: Community moderately impacted by the disturbances listed above. One of two types: (1) shrub canopy composed of native species with a nearly monotypic reed canary grass groundlayer; or (2) shrub canopy composed of up to 50 percent non-native or disturbance indicator species (e.g., buckthorn, honeysuckle, box elder) with a groundlayer stratum composed of less than 5 species of native grasses, sedges, rushes and forbs; reed canary grass may be present but comprises less than 50 percent cover.

Low Quality: Community highly impacted by the disturbances listed above. Buckthorn, honeysuckle and/or box elder comprise more than 50 percent canopy cover and the groundlayer stratum is composed of greater than 50 percent cover of reed canary grass or non-native grasses/forbs.

V.B. **ALDER THICKETS** (page 192)

High Quality: Community undisturbed or minimally disturbed by artificial drainage, grazing, filling, impoundment, etc. Non-native shrubs (e.g., buckthorn), if present, comprise less than 10 percent cover. Groundlayer stratum may be depauperate or composed of native grasses, sedges, rushes, ferns and/or forbs. Reed canary grass, if present, comprises less than 10 percent cover.

Moderate Quality: Community moderately impacted by the disturbances listed above. Non-native and/or disturbance indicator shrubs (e.g., buckthorn, box elder, honeysuckle) cumulatively comprise less than 40 percent cover. The groundlayer stratum, if present, has less than 50 percent cover of reed canary grass.

Low Quality: Community highly impacted by the disturbances listed above with greater than 40 percent cover contributed by buckthorn, box elder and/or honeysuckle; and/or reed canary grass

Plant community #1 = _____
% of Wetland Assessment Area (*can be >100%*) = _____ functional level = _____
Plant community #2 = _____
% of Wetland Assessment Area (*can be >100%*) = _____ functional level = _____
Plant community #3 = _____
% of Wetland Assessment Area (*can be >100%*) = _____ functional level = _____
Plant community #4 = _____
% of Wetland Assessment Area (*can be >100%*) = _____ functional level = _____

if more than 4 plant communities are present list them on the back of this page

Maintenance of Characteristic Hydrologic Regime

Wetlands with a natural outlet and mostly undisturbed conditions in the wetland and its local watershed would be rated as **exceptional** for this function.

1. Describe the wetland outlet characteristics:

   High = Lacks constructed outlet; or the watercourse/stream has not been ditched/channelized.
   Med. Hi. = Constructed outlet is at or above temporary wetland zone or outlet is managed to duplicate natural conditions;
   Medium = Constricted or managed outlet; outlet lowered to significantly reduce temporary (⟨ 7 days) and/or long-term (⟩ 7 days) storage; evidence of ditched/channelized watercourse.
   Low = Excavated or enlarged outlet; outlet removes most/all long-term storage, no/little/some temporary storage remains.

2. Describe the dominant land use and condition of the upland watershed that contributes to the wetland:

   High = Watershed conditions essentially unaltered; e.g., land use development minimal, idle lands, lands in hay or forests or low intensity grazing on gentle (⟨ 3%) to moderate (3 - 9%) slopes in good to excellent condition.
   Medium = Watershed conditions somewhat modified; e.g., moderate grazing or recent logging on steep (⟩ 9%) slopes; conventional till with residue management on moderate slopes, no-till on steep slopes
   Low = Watershed conditions highly modified; e.g., intensive agriculture or grazing, no residue management on moderate or steep slopes, urban semi-pervious or impervious surface, intensive mining activities.

3. Describe the conditions of the wetland itself:

   High = No evidence of recent tillage, temporary wetland zone intact; e.g., idle land, hayed or lightly to moderately grazed or logged. No compaction, rutting, or trampling damage to wetland.
   Medium = Temporary wetland zone tilled or heavily grazed most years. Zones wetter than temporary receive tillage occasionally. Some compaction, rutting, or trampling in wetland is evident.
   Low = Wetland receives conventional tillage most (⟩ 75%) years; or otherwise significantly impacted (e.g., fill, cleared). Severe compaction, rutting, or trampling damage to wetland.

High = Clays or shallow to bedrock
Moderate = Silts or loams
Low = Sands

5. For flow-through wetlands, describe the functional level of the wetland in providing flood or stormwater storage/attenuation in relation to primary wetland vegetation cover type:

   High = Dense vegetation
   Moderate = Combination of vegetation and open water
   Low = Primarily open water
   N/A = not applicable, wetland is not a flow-through type

6. Describe the functional level of the wetland in retarding or altering flood flows:

   High = No channels present
   Moderate = Channels present, but not connected
   Low = Channels connecting inlet to outlet

7. Describe the flood/stormwater management level of the wetland.

   High = Receives directed stormwater and water level managed to maximize flood/stormwater retention
   Moderate = Receives directed stormwater and water level unmanaged for flood/stormwater retention
   Low = Receives no directed stormwater and water level unmanaged for flood/stormwater retention

8. Describe the history of wetland losses in the major watershed. Estimate percentage of wetlands lost: _____%

   High = Most wetlands drained or filled (more than 50% lost).
   Moderate = Some wetlands drained or filled (20 - 50% lost).
   Low = Few wetlands drained or filled (less than 20% lost).

9. Describe the location of the wetland within the watershed:
   local watershed: upper mid lower
   major watershed: upper mid lower

Functional Level of Flood/Stormwater Attenuation = _____ ***(record on page 5 summary)***

Water Quality Protection

1. Y N Does the wetland receive direct discharge of managed water (e.g. municipal or road stormwater drainage, agricultural drainage outlet, industrial or municipal wastewater)?

2. Y N Do the surrounding or upstream land uses have the potential to deliver significant nutrient and/or sediment loads to the wetland?

3. Y N Does the wetland shape, flow inputs, and outlet configuration allow adequate residence time so that sediments are able to settle?

4. Y N N/A For non-isolated wetlands, does the wetland have significant vegetative density to decrease

Rare/Unique Species and Specialized Habitat

1. Y N Is the wetland known to be used by locally rare species or species that are state or federally listed? (A list of state and federally listed species is attached in Appendix B.) If yes, wildlife habitat functional level rating = exceptional.

2. Y N Is the wetland known to provide specialized habitat components for particular species or groups of species that are not generally available elsewhere (e.g. colonial waterbird nesting colonies, significant amphibian breeding sites, deer wintering yards). If yes, wildlife habitat functional level rating = exceptional.

3. Y N Does the wetland provide seasonal or intermittent habitat components (e.g., amphibian breeding, resting/feeding by migratory waterfowl/shorebirds)?

Habitat Structure

4. Indicate below how the plant species diversity of the evaluation wetland compares with a reference standard wetland of the same type and similar size within the wetland comparison domain.

5. What is the maintenance of characteristic hydrologic regime functional level from the Hydrology Section (on page 18)?

Exceptional High Medium Low

Habitat Interspersion and Connectivity

6. Describe the dominant land use and condition of the immediate watershed that contributes to the wetland:

High = Watershed conditions essentially unaltered, e.g., land use development minimal, idle lands, low intensity grazing or haying, forests.
Med. = Watershed conditions somewhat modified, e.g., moderate intensity grazing or haying; dispersed rowcrop agriculture; low density residential.
Low = Watershed conditions highly modified, e.g., intensive rowcrop agriculture; urban semi-pervious or impervious surface, high density residential, intensive mining activities.

7. For depressional wetlands, describe the relative abundance (no. of basins/sq. mi.), relative density (acres of wetlands per sq. mi.) and interspersion of various wetland types within a 1 mile radius from the center of the assessment wetland:

High = Abundance, density and interspersion very similar to Reference Standard Wetland
Med. = Abundance, density and interspersion somewhat dissimilar to Reference Standard Wetland
Low = Abundance, density and interspersion differs considerably from Reference Standard Wetland

8. Indicate below the extent to which the wetland either by itself or in conjunction with other habitat types provides a connection between larger wetlands or other habitat types that would otherwise be isolated by intensive agricultural or urban land use.

4. Y N Does the public have direct access to the wetland from public roads or waterways?

5. Is the wetland itself relatively free of obvious human influences, such as:
   a. Y N Structures?
   b. Y N Trash/pollution?
   c. Y N Filling/dredging/draining?
   d. Y N Invasive vegetation?

6. Is the area surrounding the wetland relatively free of obvious human influences, such as:
   a. Y N Buildings?
   c. Y N Other structures?
   b. Y N Roads?
   d. Y N Altered land uses?

7. Y N Does the wetland provide a spatial buffer between developed areas?

8. Y N Is the wetland and immediately adjacent area currently being used for (or does it have the potential to be used for) the following recreational activities? (Check all that apply.)

ACTIVITY	CURRENT USE	POTENTIAL USE
Education/cultural/scientific study		
Hiking/biking/skiing		
Hunting/fishing/trapping		
Boating/canoeing		
Food harvesting		
Wildlife observation		
Exploration/play/photography		
Others (list)		

Functional Level of Aesthetics/Recreation/Education/Cultural and Science= _____ *(record on page 5 summary)*

Appendix C
Wetland Assessment Results

PLYMOUTH

WESTWOOD LAKE WATERSHED

GOLDEN VALLEY WATERSHED

MINNEAPOLIS WATERSHED

PLYMOUTH WATERSHED

LANDLOCKED WATERSHED

HANNAN LAKE WATERSHED

GOLDEN VALLEY

MINNETONKA

TWIN LAKE WATERSHED

MINNEAPOLIS

BASS LAKE WATERSHED

WOLF LAKE WATERSHED

HOPKINS

MINNEHAHA CREEK WATERSHED

HOPKINS

EDINA

MINNEAPOLIS WATERSHED

LEGEND

- NWI WETLAND
- DNR PROTECTED WETLAND/WATER
- DNR PROTECTED WATERCOURSE
- 659W DNR PROTECTED WETLAND I.D.
- 657P DNR PROTECTED WATER I.D.
- 1 CITY OF ST. LOUIS PARK WETLAND IDENTIFICATION.

NOTE:

NWI WETLANDS ARE SHOWN AS DEPICTED ON THE NWI USGS HOPKINS & MPLS. SO. QUAD. MAPS. DNR PROTECTED WETLAND/WATERS ARE SHOWN AS DEPICTED ON THE MnDNR PROTECTED WETLANDS/WATERS SHEET 2 OF 4 FOR HENNEPIN CO. THE WETLAND BOUNDARIES HAVE NOT BEEN FIELD VERIFIED FOR THIS MAP.

1. CEDAR ST.
2. QUEBEC DR.
3. OAK PARK VILLAGE DR.
4. CEDARSHORE DR.
5. GLENHURST PL.
6. FOREST LA.
7. 42½ ST.
8. QUENTIN CT.
9. PRINCETON CT.
10. VICTORIA WAY
11. VICTORIA CIR.
12. VICTORIA CURVE
13. VICTORIA LA.
14. EXCELSIOR WAY

1200 600 0 1200 2400
SCALE IN FEET

CITY OF ST. LOUIS PARK

WETLAND INVENTORY MAP

SCALE: AS NOTED | DESIGN BY: AM | PROJECT NO: 1007.35
PLAN BY: MSS | CHECKED BY: PRW | RECORD COPY BY: | DATE

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

PETER R. WILLENBRING- P.E.
DATE: ____ REG. NO. 15958

WETLAND MANAGEMENT PLAN
ST. LOUIS PARK, MINNESOTA

350 Westwood Lake Office
8441 Wayzata Boulevard
Minneapolis, MN 55426
612-541-4800
FAX 541-1700
WSB & Associates, Inc.
INFRASTRUCTURE - ENGINEERS - PLANNERS

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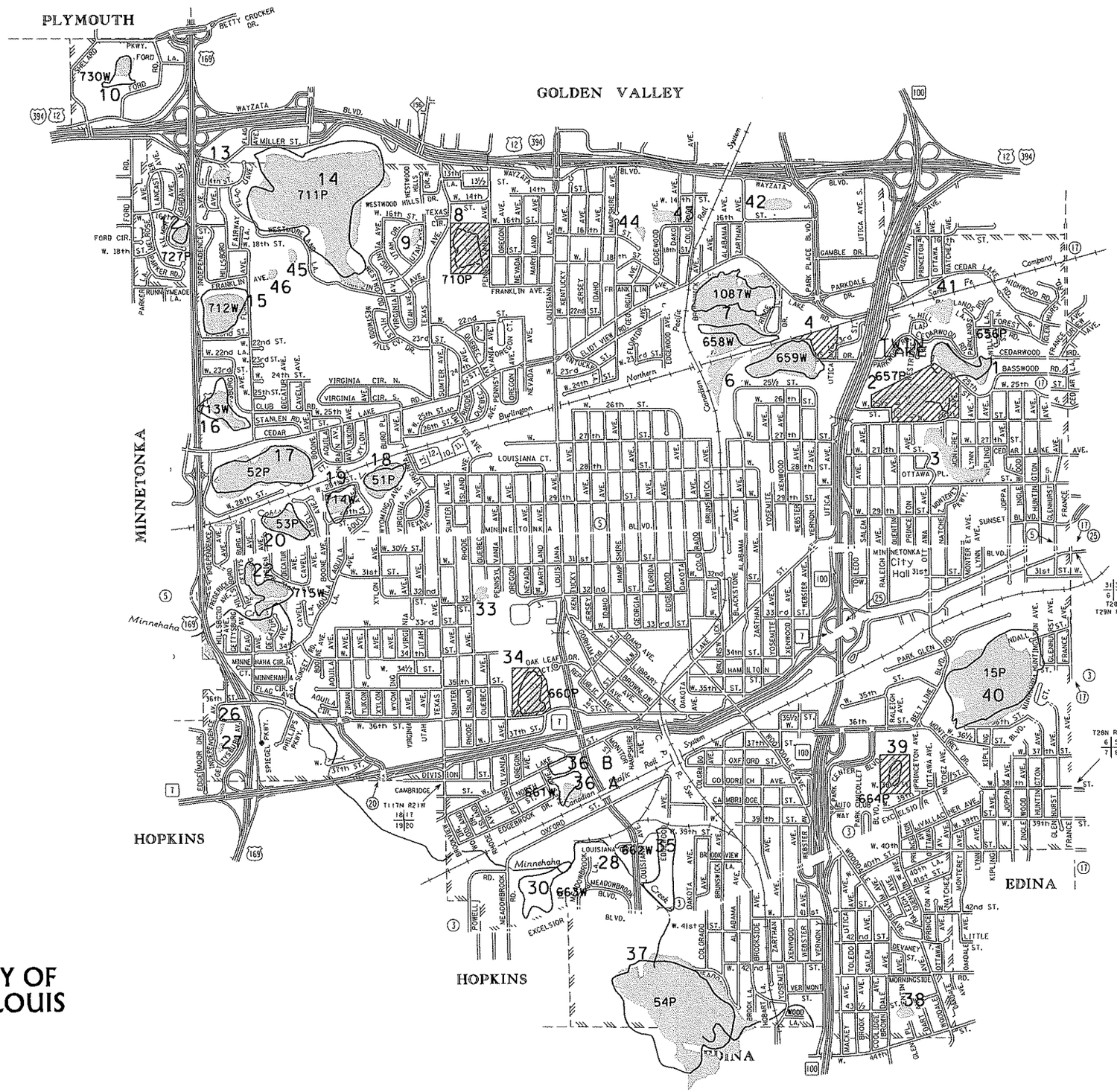
Summary of MnRAM 2.0 Assessments

Wetland Number	Wetland Name	Management Classification	DNR Number	Wetland Type		Plant Community			Functions and Values						
				Cowardin	Circular 39	1	2	3	Maintenance of Hydrologic Regime	Flood/Stormwater Attenuation	Water Quality Protection	Shoreline Protection	Wildlife Habitat	Fishery Habitat	Aesthetics/Recreation/ Educ/Cultural
1	Twin Lake	Manage II	656P	PEM/UBF	Type 5	L	M	L	M	H	H	NA	M	M	M
2	Unnamed	Manage II	657P	PEMCd/ PEMFd	Type 3	M			M	H	M	NA	MH	L	H
3	Unnamed	Manage II		PEMB/ PFO1B	Type 2	L	L		M	H	MH	NA	M	L	LM
4	Unnamed	Manage II	659W	PEMCd	Type 3	L	L		H	H	M	NA	M	L	M
6	Unnamed	Manage II		PEMB	Type 2	L			M	H	ML	NA	ML	L	L
7	Unnamed	Manage II	1087W/ 658W	PEMAd/ PEMCd/ PEMFd/ PFO1/SS1C	Type 3	M	M		H	H	M	NA	H	L	M
8	Lamplighter Pond	Manage II	710P	PUBG	Type 4	L	L		M	H	M	NA	M	L	H
9	Unnamed	Manage II		PUBG	Type 5	L	M		M	H	M	NA	M	L	M
10	Unnamed	Manage II	730W	PEMF	Type 4	M	M	M	H	H	M	NA	M	M	MH
12	Klimer Park Pond	Manage II	727P	PUBG	Type 5	L	L		M	H	M	NA	M	M	M
13	Unnamed	Manage II		PSS1/EMB	Type 2	M			H	H	M	NA	M	L	L
14	Westwood Lake	Manage I	711P	L1UBH/ PEMF/ PFO1C	Type 5	M	M		H	H	M	NA	H	M	E
15	Unnamed	Manage II	712W	PEMF	Type 3	L			H	H	M	NA	M	M	M
16	Unnamed	Manage II	713W	PEMF	Type 4	M	M		H	H	M	NA	M	M	M
17	Hannan Lake	Manage II	52P	PEMF/ PUBG	Type 5	L	ML		H	H	M	NA	M	M	M
18	Victoria Lake	Manage II	51P	PUBG	Type 5	M	M		M	H	M	NA	M	M	MH
19	Westling Pond	Manage II	714W	PUBG	Type 5	L	M		M	H	M	NA	M	M	M
20	Cobble Crest Lake	Manage II	53P	PUBG	Type 5	L	L		M	H	M	NA	M	M	M
22	Unnamed	Manage II	715W	PUBG/ PEMC	Type 4	L	L		MH	H	M	NA	M	M	M
26	Unnamed	Manage II		PUBFx	Type 4	M			M	H	M	NA	ML	L	M
27	Unnamed	Manage II		PUBFx	Type 4	M			M	H	M	NA	M	L	M
28	Part of Minnehaha Creek	Manage II	Yes	PEMCd	Type 3	M			M	H	M	H	H	M	M
29	Unnamed	Manage II		PEMF	Type 3	M			H	H	M	NA	ML	L	L
30	Part of Minnehaha Creek	Manage II	663W	PEMCd	Type 3	M			H	H	M	H	H	M	M
33	Unnamed	Manage II		PEMB	Type 2	L	M		M	H	M	NA	M	L	L
34	Oak Lake	Manage II	660P	PUBG	Type 5	L	M		M	H	M	NA	M	L	M
35	Part of Minnehaha Creek	Manage II	662W	PEMCd/ PEMFd	Type 3	M			H	H	M	H	H	M	M
36a	Unnamed	Manage II	661W	PUBGx	Type 5	L	M	M	M	H	M	NA	M	L	M

Wetland Number	Wetland Name	Management Classification	DNR Number	Wetland Type		Plant Community			Functions and Values[1]						
				Cowardin	Circular 39	1	2	3	Maintenance of Hydrologic Regime	Flood/Stormwater Attenuation	Water Quality Protection	Shoreline Protection	Wildlife Habitat	Fishery Habitat	Aesthetics/Recreation/ Educ/Cultural
36b	Unnamed	Manage II		PEMA	Type 2	L			H	H	M	NA	M	L	M
37	Meadowbrook Lake	Manage I	54P	PEMC/ L1UBH	Type 5	M	M		M	H	M	H	H	M	H
38	Browndale Park Pond	Manage II		PEMF/ PEMC	Type 4	L	M		MH	H	M	NA	M	L	M
39	Wolfe Park	Manage II	664P	PUBG	Type 5	L	L		M	H	M	NA	ML	L	L
40	Bass Lake	Manage I	15P	PEMC/ PUBG/ PUBF/ PSS1Cd	Type 4	L	L	L	H	H	M	NA	H	M	H
41	Unnamed	Manage II		PEMB	Type 2	L			H	H	M	NA	ML	L	L
42	Unnamed	Manage II		PUBG	Type 5	L			M	H	M	NA	ML	L	M
43	Otten Pond	Manage II		PUBG	Type 5	L	M		H	H	M	NA	M	L	H
44	Unnamed	Manage II		PUBG	Type 5	L	L	M	M	H	M	NA	M	L	M
45	Golf Course water hazards - not evaluated														
46	Golf Course water hazards - not evaluated														

1) E = Exceptional
H = High
M= Moderate
L = Low

Appendix D
Potential Mitigation Locations



LEGEND

- NWI WETLAND
- DNR PROTECTED WETLAND/WATER
- DNR PROTECTED WATERCOURSE
- 659W DNR PROTECTED WETLAND I.D.
- 657P DNR PROTECTED WATER I.D.
- 1 CITY OF ST. LOUIS PARK WETLAND IDENTIFICATION.
- POTENTIAL PUBLIC VALUE CREDIT AREA

NOTE:
NWI WETLANDS ARE SHOWN AS DEPICTED ON THE NWI USGS HOPKINS & MPLS. SO. QUAD. MAPS. DNR PROTECTED WETLAND/WATERS ARE SHOWN AS DEPICTED ON THE MnDNR PROTECTED WETLANDS/WATERS SHEET 2 OF 4 FOR HENNEPIN CO. THE WETLAND BOUNDARIES HAVE NOT BEEN FIELD VERIFIED FOR THIS MAP.

CITY OF ST. LOUIS PARK

WETLAND MANAGEMENT PLAN
ST. LOUIS PARK, MINNESOTA

POTENTIAL MITIGATION RESTORATION LOCATIONS

SCALE: AS NOTED
DESIGN BY: AM
PLAN BY: MSS
CHECKED BY: PRM
PROJECT NO: 1007.35
RECORD COPY BY:
DATE:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

PETER R. WILLENBRING- P.E.
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Barr Engineering Company
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Phone: 952-832-2600 • Fax: 952-832-2601 • www.barr.com *An EEO Employer*

Minneapolis, MN • Hibbing, MN • Duluth, MN • Ann Arbor, MI • Jefferson City, MO

December 31, 2007

Storm Water Management Unit
Storm Water Section
Municipal Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Re: St. Louis Park Nondegradation Report Submittal

On behalf of the City of St. Louis Park, I am enclosing copies of the St. Louis Park Nondegradation Report Submittal to meet the requirements of Appendix D of the NPDES Permit (#MNR040000) for the City of St. Louis Park to Discharge Storm Water Associated with Municipal Separate Storm Sewer Systems (MS4).

With respect to the Nondegradation Report Submittal, the City of St. Louis Park believes that there are two primary issues with which the local water authorities should be concerned, and they are:

- **Do the Best Management Practices (BMP's) that are being implemented by the City meet the requirements of the local water authorities?**
- **Will the implementation of the BMP's be reasonable and practical for addressing water quality degradation as development and redevelopment occurs in the future?**

The Permit requires the preparation of a loading assessment for total suspended solids (TSS), phosphorus (TP) and runoff volume for the land use that existed in 1988 and a similar loading assessment for current conditions, and for land uses expected in 2020. The results of the loading assessment are shown in Table 2-5, St. Louis Park Nondegradation Loading Assessment Summary. The results of the loading assessment provide conservatively low estimates for water quantity and quality improvement associated with BMP implementation because it does not factor in past implementation of BMPs and assumes the minimal NURP pond BMP design requirements will be applied to future BMP implementation. The city intends to continue to utilize the Minnehaha Creek Watershed District and the Bassett Creek Watershed Management Commission to permit activities within the city that fall under their jurisdiction. **As a result, the BMP's that will be implemented by the city of St. Louis Park with future redevelopment will meet or exceed the requirements of the local water authorities.**

As discussed in Section 2.4, the loading assessment indicates that without accounting for BMP implementation, the total imperviousness, average annual flow volume, and the TP and TSS loadings from the city have not increased since 1988 and would continue to decrease by 2020. Current and future implementation of BMPs have provided additional treatment for flow volume and TP and TSS loadings in runoff to the city's receiving waters, compared to the 1988 condition. **Combining implementation of the BMP's minimally assumed for the loading assessment with the BMP's from the City's SWPPP will be reasonable and practical for addressing water quality**

degradation as development and redevelopment occurs in the future and water quality tributary to the receiving waters will be better than it was in 1988 following implementation of the planned BMP's.

As discussed in Section 3.4, the nondegradation report discusses the implications of the impaired waters listings within the city. The MPCA's Draft 2008 impaired waters listings indicate that Cobblecrest, Windsor, Twin Lake, Bass Lake, Sweeney Lake, Lake Hiawatha and Lake of the Isles receive storm water runoff from St. Louis Park and do not meet the MPCA's water quality standards for excess nutrients. Total Maximum Daily Load (TMDL) studies have not currently been approved for any of these impaired water bodies. The Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan calls for an annual phosphorus load reduction of 172 lbs. from the City of St. Louis Park to ensure that the water quality standards will be met in Lake Hiawatha. The results of the loading assessment show that there is a TP load reduction of 446 lbs. expected from the City of St. Louis Park with continued implementation of BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects. It is conceivable that the pollutant load allocations developed as part of future TMDL studies will dictate that the city will need to provide further loading reductions, beyond those currently projected in the nondegradation load assessment. As a result, the city will update its SWPPP to consider all reasonable and practical BMPs given the potential implications of future TMDL allocations. Based on the Nondegradation Report, no changes are proposed for the SWPPP at this time.

Please respond via email at gwilson@barr.com or contact me at 952-832-2672 with questions or comments.

Sincerely,

Gregory J. Wilson, P.E.
Senior Civil Engineer

Enclosure

Cc: Scott Anderson, City of St. Louis Park
Laura Adler, City of St. Louis Park

Nondegradation Report Submittal to the Minnesota Pollution Control Agency for Selected MS4 Permit Requirements

Prepared for

City of St. Louis Park

Submitted by

Barr Engineering Company

December 2007

Executive Summary

The Minnesota Pollution Control Agency (MPCA) revised the General National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit MNR040000 (Permit) for the city of St. Louis Park to Discharge Storm Water Associated with Municipal Separate Storm Sewer Systems (MS4), effective June 1, 2006. St. Louis Park had previously completed a Storm Water Pollution Prevention Program (SWPPP) to address the six minimum control measures required by the previous permit. This report has been developed to address modifications to the SWPPP for measures that may be necessary to meet the new, applicable requirements of Appendices C and D in the re-issued permit. Appendix C covers discharges to wetlands that are applicable to the city of St. Louis Park. Appendix D covers the nondegradation requirements for Selected MS4s (30 permittees including the city of St. Louis Park), including the development of a loading assessment and nondegradation report.

For the loading assessment, the Simple Method was used to determine the pollutant loadings and runoff volumes from each of the land uses within each watershed and the P8 Model was used to account for the effects of Best Management Practice (BMP) implementation for the time periods of interest in the Permit conditions. The loading assessment modeling results were summarized for the city to show the Simple Method loading and volume estimates for each time period, as well as the total phosphorus (TP) and total suspended solids (TSS) loading and volume estimates after applying the P8 model design criteria for future BMP implementation. The loading assessment was completed assuming that future BMP implementation would follow the city's current policies and standards. The results of the loading assessment provide conservatively low estimates for water quantity and quality improvement associated with BMP implementation because it assumes the minimal NURP pond BMP design requirements.

The results show that, without accounting for BMP implementation, the total imperviousness, average annual flow volume, and the TP and TSS loadings from the city have not increased since 1988 and would continue to decrease by 2020. Current and future implementation of BMPs have provided significant treatment for flow volume and TP and TSS loadings in runoff to the city's receiving waters, compared to the 1988 condition. In the future, the city intends to implement infiltration practices to mitigate any volume and loading increases, wherever it is practical and reasonable to do so.

The MPCA's Draft 2008 impaired waters listings indicate that Cobblecrest, Windsor, Sweeney, Twin Lake, Bass Lake, Lake Hiawatha and Lake of the Isles receive storm water runoff from St. Louis Park and do not meet the MPCA's water quality standards for excess nutrients. The Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan (2007) calls for an annual phosphorus load reduction of 172 lbs. from the City of St. Louis Park to ensure that the water quality standards will be met in Lake Hiawatha. The results of the loading assessment show that there is a TP load reduction of 446 lbs. expected from the City of St. Louis Park with continued implementation of BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects. It is conceivable that the pollutant load allocations developed as part of future TMDL studies will dictate that the city will need to provide further loading reductions, beyond those currently projected in the nondegradation load assessment. As a result, the city will update its SWPPP as the TMDL studies are implemented to consider all reasonable and practical BMPs given the potential implications of future TMDL allocations associated with the impaired waters that are receiving storm water discharge. This approach will ensure the following:

- Receiving water quality should be improved for lakes, wetlands and streams in St. Louis Park
- Channel erosion and stream morphology changes will be controlled
- Further protection will be provided for the physical and biological integrity of the stream and wetland corridors
- Controlled bounce and duration of inundation in the city's wetlands and preservation of the functions and values for each type of wetland classification

City of St. Louis Park Nondegradation Report Submittal to the Minnesota Pollution Control Agency for Selected MS4 Permit Requirements

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1.0 Introduction

1.1 MS4 Permit Requirements

The Minnesota Pollution Control Agency (MPCA) revised the General NPDES/SDS Permit MNR040000 (Permit) for the city of St. Louis Park to Discharge Storm Water Associated with Municipal Separate Storm Sewer Systems (MS4), effective June 1, 2006. St. Louis Park had previously completed a Storm Water Pollution Prevention Program (SWPPP) to address the six minimum control measures required by the previous permit. This report has been developed to address modifications to the SWPPP for measures that may be necessary to meet the new, applicable requirements of Appendices C and D in the re-issued permit. Appendix C covers discharges to wetlands that are applicable to the city of St. Louis Park. Appendix D covers the nondegradation requirements for Selected MS4s (30 permittees including the city of St. Louis Park), including the development of a loading assessment and nondegradation report. The following sections describe the sections of the permit that are relevant for the city of St. Louis Park.

1.1.1 Loading Assessment

Each Selected MS4 must assess the change in storm water discharge loading for its permitted area using a pollutant loading water quality model that, at minimum, addresses changes in average annual flow volume, total suspended solids (TSS), and phosphorus (TP). This modeling should be based on two time periods: from 1988 to the present, and from the present to 2020. The Selected MS4s must use a simple model, or another more complex model that they find to be more appropriate, that addresses the parameters of concern. This may include a model that the Selected MS4 has already used. Other assessment methods may be used if they can be shown to be as effective at quantifying the increase in loading as the modeling methods. The models and/or other methods will be used as part of the assessment to develop the Nondegradation Report, to help in selecting appropriate best management practices (BMPs) that address nondegradation, to determine whether additional control measures can reasonably be taken to reduce pollutant loading.

1.1.2 Nondegradation Report

Selected MS4s that have significant new or expanded discharges are required to complete a Nondegradation Report and, upon approval, to incorporate its findings on BMPs that address nondegradation into their SWPPP. The BMPs should address changes in pollutant loadings as far as is reasonable and practical through future development. Additionally, the BMPs shall address, as far as is reasonable and practical, the negative impacts of increased storm water discharge volumes that

cause increased depth and duration of inundation of wetlands having the potential for a significant adverse impact to a designated use of the wetland, or changes in stream morphology that have the potential for a significant adverse impact to a designated use of the streams.

The Nondegradation Report must include consideration of the Loading Assessment, which must include analysis of flow and may include removal of pollutants by BMPs already initiated. For purposes of the permit, 1988 levels consistently attained means runoff that would have been produced under approximately average conditions of rainfall. Local storm water management plans and other pertinent factors may also be considered. BMPs implemented by other parties may be considered when those BMPs affect the storm water from the area of the Selected MS4. If the pollutant loadings cannot be reduced to levels consistently attained in 1988, the Nondegradation Report must describe reasonable and practical BMPs that the Selected MS4 plans to incorporate into a modified SWPPP. The Selected MS4 must consider alternatives, explain which alternatives have been studied but rejected and why, and propose alternatives that are reasonable and practical. The Nondegradation Report must give high priority to BMPs that address impacts of future growth, such as ordinances for new development. Where increases in pollutant loading have already occurred due to past development, the Nondegradation Report must consider retrofit and mitigation options (BMPs) that the Selected MS4 determines to be reasonable, practical and appropriate for the community. The Selected MS4 is responsible for developing any site specific cost/benefit, social, and environmental information that the Selected MS4 wishes to bring to the Agency's attention. The Selected MS4 must incorporate the BMPs into a modified SWPPP and include an implementation schedule that addresses new development and retrofit BMPs it proposes to implement.

1.1.3 Proposed SWPPP Modifications and Submittals to MPCA

Prior to submittal to the MPCA, the proposed SWPPP modifications to address nondegradation will be public noticed at the local level. Each Selected MS4 shall also submit its SWPPP modifications to address nondegradation to the appropriate local water authority (e.g. watershed organizations or county water planning authority) in time to allow for their review and comment. The Nondegradation Report explaining the proposed BMPs and the entire SWPPP must be made available to the public and local water authority upon request.

Selected MS4s must submit their proposed changes to the SWPPP, reports addressing nondegradation for all waters, together with other supporting documents, to the MPCA in accordance with the schedule in Appendix E of the permit. This submittal must include:

1. The Loading Assessment;

2. The Nondegradation Report;

3. The proposed SWPPP modifications to address nondegradation;

4. The public and local water authority comments on the proposed SWPPP modifications to address nondegradation, with a Record of Decision on the comments; and

5. An application to modify the permit.

1.1.4 Discharges to Wetlands

The permit does not authorize physical alterations to wetlands, or other discharge adversely affecting wetlands, if the alteration will have a significant adverse impact to the designated uses of a wetland. Any physical alterations to wetlands that will cause a potential for a significant adverse impact to a designated use must be implemented in accordance with the avoidance, minimization and mitigation requirements of Minn. R. 7050.0186 and other applicable rules.

1.1.5 Discharges Affecting Source Water Protection Areas

BMPs shall be incorporated into the SWPPP to protect any of the following drinking water sources that the MS4 discharge may affect, and a map of these sources shall be included with the SWPPP, if they have been mapped:

1. Wells and source waters for drinking water supply management areas identified as vulnerable under Minn. R. 4720.5205, 4720.5210, and 4720.5330, and

2. Source water protection areas for surface intakes identified in the source water assessments conducted by or for the Minnesota Department of Health under the federal Safe Drinking Water Act.

1.2 Discussion of MPCA Guidance

1.2.1 Responses to Comments

Following the close of the comment period on the draft permit, the MPCA issued responses to comments received through April 15, 2005 on the Permit. To provide further guidance on

compliance with the Permit requirements, this section describes responses to comments that pertain to the following subjects:

- Loading Assessment modeling approach and complexity
- Addressing volume as a parameter of concern for the Loading Assessment and Nondegradation Report
- Nondegradation requirements for Wetlands
- Nondegradation requirements for Special Waters

1.2.1.1 Modeling Approach and Complexity

In response to several comments regarding the modeling approach and complexity required for the Loading Assessment described in the Permit, the MPCA stated that the Loading Assessment should include changes to pollutant loadings associated with changes due to past land use changes and changes due to anticipated land use changes. The Loading Assessment is intended to be used as a planning tool to compare 1988 levels to present and 2020 levels of discharge. It is to be presented as comparative results (increase), not absolute (accurate) flow, total suspended solids (TSS), and phosphorus discharge levels from the MS4. It is acceptable for MS4s to do more extensive modeling for design of BMPs, but it should be explained.

The Permit does not, however, specifically require that BMPs be factored into the Loading Assessment, but the MPCA clearly states that BMP analysis could be provided if any Selected MS4 so desires. The assessment can include changes due to BMPs that have already been implemented, if increase in the loading since 1988 is explicitly stated, as well as changes due to BMPs that are planned to be implemented and written into the MS4's ordinances or other regulatory mechanisms.

MPCA further states that the Loading Assessment was developed after considerable discussion, including discussion with consultants, cities, and the League of Minnesota Cities. It was determined that to limit costs the nature of the assessment must be limited. The MPCA chose not to include treatment options in this requirement since the level of modeling must be significantly increased to model treatment. Many communities will not be conducting other modeling, therefore this requirement will be a cost that needs careful distinction between what is desirable and what is required. The MPCA chose a level that will prevent undue burden while still developing useful information.

The Loading Assessment is comparable to an influent analysis, while the Nondegradation Report addresses the actual discharges of storm water to receiving water. The permittees are allowed to show reduction in discharge or to make other arguments they believe are appropriate in the development of the Nondegradation Report. A detailed Loading Assessment can support the Nondegradation Report.

Under the provisions of Minn. R. 7050.0185, subp. 4, the MPCA must "determine whether additional control measures beyond those required by subpart 3 can reasonably be taken to minimize the impact of the discharge on the receiving water." The MPCA does not have absolute numeric or other criteria that it will use in making this determination for each of the Selected MS4s. The criterion of "reasonableness" requires flexibility and site specific determinations. Reasonableness determinations will therefore be made on a case-by-case basis. Site specific variations in situation, funding, population, and receiving water will be as critical to the determination of reasonableness as a specific increase in loading. Additionally, the MPCA must note that the required analysis and documentation for the Nondegradation Plans are relative, not absolute, in nature. For example, the Loading Assessments required by the permit are net changes; we do not request the actual pollutant loading, just estimates of the relative quantity of the change.

1.2.1.2 Average Annual Flow Volume

In response to several comments regarding the requirement for addressing volume as a parameter of concern for the Loading Assessment and Nondegradation Report described in the Permit, the MPCA stated that permit and guidance were revised to include more specifics on how flow volume will be addressed in BMPs and the Nondegradation Report. The responses were qualified by first stating that when an MS4 develops a Nondegradation Report, site specific objections, costs and other considerations can be raised, which the MPCA must consider in its determinations. Reasonable measures, not any and all measures, must be installed. For this permit, the reasonableness of volume control policy is not general and applicable for all MS4s, but is determined on an individual, site specific basis. In some situations the problems created by increased flow volume can be reduced and minimized by effective implementation of appropriate BMPs based on site specific conditions.

The MPCA asserts that based on the following statutory definition (**Minn. Stat. § 115.01 Definitions** *Subd. 13.* ***Pollution of water, water pollution, pollute the water.***) and actual environmental impacts, volume may qualify as water pollution under many specific conditions:

> *"Pollution of water," "water pollution," or "pollute the water" means: (a) the discharge of any pollutant into any waters of the state or the contamination of any waters of the state so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially*

harmful or detrimental or injurious to public health, safety or welfare, to domestic, agricultural, commercial, industrial, recreational or other legitimate uses, or to livestock, animals, birds, fish or other aquatic life; or (b) the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state.

MPCA staff looked at the rules that are applicable to nondegradation (Minn. R. 7050.0185) and studied the concept of increased loading of one or more pollutants as used in the rule. They determined that the rule directs the MPCA to consider the adverse effects of increased flow volume, and where effects are adverse, to consider flow volume as a pollutant. It is not volume per se that was asked to be addressed but the change in volume related to MS4 development. Additionally, it is well known that increases in flow can have a variety of negative environmental impacts. A discussion of the reasoning for the inclusion of volume of storm water as a pollutant was provided in excerpts from Chapter 11 of the Minnesota 2001-2005 Nonpoint Source Management Program Plan. These excerpts are summarized below:

- Hydromodification, which involves changes in flow patterns in natural waterways such as rivers or streams and wetlands, is the second leading cause of impairment of fresh waters. Removal of perennial vegetation led to a decrease in infiltration and an increase in the volume of runoff. Exposing soils to wind and water increased sediment loads carried by runoff. Impervious surfaces and artificial drainage systems increased the volume of runoff and accelerated the rate at which water was removed from the landscape. Impervious surfaces in urban areas also transported runoff more rapidly and in greater volumes than before development.

- Minn. Stat. § 155.01, subd. 13 (b) defines pollution of waters as "the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state". The basis for this statute is that human activity, such as hydromodification, affects these waters in many adverse ways. Under natural conditions and at bank-full capacity, studies have shown that streams can handle a flow approximately equal to the 1.5- to 2-year frequency peak discharge within their banks (Rosgen, 1994; Leopold *et al.*, 1964). After urbanization, increased runoff can cause bank-full flow to be exceeded several times each year. In addition to increased flooding, this condition causes previously stable channels to erode and widen. Much of the eroded material becomes bed load and can smother bottomdwelling organisms.

- In this process, stream habitat diversity is damaged or lost. Water that was once slowed by bends, pools, and woody debris in the water column moves faster and with greater volume cutting into the bed and eroding the banks. This faster flowing water carries with it an increased sediment load, some of which is deposited in the downstream reaches. Many fish and invertebrate species cannot use substrates that are laden with excessive silt for reproduction, feeding, or cover. Riffles and pools become scarce or absent as the stream is converted from riffle, run, pool sequences to long runs or pipes. Not only is habitat diversity affected but the stream hydrology becomes inherently less stable. As water leaves the system faster, the natural hydrologic timing is altered. The overall effect is an increase in the intensity of the high flows and decreased duration of low flow events. If the water is stored to prevent increased peak flows, then the flow duration is extended. Streams in which the surrounding vegetation has been removed or altered are usually compromised by an increase in the amount of silt-laden runoff. Also, water temperatures within the stream may rise as the overhead canopy is removed exposing the stream to full sunlight.

- Urbanization also changes the extent and duration of inundation in wetlands, which can modify the established wetland vegetation. Measures to control discharges to wetlands must control the peaks and volume of flow to wetlands, if they are to be protected. This also means that reduced surface and ground water flow caused by diversion to storm sewers is also an area of concern, especially for sensitive wetlands.

- Urbanizing areas increase runoff from small events in greater proportion than large events. This is important because, in Minnesota, more than 90% of the precipitation events are less than 1.0 inch. These rainfall events also account for approximately 65% of the cumulative runoff quantity in urban areas and proportionately large amounts of the pollutant loading associated with these rainfall events (Pitt, 1998). While the significance of large flood events should not be underestimated, the smaller flows with an approximately nine month to two-year return period frequency, are probably as important or more important to overall water quality. These flows can be very erosive and can be the major source of increased pollutant loading. Pollutant loading is more closely associated with total runoff volume than with peak runoff rates. Utilizing methods to maintain volumes and peaks closer to those that originally shaped the channel can reduce the channel reshaping process in a watershed. Examples of appropriate management techniques are the volume reduction that results from the use of swales instead of curb and gutter, reduced impervious surfaces or infiltration structures. Wetland and upland vegetation can affect or be significantly affected by hydrologic changes.

For example, drainage can obviously change the vegetation at a site, but increased water that drains from a project area into an off-site drainage basin can impact trees and other vegetation, including wetland vegetation. In such cases, water itself is the damaging agent even if it is clean. The increase in water level, both surface and subsurface, can result in the death of roots. Roots require oxygen from the air, and saturated soils create an anaerobic condition that will eventually kill the roots. A case in point is a tamarack swamp that receives water from several developments. As water levels increase through the swamp, the increased flow depth results in the death of many of the tamarack trees, even though they are tolerant of wet conditions. In Minnesota, we have several tree species that tolerate short periods of flooding, but we should be encouraging diversity and be mindful of sensitive areas downstream. Likewise vegetation in upland areas can change the infiltration capacity or evapotranspiration capacity of a watershed. By using native plantings that have denser canopies and/or deeper root networks the storage capacity of the upland areas are significantly increased reducing run-off volumes, especially in the smaller storms.

Addressing average annual flow volume in the nondegradation plan may show that the modeling effort indicates a significant increase in flow from 1988. This is an indication to the MPCA that your loading of one or more pollutants has increased, and the plan will need to address what is reasonable and practical to get the flow back to 1988 levels. Alternatively, you may wish to demonstrate that your flow increase has not resulted in water quality degradation and therefore does not need to be addressed. The MPCA has found flow volume to be related to significant degradation, therefore claims to the contrary will be carefully scrutinized. To address flow volume some of the options include consideration of BMPs for flows existing before 1988, BMPs for flows developed since 1988, and limitations on future flows. The MPCA notes that the 1.0 inch event is about the 90_{th} percentile event for 24 hour storm on an average annual basis, and that this represents 67% of the cumulative volume of precipitation. This means that runoff reduction often can be related to BMPs that reduce flow from events smaller than 1.0 inches in depth. If properly designed the BMPs could also treat some percentage of flow related to larger events without loss of effectiveness for reasons such as re-suspension. Depending on development patterns, zoning, soils, water table, and other factors, many communities may be able to meet the non degradation goal of returning the flow to pre-1988 levels. Treatment BMPs that reduce flow include infiltration basins, trenches, bio-retention, enhanced swales, evapo-transpiration, disconnection of impervious surfaces, reduced imperviousness, filterstrips, and variations and combinations of these and other BMPs.

In some instances, a community may not be able to reduce the flows to 1988 levels. If so, the basis for this conclusion should be explained. For example the current problems may be related to past development patterns, past or present zoning, soils, water table, and other factors that may be pertinent. In establishing the case, any cost information that is available, especially site specific information, should be provided. The MPCA must consider the potential impact of the discharge on the receiving water and cumulative impacts of multiple discharges. While MS4s are not required to develop information on this aspect of the analysis, they may find it beneficial to supply information that supports their position.

1.2.1.3 Wetlands

In response to several comments and questions regarding the designated uses and nondegradation requirements for wetlands in the Permit, the MPCA clarified that the terms “designated uses” of the permit relate to MPCA rules and requirements and are set by MPCA through notice and comment rulemaking under state law and any changes to designated uses would have to be made through notice and comment rulemaking. The MPCA has included, in guidance, the pertinent parts of those rules to help describe the context of these terms. The permit and rules are under MPCA authority and the permit implements the rules.

Under this NPDES permit, the permittee is required to comply with conditions that are established to protect the water quality standards of wetlands as listed in Minn. R. 7050. One of the purposes of the NPDES permit is to establish requirements or conditions that the permittee must operate under in order to assure compliance with the water quality standards. While the WCA for LGUs does regulate the activities that cause draining, filling and some excavation to certain wetlands, the WCA does allow for ten categories of exemptions to these requirements, does not have jurisdiction over all wetlands that are considered waters of the state, and does allow the LGU to vary wetland sequencing requirements if a local wetland plan is developed. The permittee must recognize the nondegradation standards for wetlands and the required mitigation sequence of Minn. R. 7050.0186 to mitigate for degradation of wetlands, apply to all wetlands that are considered waters of the state. The MPCA water quality standards provide more comprehensive water quality protection for all wetlands in Minnesota than is required of the LGU to implement under WCA. Application of the WCA by the LGU will provide comparable wetland protection to wetland impacts in many to most cases and the WCA determination would also satisfy the Minn. R. 7050.0186 determination. However, in the few projects where the requirements of the WCA are not as comprehensive as MPCA water quality standards, then the requirements of the NPDES permit will require an LGU to make a determination that will also satisfy Minn. R. 7050.0186. Considering those

exceptions, allowing the permittee to only reference the WCA requirements for wetland protection would not be adequate to assure compliance with the NPDES permit for all cases.

The MPCA does not anticipate that it will review and make a separate determination (a duplicate effort) regarding the evaluation of the sequence mitigation requirements when that determination has been conducted by the permittee. MPCA enforcement of the NPDES permit requirements of Minn. R. 7050.0186 regarding wetland impacts associated with a component of the storm water system should only be necessary if the LGU does not apply the permit requirements to their determinations. A separate determination by the permittee under the NPDES requirements that a wetland alteration activity satisfy Minn. R. 7050.0186 sequencing is only initiated when the WCA requirements exempt or consider the wetland or the activity nonjurisdictional or if the local wetland plan designation of the wetland does not require full sequence evaluation for impacts of a wetland alteration. It should be noted the WCA also recognizes that there may be other agencies or programs that have regulatory jurisdiction regarding wetland impacting activities. The WCA rules contained in Minn. R. 8420.0105, item B state that WCA rule is in addition to other regulations including those of the United States Army Corps of Engineers, United States Department of Agriculture, Minnesota state agencies, watershed districts, and local governments. Also, specifically the WCA requires that the person conducting an activity in a wetland under an exemption ensure the activity is conducted in compliance with all other applicable federal, state, and local requirements (see Minn. R. 8420.0115).

1.2.1.4 Special Waters Considerations

The evaluation for special waters is contained in Appendix C and the evaluation of other waters is contained in Appendix D**.** The test for ORVWs is that feasible and prudent alternatives must be used. The test for other waters is reasonable and practical BMPs to be implemented. These analyses have a different criteria and standard of judgment with a long history of precedent that must be considered. The exact format of the evaluation is not described, but this distinction should be kept in mind as evaluations are planned; the MPCA will also address this in guidance.

1.2.2 Guidance Manual for MS4s

The purpose of this draft report (MPCA, 2006) is to provide guidance for MS4s to comply with the Permit requirements, including the nondegradation policy. Nondegradation is achieved if 1988 levels of flow and pollutants can be maintained. If it is not feasible for a Selected MS4 to demonstrate that it has achieved 1988 levels of flow and pollutants, the MPCA must find if additional measures (BMPs) are “reasonable and practical” (Minn. R. 7050.0185). These measures are in addition to the minimum measures of the permit. The MPCA will review required submittals such as the loading

assessments, and other information such as water plans, population growth data and development plans to determine appropriate measures. During the review, the MPCA will consider what additional control measures would be reasonable to reduce the impact on the receiving water in light of the relative importance of the economic and social impacts. The objective is to allow the MPCA to make an informed, public decision that reasonably balances additional BMP costs against the adverse impact on the environment posed by the new or expanded discharge.

Under Minn. R. 7050.0185, the MPCA is free to consider whatever information is available while the MS4 has the opportunity, albeit the burden, to demonstrate to the MPCA why expanded discharges are necessary to accommodate important economic or social development and what treatment is reasonable and practical. This burden is appropriately placed upon the MS4 since the discharger is in the position to know the relative costs and benefits of the proposed actions. The MPCA must consider the economic and social development of the community; this means the houses, jobs, taxes, recreational opportunities, and other impacts on the public at large that will result from development. Therefore, the MS4 should point out to the MPCA how and why the public has benefited from the development that created the new or expanded significant discharge, and why the public costs associated with the proposed BMPs are reasonable.

1.2.2.1 Loading Assessment

Loading Assessment modeling must be conducted for the entire MS4, not for individual watersheds or areas unless the MS4 will model these for their own interests. Some communities may wish to use models that address peak flows, or site specific increased loading. While this makes some sense in terms of overall plan development, it is not required by the permit; it is an option that the MPCA encourages but does not require. Modeling examples of methods that may be acceptable include but are not limited to the following:

- The Simple Method
- PONDNET
- SLAMM
- P8 Urban Catchment Model
- XP-SWMM

Modeling or assessment methods will be used to estimate increases in loading based on two time periods, 1988 to current development and current to projected (2020 or ultimate, whichever is first) development. Modeling may also be used to help in the decision making process of determining appropriate BMPs to implement to bring those discharges back to 1988 levels, or maintaining those levels into the future if they are not already exceeded. Use of the models in this manner is not required but is encouraged.

The MPCA expects that the model will produce relative values. For this effort, the MPCA is more concerned with the average annual increases than about specific event increases. It is not as important for this particular requirement of the permit to get the actual loads correct as it is to model consistently, showing the relative change in loads rather than the actual loads. Also note, the permit does not require the development of annual rainfall tables or calculation of hydrographs and/or store and release calculation.

All models need to be adapted for use in the specific circumstances of each MS4. Gather available information on land use/imperviousness and other pertinent facts from conditions that existed or will exist from 1988 to 2020. Selection of the appropriate method is often dependant on the readily available or collectable data as well as on the outputs or results required. Since the MPCA's goal is to show relative increases or decreases in loading, a simple method can be used rather than a more complex model. MS4s may still want to use models that are more complex for your own purposes. The permit requirement is to consistently model between time periods so that the result can be objectively compared. An MS4 may want to select a model that can model BMPs to show removal from various practices that you may have installed or that you may want to install. This is not necessary for compliance with the permit, but makes sense when it comes to justifying your nondegradation plan. The model does not need to calculate design features such as hydrographs, but can show removal rates based on design criteria which can be just as useful for planning purposes. Design calculations may need to be run before implementation but often these can be run on a much smaller scale. Runoff and loading factors should be developed based on available information. BMP modeling, while optional, can be used in plan development and could consider BMP measures taken since 1988 to present and proposed BMP measures for present to 2020 or ultimate development conditions. The MPCA has examples of how the "simple method" can be applied to every community in the metro area.

The modeler must provide an explanation of assumptions and calculation methods. The inputs will need to be listed and the values shown. All values will need to be explicitly stated. The modeler must also provide an explanation of assumptions and calculation used in the model, whether they are inherent to the model or assigned by the user. The exact algorithms must be shown. The results of the model must be

examined to demonstrate reasonable results from the model runs. Outlier values that do not seem in line with reasonable results must be explained or discussed in enough detail to help the MPCA decide the significance of the results.

1.2.2.2 Nondegradation Report

Based on the modeling, local storm water management plans, and other pertinent factors, permittees must develop a Nondegradation Report to get new or expanded discharges back to 1988 levels. Where increases in runoff or pollutant loading has occurred due to new or expanded discharges from storm water runoff, the Nondegradation Report must include retrofit and mitigation options (BMPs) that the permittee has determined to be reasonable and practical to be included in the permittee's SWPPP.

Each Selected MS4 will submit its SWPPP, including BMPs proposed to be included, to the appropriate water authority, watershed organizations or county water planning authority, for their review and comment. The Nondegradation Report, as the basis for the SWPPP, will also be available to the water authority. The intention is that these groups will work together to create a Nondegradation Report that is acceptable to the public and other affected parties. As required in the permit, the proposed SWPPP, as based on the Nondegradation Report, will be public noticed at the local level for public participation.

The Nondegradation Report explains the decisions made by the permittee regarding the incorporation of BMPs into their SWPPP to meet the nondegradation requirements. The purpose of the Nondegradation Report is "to allow the MPCA to make an informed, public decision that reasonably balances additional BMP costs against the adverse impact on the environment posed by the new or expanded discharge" (Minn. R. 7050.0185). The report is an explanation of the nondegradation implementation plan proposed to be adopted by the MS4 community, explaining why some measures have been rejected and why the measures taken are reasonable and practicable given the circumstances for the community they serve.

To help the MPCA determine if discharge loads should be allowed to increase, Selected MS4s must submit pertinent information that demonstrates how potentially adverse water quality impacts from a new or expanded discharge have been addressed. The goal of the Nondegradation Report is to demonstrate what additional control measures would be reasonable to reduce the impact on the receiving water in light of the relative importance of the environmental, economic and social impacts. The Report should explain all aspects of the proposed Report that the permittee intends to implement. It is understood that the SWPPP itself may have already addressed some specific aspects of nondegradation, and it may be beneficial to note these in the Report. The Report should also address the alternatives that have been studied but rejected. It is not necessary to include all rejected alternatives, but it will be very important to

establish the general thinking regarding why some option have been rejected and the basis for such rejection.

1.3 Storm Water Management Planning and Water Quality Improvement Projects

In addition to its SWPPP (St. Louis Park, 2006), the City of St. Louis Park has completed, participated in, and implemented several storm water management planning and water quality improvement projects since 1988. These projects are summarized below:

- Comprehensive Water Resources Management Plan (CWRMP, 2001)—Established water quality goals and BMP implementation requirements for all new development within the city.
- Capital Improvement Program projects specifically designed for water quality improvement and erosion control.
- The City has continued work on the following ongoing water quality monitoring and improvement programs and projects:
    - Lawn fertilizer application control, erosion control, shoreland zoning, and animal control ordinances
    - Street sweeping program
    - Pond maintenance
    - Storm water education presentations, outreach, meetings and training
    - Wellhead Protection Program

2.0 Loading Assessment

2.1 Land Use/Land Cover Compilation

To meet the Permit requirements, it will be necessary to estimate average annual runoff volumes, TP and TSS loadings for 1988 (the base year), 2000-2002 (existing conditions), and 2020. An important parameter for estimating historical TP and TSS loading and stormwater runoff volumes is an accurate determination of land use for the city of St. Louis Park for the years of interest. These land use data are available in Geographic Information System (GIS) data format for various years in the Twin City Metropolitan area, but due to land use changes in St. Louis Park, the land use data available does not reflect the development status of the City during all of the years specifically analyzed for this study. A generalized classification system was developed to get a consistent comparison of land use for the existing and future conditions using the data that were available. The land use classes used are shown in Table 2-1.

Table 2-1 Land Use and Land Cover (LULC) Classes

County Landuse Code based on Existing Conditions Data	Converted Land Use Classification	
	Converted Landuse Code	Landuse Description Used in Analysis
ABP	IND	Industrial
ADU	COM	Commercial
ANM	COM	Commercial
BAR	COM	Commercial
BLB	COM	Commercial
BNK	COM	Commercial
BNK	COM	Commercial
CCR	CIV	Institutional
CDO	COM,RH,RM*	Commercial, Medium Density Residential or High Density Residential
CLB	COM	Commercial
CLR	RM	Medium Density Residential
EDU	CIV	Institutional
ELD	RH	High Density Residential
ENT	COM	Commercial
FDS	COM	Commercial
FUH	COM	Commercial
GAS	COM	Commercial
GHN	RL	Low Density Residential
GHS	RL	Low Density Residential
HOS	OFC	Office
HOT	OFC	Office

LIB	CIV	Institutional
MED	OFC	Office
MFG	IND	Industrial
MFR	RM	Medium Density Residential
MIX	COM, IND, OFC, PRK, RH, RM*	Commercial, Industrial, Office, Park/Open Space/Vacant, High Density Residential, Medium Density Residential
MUS	CIV	Institutional
MVR	COM	Commercial
MVS	COM	Commercial
NUR	RH	High Density Residential
OFC	OFC	Office
OWH	IND	Industrial
PKG	IND	Industrial
PKR	OFC	Office
PND	PRK	Park/Open Space/Vacant**
POF	IND	Industrial
PRK	PRK	Park/Open Space/Vacant
PRT	COM, IND*	Commercial or Industrial
PSS	CIV	Institutional
RCY	IND	Industrial
REC	PRK	Park/Open Space/Vacant
REL	CIV	Institutional
REP	COM	Commercial
RET	COM	Commercial
ROW	COM, TRANS, ROW*	Highway Right of Way, Municipal Right of Way, or Railroad Right of Way
RRR	TRANS	Railroad Right of Way
RSC	COM	Commercial
RWL	COM	Commercial
RWO	COM	Commercial
SDO	IND	Industrial
SFR	RL	Low Density Residential
SHW	COM	Commercial
STR	IND	Industrial
SUB	IND	Industrial
SVC	COM	Commercial
TFR	RM	Medium Density Residential
TWR	IND	Industrial
VAC	PRK	Park/Open Space/Vacant
WHS	IND	Industrial

*Actual classification was chosen based on examination of existing development as observed from 2004 Aerial Photography

**Water surfaces were assigned based on Met Council Landcover data (2000) and Aerial Photography. If appropriate, non-water areas around ponds were assigned Park/Open Space/Vacant classification.

Land use data for the city of St. Louis Park for the 2000/2002 and 2020 time periods are summarized in Table 2-2. Table 2-2 shows that approximately 400 acres of the city is expected to undergo a change in land use between the current and future conditions. Sources used to derive the data for 1988 and existing conditions include the 1990 and 2000 Metropolitan Council land use GIS data, 1991 and 2004 aerial photography. The City of St. Louis Park's Existing Conditions and 2020 Comprehensive Plan land use GIS layers were obtained from the City's Planning Department staff were also used.

Table 2-2 St. Louis Park Land Use/Land Cover (LULC) and Imperviousness Calculations for 2000/2002 and 2020

Land Use Description	Land Use Impervious Percentage (based on average of 2000 and 2002 imperviousness data)	Area (acres)			Impervious Area (acres)		
		2000/2002	2020	Change	2000/2002	2020	Change
Commercial	82.1%	302	364	61	248	299	50
Industrial	70.4%	400	410	11	281	289	8
Office	69.1%	275	206	-69	190	142	-48
Highway ROW	60.8%	360	360	0	219	219	0
High Density Residential	59.2%	49	182	132	29	107	78
Medium Density Residential	50.5%	440	393	-46	222	199	-23
Institutional	47.2%	227	234	7	107	111	3
Highway ROW	40.2%	1,184	1,183	-1	476	475	0
Transportation (RR ROW)	35.6%	163	163	0	58	58	0
Low Density Residential	27.2%	2,319	2,495	176	631	678	48
Water	0.0%	155	155	0	0	0	0
Park/Vacant/ Undeveloped	14.9%	1,059	772	-287	158	115	-43
Commercial Mix**	82.1%	0	13	13	0	11	11
Mix**	59.2%	0	3	3	0	2	2
Total		6,935	6,935	0	2,620	2,705	85
Percent Imperviousness					37.8%	39.0%	

**Estimated

2.2 Watershed Imperviousness Determination

The MPCA and the University of Minnesota have developed GIS-based datasets that estimate imperviousness based on analysis of color-infrared Landsat photography (University of Minnesota). These datasets were developed for the following years for the Twin Cities Metropolitan Area: 1986, 1991, 1998, 2000, and 2002. Since there is no data available for 1988, an average of 1986 and 1991 city-wide imperviousness values were assumed to be adequate for estimating 1988 conditions. To estimate future imperviousness, the 2000 and 2002 imperviousness data were used to determine existing percent imperviousness for specific land uses within the City. These percentages were then applied to the city using land use data from the City's 2020 Comprehensive Plan.

Historical imperviousness was determined by overlaying the impervious layers onto the boundary of the City of St. Louis Park. The average impervious is calculated by determining the average value of all of the pixel values of the impervious layer that fall within the City (each pixel value has a value of zero to 100 corresponding to the percent imperviousness of the area represented by that pixel). However, some adjustments had to be made to the data to account for error that can be introduced for water surfaces. It was found that some water surfaces would return false positives for imperviousness. Therefore, water surface areas were identified using 1990 Metropolitan Council land cover data and 1991 aerial photos. A zero percent imperviousness was assigned to these water areas rather than the value in the imperviousness layer.

The impervious values calculated for 1986 and 1991 are summarized in Table 2-3. Table 2-3 shows about a 2 percent difference between the imperviousness estimates for 1986 and 1991. This difference is likely due to errors introduced in developing the imperviousness layer and less likely from any land use changes during the period. The average of the two years of data is 40.0%, which was used as the 1988 estimate of imperviousness for the loading assessment.

Table 2-3 St. Louis Park Imperviousness Calculations for 2000/2002 and 2020

Year	Total Area (acres)	Impervious Area (acres)	Citywide Impervious Percentage
1986	6,935	2,700	38.9%
1991	6,935	2,846	41.0%
2000	6,935	2,596	37.4%
2002	6,935	2,644	38.1%
2020*	6,935	2,681	38.7%
2020**	6,935	2,730	39.4%

*Estimate using 2000 imperviousness data estimates and comprehensive plan data
**Estimate using 2002 imperviousness data estimates and comprehensive plan data

The estimate of 2020 imperviousness was done in three steps:

1. Determination of a common land use classification system for "existing" (2000-2002) conditions and 2020

2. Estimation of imperviousness for these land use classes for the 2000 and 2002 time period using Landsat-based imperviousness data

3. Calculation of imperviousness estimates for 2020 by applying the imperviousness calculated for each of the common land use classes provided in the City's 2020 Comprehensive Plan

To estimate future imperviousness of the city (in 2020), an estimate of imperviousness for representative land uses were made for the 2000 and 2002 data sets. Once these values were determined, estimates could be calculated based on land uses in the City's 2020 Comprehensive Plan.

The first step in doing this involved the development of a consistent classification system for existing conditions and for the 2020 land use projections. A parcel-based GIS layer showing existing land use and expected land use in 2020 (based on the City's Comprehensive Plan) was developed by city staff. This data set provides a very detailed description of existing land uses for most of the cities parcels. It also provided a land use classification expected for the parcel in 2020. The 2020 Comprehensive Plan land use classes were more general than the detailed existing land use classes. Table 2-1 shows how the existing land uses relate to those assigned in the City's Comprehensive Plan. For some of the land use classes, the conversion of the existing land use classes was done manually, particularly with the MIX and CDO classes.

Water surfaces were designated by using the 2000 Metropolitan Council Land Use Layer. Adjustments were made to the water surface layer using 2004 USGS Aerial Photography, where necessary.

The existing land use data GIS layer, based on the land use classifications shown in last column of Table 2-1, was intersected with the imperviousness data for 2000 and 2002. Table 2-2 shows the results of this analysis for each land use class using an average of the 2000 and 2002 values to estimate future (2020) imperviousness.

The highest percent imperviousness occurs with the commercial land use (about 82 percent) and the lowest (not including water surfaces) was 15 percent for the Park/Vacant/Undeveloped land class. Note that the Park/Vacant/Undeveloped land class can have impervious areas such as park buildings,

parking lots and trails. The estimated average city wide imperviousness data for 2000 and 2002 is 37.8% (see Tables 2-2 and 2-3). The difference in imperviousness using the 2000 and 2002 data was approximately 1 percent.

The imperviousness calculated for each land use class using the 2000 and 2002 impervious layers was applied to those same classes as designated in the City's 2020 Comprehensive Plan. For example, if a parcel is shown to be "Commercial" in 2020, the commercial imperviousness percentage calculated using the average of the 2000 and 2002 data were applied for that parcel. In most cases there was no change in imperviousness (the land use did not change). However, in some cases the imperviousness of a parcel increased (such as a parcel currently designated low density residential converting to high density residential land use in 2020). In other cases there were parcels in the City where imperviousness was expected to decrease or not change. Table 2-2 provides a summary of land use areas and the calculation of the estimated imperviousness for 2020.

Table 2-2 provides the estimated 2020 imperviousness calculated using the average of the 2000 and 2002 land use impervious values shown in Table 2-3. The average imperviousness value shown for 2020 is approximately 39%. The estimates for all three time periods indicate that the imperviousness of the City will not change significantly from 1988 to 2020, and should stay within a range of approximately 2 to 4 percent, which is less than the standard error of the Landsat data (University of Minnesota).

2.3 Modeling Approach and Methodology for Loading Estimates

Complex models used to answer simple questions are not advantageous and simple models that do not model important or required physical processes are not useful. In keeping with the Permit conditions and guidance discussed in Section 1.2, our modeling approach was developed based on the following requirements:

- The loading assessment should include changes to pollutant loadings associated with changes due to past land use changes and changes due to anticipated land use changes

- The modeling will produce relative values, as the MPCA is more concerned with the average annual increases than about specific event increases. It is not as important to get the actual loads correct as it is to model consistently, showing the relative change in loads rather than the actual loads

- The assessment can include changes due to BMPs that have already been implemented, if increase in the loading since 1988 is explicitly stated, as well as changes due to BMPs that are planned to be implemented and written into the MS4's ordinances or other regulatory mechanisms

- The model does not need to calculate design features such as hydrographs, but can show removal rates based on design criteria, which can be just as useful for planning purposes. Design calculations may need to be run before implementation but often these can be run on a much smaller scale.

Currently, there are several water quality models available for simulating urban runoff and the treatment effectiveness of BMPs. Table 2-4 presents a qualitative comparison of several of the important attributes associated with some of the more common runoff water quality model capabilities based on the various selection criteria. The compiled model attributes and capabilities come primarily from peer-reviewed manuals (U.S. EPA, 1997; Burton and Pitt, 2001), with additional updated information based on our own experience and professional judgment. The water quality models included in the table are generally listed in increasing order of complexity (from left to right). For each attribute or selection criteria the models are categorized by possessing low, medium (intermediate) or high capabilities. Those capabilities that are not incorporated into a particular model, or were not applicable, were also indicated. Our approach for model selection for this assessment involved comparison of the advantages and limitations of the various models as they pertain to the Permit requirements, available data, and objectives of the city.

Table 2-4 shows that the only limitation with the P8 model, as it relates to the modeling requirements for the loading assessment, is that it is not intended to be used to determine pollutant loadings from non-urban land uses. However, the Simple Method, PONDNET and GWLF can be used to determine pollutant loadings from both urban and non-urban land uses. Both the Simple Method and PONDNET are typically used on an annual time scale. Table 2-4 also shows that the Simple Method, PONDNET and GWLF lack the ability to model the BMPs that would typically be considered for implementation by the City (such as vegetated drainage ways, extended detention, infiltration/filtration practices and street sweeping). SLAMM lacks a snowmelt runoff routine, does not have any capabilities for including baseflow in BMP analysis, and does not have the model output features contained in the P8 model. XP-SWMM is more complex, but is not in the public domain, is significantly more expensive, and BMP modeling is more cumbersome, less accurate and less intuitive than the P8 model.

Table 2-4 Comparison of Modeling Attributes/Capabilities by Selection Criteria

Criteria/Attributes		Simple Method	PONDNET	SLAMM	P8	GWLF	XP-SWMM
Time Scale	Annual	H	H	--	--	--	--
	Single Event	H	--	--	H	--	H
	Continuous	--	--	H	H	H	H
Hydrology	Runoff	L	L	H	H	H	H
	Baseflow	--	--	--	L	H	H
	Snowmelt	--	--	--	H	--	H
Pollutant Loading (Constituents)	Sediment (TSS)	H	--	H	H	H	H
	Nutrients	H	H	H	H	H	H
Pollutant Loading (Land Uses)	Urban	H	H	H	H	H	H
	Agricultural	H	H	--	--	H	--
Pollutant Routing	Transport	--	--	L	L	L	H
	Erosion	--	--	--	--	H	H
	Transformation	--	--	--	--	--	L
Hydraulic Flow Routing/Diversions		--	--	--	L	L	H
Model Output	Statistics	L	L	L	H	L	H
	Graphics	--	--	L	H	M	H
	Hydro/Pollutographs	--	--	--	H	--	H
	Format Options	L	L	H	H	H	H
	Sensitivity Analysis	--	--	--	H	--	--
Input Data	Requirements	L	L	M	M	M	H
	Calibration	L	L	L	M	L	H
	Default Data	L	H	H	H	H	M
	User Interface	L	L	H	H	H	H
GIS Compatibility		L	L	--	M	L	M
BMPs-General	Evaluation	--	H	M	H	L	H
	Design Criteria	--	H	L	H	--	H
Specific BMPs	Ponds/Wetlands	--	H	H	H	--	H
	Extended Detention	--	--	M	H	--	H
	Infiltration/Filtration	--	--	H	H	--	M
	Street Sweeping	--	--	H	H	--	M
	Others	--	--	H	H	--	L
Documentation	Peer Acceptance	H	H	H	H	H	H
	Technical Support	L	L	M	H	L	H
Cost	Software	L	L	M	L	L	H
	Use	L	L	M	M	M	H

H – High M – Medium (Intermediate) L – Low -- Not Incorporated (Not Applicable)

For this loading assessment, we have chosen to use the Simple Method to determine the pollutant loadings and runoff volumes from each of the land uses within each watershed and then use the P8 model to account for the effects of BMP implementation for the time periods of interest in the Permit conditions. In addition to the discussion associated with Table 2-4, the following information provides further justification for choosing the Simple Method/P8 model combination for the loading assessment modeling, in comparison to SLAMM, PONDNET, XP-SWMM, or some combination thereof:

- The Simple Method inputs can be directly derived within GIS
- PONDNET does not model TSS loadings and is only intended for modeling TP within wet detention ponds
- SLAMM is more detailed than P8 with respect to distinguishing source loading areas (such as driveways, parking lots, lawns, etc.), but P8 exceeds the capabilities of SLAMM when it comes to networking of watersheds/BMPs and many of the graphics and advanced output features
- P8 provides routines for performing sensitivity analyses and can also be run in design mode to determine required sizes of BMP(s) to meet treatment criteria
- P8 has the highest peer acceptance in Minnesota for urban runoff and BMP water quality modeling and enhancements have been supported by the MPCA
- P8 is free, user-friendly and easy to learn with its menu driven system
- P8 allows for some GIS compatibility via ASCII text file import of watershed data and export of results
- P8 models actual hourly precipitation and climatic data as it occurs, with its associated antecedent moisture conditions, while SLAMM only reads in the total precipitation and duration of each rainfall event and does not model actual runoff events in real-time with their associated antecedent moisture conditions
- Unlike SLAMM, P8 allows for hydrologic calibration within the program and can be calibrated/validated to time series runoff events continuously simulated from climatic data

While the City of St. Louis Park has conducted some monitoring of stormwater runoff and receiving water quality/quantity, none of the studies included monitoring of runoff from individual land uses or specific land cover types.

Following the initial assessment of TSS, TP and volume contributions with the Simple Method, the benefit that future BMP implementation will have on the flow, TP and TSS loadings is assessed within the city limits using the P8 water quality modeling for developments based on P8 model design criteria examples that are indicative of the ordinances and design standards that are currently in place by the City, the watershed management organizations, the Wetland Conservation Act and the MPCA. Based on the available data, combining the Simple Method and P8 Model for the loading assessment ensures full compliance with the Permit requirements, for the following reasons:

- The Simple Method ensures that a consistent method for calculating average annual volumes and loadings will be applied to all land uses to produce relative values across the two times periods of interest, as discussed in the Permit and Guidance Manual (see Sections 1.1.1 and 1.2.2.1 of this report)

- The P8 Model simulations of volume and pollutant loading reductions associated with BMP implementation, according to the various ordinances and design standards that were in place when development occurred, is consistent with the Permit conditions and Guidance Manual and provides a consistent method for calculating relative removal rates as suggested in Section 1.2.2.1 (which includes the following excerpts from the Guidance Manual, "The model…can show removal rates based on design criteria… Design calculations may need to be run before implementation but often these can be run on a much smaller scale.)

- Excludes the effects that natural wetlands would have on improving the storm water quality within each watershed, which ensures that the loading assessment estimates that include BMPs (discussed in Section 2.4) do not take credit for treatment by natural wetlands

- The city will not have to revise and update existing P8 models to exclude the effects of natural wetlands or collect significantly more data on every BMP to develop new P8 models for the rest of the city, which would represent significantly more cost for a product that would not provide a "distinction between what is desirable and what is required. The MPCA chose a level [in its loading assessment requirements] that will prevent undue burden while still developing useful information." (MPCA Guidance Manual, 2006)

The loading assessment modeling results were summarized for the City to show the Simple Method loading and volume estimates for each time period, as well as the loading and volume estimates after applying the P8 model design criteria examples to the future conditions, based on the minimum ordinances and design standards that are expected to be in-place when the various developments or redevelopments occur.

2.3.1 Average Annual Flow Volume

The conversion of land areas to urban land uses leads to changes in watershed hydrology and pollutant load rates. The areal increase in impervious surfaces in urban areas over undeveloped rural and natural land uses leads to greater surface water runoff volumes. The increased runoff coupled with human activities increases the types of pollutants and delivery rate of these pollutants to surface waters. Impermeable surfaces shed water as surface runoff which reduces the infiltration and evapotranspiration components of the hydrologic cycle. Surface runoff in urbanized areas is generally directed to storm sewers and other conveyance systems to rapidly move the large volumes to receiving waters and prevent flooding. This section provides a general discussion about the methodology used to quantify the amount of runoff from the various land uses in the St. Louis Park watersheds during the two time periods of interest for the Permit conditions.

As previously discussed, the Simple Method was used to estimate the average annual runoff volumes, which in turn, are also used to calculate the TP and TSS loadings, for the various land uses present within the St. Louis Park watersheds. In the urbanized portion of each watershed, average annual runoff volume was calculated using the following relationships (as described in Schueler, 1987):

Annual Runoff Coefficient [RC] = 0.05 + ((0.009) x (Impervious Fraction) x 100)

Annual Runoff Volume (acre-feet) = RC x Annual Rainfall (inches) x Urban Area (acres) / 12

As previously discussed, there is no monitoring data available for runoff volumes or quality from individual land uses or specific land cover types within the city. The annual rainfall amount of 29.41 inches was used for this analysis, based on the long-term (1971-2000) average annual precipitation measured at the Minneapolis-St. Paul International Airport and published by NCDC.

2.3.2 Total Phosphorus and Total Suspended Solids

As previously discussed, there is no monitoring data available for runoff volumes or quality from individual land uses or specific land cover types within the city. Since the city is fully urbanized, the TSS and TP average annual runoff concentrations were assumed to be 100 mg/L and 0.33 mg/L,

respectively, based on the median Nationwide Urban Runoff Program (NURP) studies concentrations cited by Athayede et al. (1983).

The TSS and TP loadings from the City were then calculated according to the following equation:

TSS and TP Load (lbs.) = Concentration (mg/L) x *Annual Runoff Volume (acre-feet)* x *2.72*

2.3.3 BMP Implementation Modeling

As previously discussed, P8 water quality modeling was used to assess the benefit that expected future BMP implementation would have on the flow volume, TP and TSS loadings within the city limits for developments and redevelopments based on the ordinances and design standards that control the treatment efficiency of the BMPs. The NURP pond BMP design requirements have controlled the treatment efficiency of the BMPs associated with each new development and will be the minimum design requirements that control the treatment efficiency for BMPs that are implemented through 2020 for the city. The NURP design scenario was run in P8 for a hypothetical low-density residential development with 25% imperviousness and a commercial development with 80% imperviousness to obtain a range of treatment efficiencies, as well as the average efficiency, that would be expected for the same design standard. For the NURP design scenario, the P8 Model estimated average TP and TSS load reductions of 56% and 87%, respectively. It was assumed that a negligible volume reduction would be realized from implementation of the NURP design requirements.

As a result, the NURP design scenario has been used to conservatively represent the results of the loading assessment, following future BMP implementation. The loading assessment results do not attempt to quantify the amount of stormwater treatment that has occurred in the past. As discussed in Section 2.2, a parcel-based GIS layer showing existing land use and expected land use in 2020 (based on the City's Comprehensive Plan) was developed and reviewed by city staff to determine whether redevelopment, for those parcels with changing land use, would result in increased or decreased imperviousness. This review indicated that approximately 723 acres of the city would undergo redevelopment between 2000/2002 and 2020, with approximately 157 acres experiencing increased imperviousness and the remaining 566 acres experiencing decreased or no change in imperviousness. For this analysis, it was assumed that the 723 acres of future redevelopment area would receive stormwater treatment that meets or exceeds the NURP design requirements, so the loading assessment results provide the city-wide TP and TSS loadings with and without the reductions attributed to the aforementioned NURP design scenario.

2.4 Results and Discussion

Table 2-5 shows the overall results of the loading assessment modeling, which were summarized for the city to show the Simple Method loading and volume estimates for each time period (without BMPs), as well as the future loading and volume estimates after applying the P8 model NURP design criteria (with BMPs), based on the parcel-based GIS coverage that showed all of the areas that are expected to redevelop in the city.

2.4.1 Average Annual Flow Volume

Table 2-5 shows that the total average annual flow volume from the city has not increased or changed significantly since 1988 and would continue to remain approximately the same by 2020, regardless of the future BMP implementation, since it was assumed that no volume reduction would be realized from implementation of the NURP design requirements. The flow volumes estimated for current and future (2020) conditions are approximately 4 and 2 percent lower than the estimated flow volume for 1988.

2.4.2 Total Phosphorus

Table 2-5 shows that the TP loading from the city has not increased or changed significantly since 1988 and would continue to remain approximately the same by 2020. Without implementation of BMPs, the TP loading estimated for current and future (2020) conditions are approximately 4 and 2 percent lower than the estimated TP loading for 1988. Table 2-5 also shows that by 2020, the TP loading should be approximately 9 percent lower than the 1988 condition, with future BMP implementation following the NURP design requirements for redevelopments.

2.4.3 Total Suspended Solids

Table 2-5 shows that the TSS loading from the city has not increased or changed significantly since 1988 and would continue to remain approximately the same by 2020. Without implementation of BMPs, the TSS loading estimated for current and future (2020) conditions are approximately 4 and 2 percent lower than the estimated TP loading for 1988. Table 2-5 also shows that by 2020, the TSS loading should be approximately 13 percent lower than the 1988 condition, with future BMP implementation following the NURP design requirements for redevelopments.

Table 2-5 St. Louis Park Nondegradation Loading Assessment Summary

TIME PERIOD	WATERSHED TOTAL RUNOFF (acre-feet)	WATERSHED TP YIELD (LBS)	WATERSHED TSS YIELD (LBS)
Without BMPs			
1988	6,811	6,113	1,852,452
Current	6,511	5,843	1,770,691
2020	6,665	5,982	1,812,605
With Future BMP Implementation			
2020	6,665	5,536	1,603,031

2.4.4 Other BMPs and Considerations Not Included in the Loading Assessment

The results of the Loading Assessment with BMP implementation present the estimated volumes and pollutant loading estimates associated with the minimum structural BMP requirements for future developments or redevelopments. There are several other structural and nonstructural BMPs that have been, or will continue to be, implemented in the city that, collectively, would also be expected to make significant reductions in volume and pollutant loadings beyond those indicated in Table 2-5. These BMPs include the following:

- Capital Improvement Program projects specifically designed for water quality improvement
- The lawn fertilizer phosphorus ban
- Street sweeping program
- Public education/participation/outreach
- Illicit discharge detection and elimination
- Pollution prevention/good housekeeping measures for municipal operations
- Public nuisance ordinance controlling pet waste
- Shoreland zoning ordinances controlling setbacks and requiring buffers for all public waters and wetlands

In addition, there are other assumptions that were made about BMP implementation considered in the Loading Assessment that were especially conservative, which meant that the 2007 and 2020 loadings, with BMP implementation, shown in Table 2-5 were higher for the following reasons:

- There is increased seepage to groundwater from storm water pretreatment measures and wet detention ponds
- Disconnection of impervious surfaces from drainageways

3.0 Nondegradation Report

3.1 BMP Selection Considerations for Development

The loading assessment indicates that implementation of watershed BMPs within the City of St. Louis Park, both in the past and as planned for the future, will ensure that the TP and TSS loads from the city will be reduced and the runoff flow volumes will not increase or slightly decrease between 1988 and 2020. As a result, the following sections of the Nondegradation Report discuss how BMPs, incorporated into the current SWPPP, will address and mitigate any localized increases in average annual flow volume and TP or TSS loading, as far as is reasonable and practical.

The following sections also include discussion about the BMP selection considerations, the alternatives that were evaluated, and the basis for the selected BMP approach for both new development and retrofits of existing development. The BMP selection considerations primarily consist of stream morphology/channel erosion, wetlands and source water protection.

3.1.1 Stream Morphology/Channel Erosion

While much of the storm water runoff generated in the St. Louis Park watersheds is conveyed to the lakes, streams and wetlands via storm sewer, there are some open channels within these watersheds, in addition to the streams, that could be subject to channel erosion due to increased flow volumes. In general, channels with culvert crossings experiencing localized increases in flow volume would still have controlled the peak flows since the policy in the St. Louis Park Comprehensive Water Resources Management Plan (CWRMP) (St. Louis Park, 2001) would have required rate control due to new development. As previously discussed, the loading assessment shows that runoff flow volumes have not increased or may have experienced a slight decrease between 1988 and 2020. As a result, with the exception of portions of Minnehaha Creek, the city has not observed significant channel erosion.

Both the St. Louis Park WRMP and the zoning ordinance require minimum structural setbacks and stormwater management along stream corridors, which will provide further protection for the physical and biological integrity within each watershed. Erosion and sedimentation control plans will be reviewed and enforced by the City for all new development and redevelopment. The City may prohibit work in areas having steep or very steep slopes and high erosion potential where the impacts of significant erosion cannot be protected against or mitigated in accordance with the erosion control regulations contained in the City's Zoning Ordinance. In addition, St. Louis Park will

continue to educate landowners and residents of existing developments about the importance of maintaining existing stream buffers.

Future implementation of infiltration practices represents another BMP alternative that may be reasonable and practical. However, the city's policies will need to include flexibility for new developments and redevelopments that have site constraints that would otherwise limit the BMP feasibility or cost-effectiveness and/or lose excessive amounts of useable space due to infiltration storage volume requirements.

3.1.2 Wetlands

This section addresses, as far as is reasonable and practical, the potential negative impacts of increased storm water discharge volumes that have caused increased depth and duration of inundation of wetlands having the potential for a significant adverse impact to a designated use of the wetland.

The Permit uses terms such as "designated uses" and/or "functions and values" which come from MPCA rules. The term "significant adverse impact" in the Permit is based on the existing water quality standards and applicable rules. The term implies "significant adverse impact to a designated use" of the water, as defined in water quality standards. The following rules apply to wetland mitigation. Wetland mitigation maintains nondegradation of wetland designated uses. The wetland mitigative sequence incorporates the following principles in descending order of priority:

1. Avoid the impact altogether by not taking a certain action or parts of an action;

2. Minimize the impact by limiting the degree or magnitude of the action and its implementation, and by taking affirmative actions to rectify the impact and reduce or eliminate the impact over time; and

3. Mitigate the unavoidable impact to the designated uses of a wetland by compensation. Compensatory mitigation shall be accomplished in the following descending order of priority of replacement:

    a. Restoration of a previously diminished wetland; and

    b. Creation of a wetland.

If compensatory mitigation is accomplished by restoration or creation, the replacement wetland shall be of the same type and in the same watershed as the impacted wetland, to the extent prudent and

feasible. Compensatory mitigation shall be completed before or concurrent with the actual physical alteration of the wetland affected by the proposed project to the extent prudent and feasible.

The City of St. Louis Park has deferred the local governmental unit (LGU) responsibility for wetland management to the Minnehaha Creek Watershed District and the Bassett Creek Watershed Management Commission. The LGUs requires full sequence evaluation for impacts of a wetland alteration and provides wetland mitigation and replacement requirements. The City will not allow any mowing, burning, or other non-filling related alteration to an existing wetland without the City's expressed written approval.

As discussed in Section 1.2.1.3, the WCA does allow for ten categories of exemptions to the requirements and does not have jurisdiction over all wetlands that are considered waters of the state. In the few projects where the requirements of the WCA are not as comprehensive as MPCA water quality standards, then the requirements of the NPDES permit will require an LGU to make a determination that will also satisfy Minn. R. 7050.0186. As a result, St. Louis Park will reference both the WCA and Minn. R. 7050.0186 requirements for wetland protection in the zoning ordinance and CWRMP.

The City believes it is reasonable and practical to continue to implement BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects. Combining the BMP requirements with the existing policies and ordinances for setbacks, buffers and storm water management represents the most reasonable and practical means of preventing significant adverse impacts to the designated use of wetlands in the City of St. Louis Park.

3.1.3 Source Water Protection Areas

All 11 of the St. Louis Park drinking water wells have high aquifer sensitivity and the source water protection areas in the city have variable vulnerability. As a result, the city will define the appropriate measures that will reduce the threat to drinking water to the maximum extent practicable. These measures will be developed in accordance with the Minnesota Department of Health's, Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas, and the MPCA's, Minnesota Stormwater Manual guidance for potential stormwater hotspots. Infiltration practices will not be allowed within the 1-year time-of-travel (emergency response zone) Drinking Water Supply Management Area (DWSMA).

3.2 Retrofit and Mitigation BMP Options

The city currently applies its water quality policies to redevelopments that are greater than 2.5 acres or create more than 1 acre of additional impervious surfaces. Erosion control permits are required for projects that disturb more than 5,000 square feet or move more than 50 cubic yards of soil. The City believes it is reasonable and practical to continue to implement BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects. Implementation of these practices is expected to fully mitigate past increases in storm water runoff volume and further improve receiving water quality and habitat. Variances to some of the requirements may occasionally be granted in the case of hardships or when site conditions do not allow for proper or successful BMP implementation.

3.3 Cost/Benefit, Social and Environmental Considerations

Kuo et al. (1988) determined that extended wet detention ponds provided the most cost-effective performance, compared to infiltration trenches and porous pavements, to control storm water quantity and quality. Weiss et al. (2007) determined that constructed wetlands provide the most cost-effective treatment for TSS and TP, compared to wet basins, sand filters, bioretention filters and infiltration trenches, if land acquisition costs are ignored. If land acquisition costs are factored into the analysis, wet basins would typically become more cost-effective in comparison to constructed wetland and bioretention systems. Ignoring land acquisition costs, Wossink and Hunt (2003) determined that the following BMPs would be expected to have decreasing levels of cost-effectiveness for treatment of TP loadings: bioretention in sandy soils, stormwater wetlands or wet ponds, bioretention in clay soils, and sand filters.

The City intends to continue to implement BMPs that are consistent with or equivalent to the NURP design criteria, at a minimum, based on the cost-benefit considerations for future redevelopment projects.

3.4 Implications of Impaired Waters for Addressing Loading Assessment

The MPCA's Draft 2008 impaired waters listings indicate that Cobblecrest, Windsor, Sweeney, Twin Lake, Bass Lake, Lake Hiawatha and Lake of the Isles receive storm water runoff from St. Louis Park and do not meet the MPCA's water quality standards for excess nutrients. The MPCA's water quality standard that pertains to lakes for excess nutrients, requires that the average summer (May-

September) total phosphorus concentration be maintained at or below 40 µg/L. While it is expected that the MPCA will adopt a new shallow lakes standard of 60 µg/L, some of these city lakes may still have total phosphorus concentrations that will exceed the applicable water quality standards for nutrients. The Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan (2007) calls for an annual phosphorus load reduction of 172 lbs. from the City of St. Louis Park to ensure that the water quality standards will be met in Lake Hiawatha. Table 2-5 shows that there is a TP load reduction of 446 lbs. expected from the City of St. Louis Park with continued implementation of BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects.

The Environmental Protection Agency (EPA) requires that the MPCA develop and submit Total Maximum Daily Load (TMDL) studies for each water body that they have on the impaired waters list. TMDL studies are used to determine what the maximum allowable pollutant loadings are for each water body without exceeding the water quality standards. The allowable pollutant loading is then allocated to each of the NPDES-permitted (including MS4s) and non-regulated sources of pollutants in the watershed. TMDL studies to be completed for Cobblecrest, Windsor, Twin Lake, Bass Lake, Brownie Lake, and Lake of the Isles may require that the City provide further reductions in total phosphorus loadings to these water bodies to comply with the MPCA's water quality standards.

Minnehaha Creek is on the impaired waters list for biota-fish, fecal coliform and chloride. The biota listing may be due to poor water quality or poor fish habitat associated with flows or excess turbidity. As a result, pollutant load allocations associated with the creek impairments would also require the city to reduce nutrient and/or sediment loadings, while possibly addressing flow volume and peak runoff rates. The fecal coliform and chloride listings will require a more detailed assessment of the specific sources of these pollutants in a TMDL study before the City can develop an approach to meet the future wasteload allocations.

It is conceivable that the pollutant load allocations developed as part of future TMDL studies will dictate that the city will need to provide further loading reductions, beyond those currently projected in the nondegradation load assessment. As a result, as TMDL studies are implemented, the City's SWPPP will also consider all reasonable and practical BMPs given the potential implications of future TMDL allocations associated with the impaired waters that are receiving storm water discharge. Since the City is fully developed, the City's SWPPP will also consider reasonable and practical BMPs for redevelopment projects.

4.0 Proposed SWPPP Modifications

This section describes the modifications that are proposed for City of St. Louis Park SWPPP, based on the results of the loading assessment and discussion in the nondegradation report.

The loading assessment and nondegradation report were completed assuming that future BMP implementation would follow the NURP design criteria, at a minimum. As necessary, the city will update its development review policies, standards and procedures, as cited in the SWPPP. The City's current approach for storm water management from the SWPPP has ensured the following:

- Receiving water quality should be improved for lakes, wetlands and streams in St. Louis Park
- Channel erosion and stream morphology changes will be proactively managed
- Further protection will be provided for the physical and biological integrity of the stream and wetland corridors
- Limiting bounce and duration of inundation in the city's wetlands to preserve the functions and values for each type of wetland classification
- Where feasible, rules will be applied to redevelopment to mitigate impacts from storm water runoff, including TSS, phosphorus, and volume
- The City will encourage a disconnect from impervious surfaces to the City's drainage system

In addition, the SWPPP will be modified to address further protection for the impaired waters within the city or downstream of the city as TMDLs and their associated implementation plans are developed.

In the few projects where the requirements of the WCA are not as comprehensive as MPCA water quality standards, then the requirements of the NPDES permit will require an LGU to make a determination that will also satisfy Minn. R. 7050.0186. As a result, St. Louis Park should reference both the WCA and Minn. R. 7050.0186 requirements for wetland protection in the St. Louis Park Zoning Ordinance and the CWRMP. Based on the Nondegradation Report, no changes are proposed for the SWPPP at this time.

5.0 Comments on Proposed Nondegradation Report

5.1 Local Water Authority Comments on Proposed Nondegradation Report

Prior to submittal to the MPCA, the City of St. Louis Park submitted its draft Nondegradation Report submittal to the appropriate local water authorities (the Bassett Creek Water Management Commission and the Minnehaha Creek Watershed District) in time to allow for their review and comment. The Nondegradation Report explaining the proposed BMPs and the entire SWPPP was also made available to the local water authorities. The following sections summarize the comments received from the local water authorities on the draft Nondegradation Report submittal.

5.1.1 Bassett Creek Water Management Commission (BCWMC)

Since the loading assessment showed that there was no increase in pollutant loadings or flow volume, the BCWMC decided there is no need to perform additional review and did not have any comments on the draft Nondegradation Report.

5.1.2 Minnehaha Creek Watershed District (MCWD)

There were no comments received on the draft Nondegradation Report submittal.

5.2 Record of Decision on the Comments

Since there were no comments, the draft Nondegradation Report submittal was not revised.

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HYDROLOGIC, HYDRAULIC, AND WATER QUALITY MODELING FOR THE CITY OF ST. LOUIS PARK

TOPICAL REPORT RSI-2858

PREPARED FOR

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St. Louis Park, Minnesota 55416

FEBRUARY 2019

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TOPICAL REPORT RSI-2858

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FEBRUARY 2019

Project Number 3259

EXECUTIVE SUMMARY

As part of the Metropolitan Surface Water Management Act, all communities in the metropolitan area are required to prepare Surface Water Management Plans in response to their governing watershed district plans. Minnesota Statutes require, in part, that these local plans define drainage areas, volumes, rates, and paths of stormwater runoff. This report documents the hydrologic and hydraulic modeling used to delineate the drainage areas and quantify the stormwater runoff from the City of St. Louis Park (City).

The City is part of the Minnehaha Creek Watershed District and the Bassett Creek Watershed Management Commission, which provide oversight of stormwater runoff and water quality in the City. Stormwater runoff from the City enters the cities of Edina, Golden Valley, Minneapolis, and Minnetonka. This report documents the rates of runoff entering the City's neighboring communities, as well as identifying constraints in the existing storm sewer system and flood-prone areas within the City.

The City also has three impaired waterbodies within its limits: Cobblecrest Lake, Minnehaha Creek, and Twin Lake. The City intends to manage its water resources to improve the water quality of all of its lakes, wetlands, and streams, not just those that are impaired. This report identifies areas that are contributing to the pollutant loading of the City's natural resources.

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1.0 BACKGROUND

The goal of this project was to develop comprehensive models for the entirety of the City using available data and existing models as a starting point and establish the rate and quantity of stormwater. The City is covered by a total of eight models, including off-site drainages from the cities of Edina, Minnetonka, Plymouth, and Minneapolis, as well as runoff from Minnesota Department of Transportation (MnDOT) right-of-way. The City is within the Minnehaha Creek Watershed District (MCWD) and the Bassett Creek Watershed Management Commission (BCWMC). The stormwater runoff from the City generally discharges either in Minnehaha Creek or Bassett Creek, both of which discharge into the Mississippi River.

The City is divided into the following eight drainage districts, based on the larger waterbodies within the City.

- Bass Lake
- Edina
- Golden Valley
- Hannan Lake
- Minneapolis
- Minnehaha Creek
- Twin Lake
- Westwood Lake.

The City also receives and discharges runoff from neighboring communities, including the following:

- Edina
- Golden Valley
- Minneapolis
- Minnetonka
- Plymouth
- MnDOT right-of-way.

1.1 EXISTING MODELS

The City had access to several models that were developed by MCWD and BCWMC, including the following:

- Beltline
- Twin Lake
- BCWMC Phase 2 Regional Model
- MCWD Regional Model.

1.2 CURRENT MODEL

The US Environmental Protection Agency's (EPA's) Storm Water Management Model 5 (SWMM5) was selected as the platform to model the City. SWMM5 is flexible, open-source, and unlimited in multiple features that may be modeled. SWMM5 is used throughout the world for planning, analysis and design related to stormwater runoff, particularly in urban areas, and the propriety PCSWMM (which runs on the SWMM5 engine) was used to develop the models for this study. Where possible, the new models were evaluated against existing observed data, including the July 1987 flood event.

1.2.1 BASS LAKE

The Bass Lake model includes 403 subcatchments across 1,362 acres within the City, primarily the Lenox, Sorensen, Elmwood, Triangle, and Wolfe Park neighborhoods. This drainage district discharges to the City of Minneapolis' storm sewer along France Avenue and into the Minikahda Club Golf Course. Major waterbodies in this model include the Bass Lake Preserve, Klodt Pond, Wolfe Lake, and Cattail Pond, and many stormwater ponds for private and public development, including MnDOT right-of-way ponds and the newly constructed Carpenter Park underground stormwater storage facility.

1.2.2 EDINA

The Edina model includes 113 subcatchments across 497 acres in the Minikahda Vista and Browndale neighborhoods of St. Louis Park, as well as the Cities of Edina and Minneapolis. This model discharges into the City of Edina storm sewer system primarily at Vale Gardens Park and reenters the City south of Minikada Vista Park, before discharging into the City of Minneapolis' storm sewer under France Avenue. Major waterbodies in this model include Browndale Pond and Weber Pond in Edina.

1.2.3 GOLDEN VALLEY

The Golden Valley model includes 38 subcatchments across 219 acres from the Pennsylvania Park and Eliot neighborhoods, which discharge to MnDOT I-394 right-of-way in the City of Golden Valley along the City's north border. Major waterbodies in this model include Hampshire Pond (i.e., Otten Pond South) and Otten Pond. This drainage district is part of the Bassett Creek Watershed and followed the model methodology outlined in the BCWMC *Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report*.

1.2.4 HANNAN LAKE

The Hannan Lake model includes 47 subcatchments across 605 acres from the City and City of Minnetonka. Stormwater runoff from a small portion of the St. Louis Park Kilmer Pond neighborhood enters the City of Minnetonka to the west of US 169 and reenters the City at the land-locked wetland to the east of US 169 in the Crestview neighborhood and to the south at Cedar Manor Lake in the Cedar Manor neighborhood. The connection under US 169 is confirmed to exist; however, the size and type of pipe is unknown. Major waterbodies include land-locked wetland, Cedar Manor Lake, and Hannan Lake in the City and Windsor Lake (impaired for nutrients) in the City of Minnetonka.

1.2.5 MINNEAPOLIS

This model includes portions of the Triangle, Fern Hill, Lake Forest, Cedarhurst, and Blackstone and neighborhoods in the City, which discharges to the north into the MnDOT I-394 right-of-way and east into Brownie and Cedar Lakes, which are both impaired for mercury and located in the City of Minneapolis. This model includes 89 subcatchments across 649 acres from both cities, and major waterbodies include Candlestick Pond and Blackstone Park Pond. A stormwater lift station is located at Candlestick Pond along West 16th Street.

1.2.6 MINNEHAHA CREEK

The Minnehaha Creek model was built off of the MCWD regional XPSWMM model and uses existing off-site drainage areas from the Cities of Hopkins and Minnetonka to estimate the flows entering the City from upstream communities. This model includes 406 subcatchments, covering a total of 3,783 acres from many neighborhoods in the City. Major waterbodies include Lake Victoria, Westling Pond, Cobblecrest Lake (impaired for nutrients), Amhurst Ponds, Oak Pond, Oregon & 32nd Pond, Summer Sediment Basin, South Oak Pond, Meadowbrook Lake, and Minnehaha Creek, which is impaired for dissolved oxygen. This drainage district also includes seven stormwater lift stations to move stormwater and prevent flooding on Cobblecrest Lake, Lake Victoria, Westling Pond, South Oak Pond (two lift stations), Oregon Pond, and the Maryland Avenue Pond.

1.2.7 TWIN LAKE

The Twin Lake model includes 286 subcatchments across 1,636 acres in the City. This model covers the neighborhoods of Pennsylvania Park, Willow Park, Eliot View, Blackstone, Bronx Park, Birchwood, Lake Forest, and Fern Hill. Major waterbodies include Utah Pond, Lamplighter Pond, Boneyard Ditch, Natchez Pond, Twin Lakes Sediment Basin, and Twin Lake (impaired for nutrients). This district drains to Twin Lake, which discharges to the northeast into the Minneapolis drainage district. This drainage district includes stormwater lift stations at Lamplighter Pond and Nelson Park to move stormwater from these low-laying areas.

1.2.8 WESTWOOD LAKE

The Westwood Lake model was built using the BCWMC regional XPSWMM model as a foundation and uses existing off-site drainage areas from the Cities of Plymouth and Golden Valley to estimate the runoff entering the City from upstream communities. The model includes 93 subcatchments across 739 acres in the Shelard Park, Kilmer Pond, Westdale, Crestview, and Westwood Hills neighborhoods of the City, as well as portions of Minnetonka, Plymouth and Golden Valley. Major waterbodies in this drainage district include Shelard Sedimentation Basin, Kilmer Pond, Westwood Lake, and the Minneapolis Golf Course basins. This drainage district ultimately discharges to the Bassett Creek, which is impaired because of chloride and *E. coli* bacteria and the City of Golden Valley storm sewer system, which discharges to Bassett Creek. This drainage district is part of the Bassett Creek Watershed and followed the model methodology outlined in the BCWMC *Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report*.

2.0 METHODOLOGY

The procedures and methodology used in this study are outlined in *XP-SWMM Hydrology and Hydraulics Model Development Guidance Manual for the City of Minneapolis*, for all of the models within the Minnehaha Creek watershed. For all of the models within the Bassett Creek Watershed (Golden Valley and Westwood Drainage Districts only), the procedures and methodology outlined in the *Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report* are used. This additional step was done to simplify the future transmittal of data between the City and watershed districts.

2.1 DATA SOURCES

The Storm Water Management Plan (SWMP) modeling relies on data from multiple sources, which include the following:

- **City of St. Louis Park:** as-built records, GIS data, survey data, and existing XPSWMM modeling
- **Hennepin County:** 2017 aerial imagery
- **BCWMC:** regional XPSWMM model
- **MCWD:** regional XPSWMM model
- **Metropolitan Council:** 2016 Generalized Land Use dataset
- **Minnesota Department of Natural Resources:** Hennepin County LiDAR data
- **MnDOT:** HydInfra database, construction plans for I-394, TH 7, TH 100, and US 169
- **Federal Emergency Management Agency (FEMA):** 2016 Hennepin County Flood Insurance Study
- **US Geological Survey Soil (USGS):** Soil Survey Data for Twin Cities, Minnesota.

After reviewing these datasets, converting the vertical datums to a consistent value for the purposes of this study was determined to be necessary. The listed datasets varied depending on whether the data used a local datum or used NGVD29 or NAVD88. After discussions with City staff, NGVD29 was used for this study because the majority of the City's data and data from neighboring communities, review agencies, and FEMA reference this datum.

The first conversion used converts the local datum from the City's local vertical datum to the National Geodetic Vertical Datum of 1929 (NGVD29). This conversion is presented below:

Local Datum + 710.3 = NGVD29

We also established the conversion between NGVD29 and the North American Vertical Datum of 1988 (NAVD88) by examining the shift at five locations across the City, using National Oceanic and Atmospheric Administration's (NOAA's) VertCon website. The average of all five locations was used to convert the NAVD88 elevations to NGVD29 in this study; the conversion is presented below:

NAVD88 – 0.18 = NGVD29

2.2 RAINFALL DATA

As requested by the City, the following events have been included in the updated models.

Table 2-1. Design Storm Depths Used in the City of St. Louis Park Storm Water Management Plan Modeling

Storm	Duration (hours)	Depth (in)	Source
10-year	24	4.1	NOAA TP-40
10-year	24	4.29	NOAA Atlas 14
100-year	24	5.9	NOAA TP-40
100-year	24	7.47	NOAA Atlas 14

in = inches.

Rainfall data were determined using the NOAA's Technical Paper 40 (TP-40) maps published in May 1961 and used until recently for most stormwater design. Rainfall data from NOAA's 2013 revised Atlas 14, Volume 8 were also used in this modeling effort to evaluate present and future conditions.

2.3 SUBWATERSHEDS

Using the Minnesota Department of Natural Resources (MnDNR) light and detection ranging (LiDAR) elevation dataset combined with the City's storm sewer infrastructure GIS data and recent MnDOT construction plans, subwatersheds were delineated to each 18-inch or larger pipe in the City, as well as the direct drainage to all waterbodies and local sinks. Individual catch basins and lead pipes were not modeled in this effort, nor was inlet capacity of the storm sewer system. A total of 1,475 separate subwatershed were delineated as part of this study and are shown in Appendix A.

2.4 HYDROLOGY PARAMETERS

In the EPA's SWMM5 model, the following parameters are needed to quantify runoff: impervious land cover, watershed slope, catchment width, and soil infiltration.

2.4.1 IMPERVIOUS COVER

The process for determining the directly connect impervious area (DCIA) was based on the Basset Creek WMC regional model report. Using the 2016 Generalized Landuse dataset from Metropolitan Council, we separated areas of the city that are traditionally "heavily impervious areas," including classifications of: Industrial and Utility, Institutional, Major Highways, Manufactured Housing Parks, Mixed Use Commercial, Mixed Use Industrial, Mixed Use Residential, Multifamily, Office, Open Water, Railways and Retail and Other Commercial. These areas were assumed to have 100 percent of the total impervious area identified as directly-connected impervious. Using the Twin Cities Metropolitan Area 1-meter Land Cover Classification developed by the University of Minnesota, Twin Cities, we extracted roads and buildings as the directly impervious surface in "heavily impervious areas" and only roads for the remainder of the City. DCIA was the area of directly-connected impervious cover as a percent of the total subwatersheds area.

For residential and open-space areas, we followed the City of Minneapolis's XPSWMM Manual recommendations to include a reduction for impervious areas that flow onto pervious areas, such as gutters from rooftops or the surface area of lakes.

2.4.2 WATERSHED SLOPE

By using the MnDNR LiDAR elevation dataset, the average slope for each subwatershed was calculated in GIS, including for existing off-site subcatchments for consistency.

2.4.3 CATCHMENT WIDTH

The catchment width factor is a parameter that controls how quickly water travels from one end of the subcatchment to the outlet, which is similar to the time of concentration in other hydrology methods. In SWMM, the width factor is often used as calibration parameter, and in these models, the width factor was generally estimated by dividing the drainage area by the longest overland flow. Because most of the City is heavily urbanized, this flow length was assumed to be 100–300 feet (ft) (before water enters the storm sewer system); this parameter will likely need to be modified in future modeling efforts as calibration data was not readily available for all watersheds.

2.4.4 SOIL INFILTRATION

The City is covered by two watershed districts and each watershed district's regional XPSWMM model. To incorporate the City's models into the larger regional models in the future, the overlying regional model soil infiltration methodology was used. For the Bassett Creek models (Golden Valley and Westwood drainage districts), these models used the Horton infiltration parameters outlined in the *Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report*. For the Minnehaha Creek models, the Green-Ampt parameters estimated in the City of Minneapolis's *XP-SWMM Hydrology and Hydraulics Model Development Guidance Manual for the City of Minneapolis* were used.

2.5 HYDRAULICS

After parameterizing the subcatchments, SWMM routes the storm hydrographs through the modeled storm sewer, stream, and overland drainage networks to determine the water surface elevations and depths at ponding locations.

2.5.1 STORM SEWER NETWORK

GIS data and as-built records of the storm sewer network were obtained from the City and cities of Minnetonka and Edina. The MnDOT also provided their as-built GIS database and construction plans for the recently reconstructed TH 7, TH 100, I-394, and US 169. The City also provided supplemental survey data for inverts and pipes that were not provided in the GIS data. A total of 2,483 manholes, catchbasins, and junctions are included in the model.

Multiple pipe sizes, shapes, and materials make up the 83.2 miles of storm sewer modeled. Pipe material and Manning's roughness value are provided in Table 2-2.

Table 2-2. Pipe Material Hydraulic Coefficients Used in the City of St. Louis Park SWMP Modeling

Pipe Material	Manning's n-value	Hazen-Williams Coefficient
DIP/Cast Iron	0.013	140
VCP	0.014	—
RCP	0.013	—
CMP/PVC	0.024	130
PP/PVC	0.010	—
Steel Pipe	0.012	—
Clay Drain Tile	0.013	—

Because discrepancies occurred in the data, the original as-designed data were used for modeled development and a note was appended to the model data to identify any assumptions made. When no data existed for a node invert or pipe diameter, the values were estimated based on the nearest up and downstream data and our professional judgement.

2.5.2 STORMWATER STORAGE AREAS AND SINKS

Using the MnDNR LiDAR elevation dataset and the 2011 *Stormwater Pond Evaluation and Prioritization – Assessment of Twenty-Six Basins* report, available flood storage for each pond above the normal water surface elevation was determined and combined with the dead storage provided in the report. These data were incorporated into the model to evaluate the flood detention and water quality benefits of the City's existing ponds and lakes. Using the LiDAR dataset, low-laying areas with a depth of more than 2-ft were identified and incorporated in the modeling. These areas are typically low points in backyards or intersections and provide live storage during flood events when the storm sewer system is at capacity and surcharges into streets or out of the system. Locations where the subsurface system surcharges are connected to the subsurface system via drainage pathways that occur in streets or swales and allow stormwater to reenter the subsurface system at a downstream point. A total of 390 storage areas were included in the models.

2.6 WATER QUALITY

EPA SWMM5 can also model water quality and pollutant loading. This module was added to establish the existing loading from watersheds and roughly estimate the reduction occurring from the City's waterbodies and regional best management practices (BMPs).

The event mean concentration (EMC) data from the Minnesota Pollution Control Agency's (MPCA) *Minnesota Stormwater Manual* was incorporated into the SWMM models to evaluate the watershed loading rates for total phosphorus (TP) and total suspended solids (TSS), shown in Table 2-3.

To evaluate the pollutant mass loading from the City, the models were run using a 10-year daily rainfall record developed from precipitation data at Minneapolis-St. Paul International Airport. These data are shown in Table 2-4.

Table 2-3. Total Phosphorus and Total Suspended Solids Event Mean Concentrations by Land Use in St. Louis Park

Land Use	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)
Low Density Residential	0.5	150
Medium Density Residential	0.3	120
High Density Residential	0.4	140
Mixed Use	0.4	140
Commercial	0.25	140
Industrial	0.25	150
Office/Business Park	0.25	140
Civic	0.3	140
Park and Open Space	0.2	90
Highway and Rail Right-of-Way	0.04	135
Streets	0.5	135

mg/L = milligrams per liter.

Table 2-4. Total Precipitation at Minneapolis-St. Paul Airport (2008–2017)

Year	Precipitation
2008	22.38
2009	24.8
2010	32.89
2011	26.91
2012	29.59
2013	32.77
2014	35.4
2015	36.14
2016	40.32
2017	32.36
Mean Annual	31.36

Areas outside of the City, including the MnDOT right-of-way, are not included in this analysis. The pollutant removal efficiencies of existing stormwater facilities were not incorporated into this study; however, the existing facilities within the City were estimated to provide the removal efficiencies shown in Table 2-5.

Table 2-5. Pollutant Removal Efficiencies for Stormwater Best Management Practices in St. Louis Park

Practice	Total Phosphorus (%)	Total Suspended Solids (%)
Constructed Wet Pond	50	84
Constructed Wetland	38	73
Biofiltration With Underdrain	80	85
Structural Pollutant Removal Devices	N/A	Varies by manufacturer

3.0 RESULTS

3.1 JULY 1987 FLOOD EVENT

The hydrology and hydraulic components of the SWMM models were compared to high water elevations collected during the July 23–25, 1987, storm event. The 15-minute rainfall record at Golden Valley COOP Station 213202 was collected from NOAA's Climate Data Online clearinghouse. This precipitation record was run in all of the final models to evaluate how well the model predicted the observed high water conditions. In general, the model overestimated high water elevations by approximately 0.26 percent on average, with a maximum error of 2.91 percent at the intersection of Lake Street and Hamilton Street (SA-7-045) in the Bass Lake model. This area has been redeveloped and may no longer reflect the 1987 conditions. No observed hydrograph data were available for calibration, and future modeling efforts are recommended to include collecting the data necessary for calibration.

3.2 HYDRAULIC RESULTS

The model results for all of the events were exported to GIS and analyzed to evaluate the approximate extents of surface flooding and pipe capacities in the City. The results of these analyses are presented in Appendix A. Areas of excessive flooding, which are defined as more than 2-ft deep even during the 10-year event, include the following:

- City Hall parking lot
- Edgewood Industrial Area
- Franklin Avenue and Lamplighter Pond area
- Franklin Avenue and Louisiana Avenue
- Minnetonka Boulevard and Georgia Avenue
- Minnetonka Boulevard and Highway 7
- Morningside Road and Browndale Avenue
- Nelson Park
- West 26th Street and Raleigh Avenue
- West 27th Street and Zarthan Avenue
- West 28th Street and Jersey Avenue
- West 29th Street and Vernon Avenue
- West 34th Street and Xylon Avenue
- West 39th Street and Kipling Avenue.

The large waterbodies in the City were evaluated for freeboard under TP-40 and Atlas 14 rainfall events for both the 100-year and 10-year events. A comprehensive list of modeled water surface elevations for all events is provided in Appendix B. All modeled lake elevations increased with the change from NOAA's TP-40 to Atlas 14 rainfall depths and as a result, all lakes show a decrease in available freeboard between the lowest primary structure elevation and the 10- and 100-year water surface elevation. Some lakes actually have negative freeboard, indicating the potential for the flooding of

residential structures. Lakes with negative freeboard (i.e. flooding) are shown in Table 3-2 for all four of the modeled events. The models were used to summarize the stormwater runoff leaving the City. The peak discharges and locations are summarized in Table 3-3.

Table 3-1. Model Results and Comparison With July 1987 Observed Data

Node Name	Location	1987 Peak Flood Elevation	Modeled Elevation	Difference (ft)	Difference (%)
CE-16K-06	4725 Highway 7	878.83	880.07	1.24	0.14
SA-7-045	Lake Street and Hamilton Street	892.18	918.11	25.93	2.91
SA-7-058	Beltline Road & West 35th Street	877.83	880.05	2.22	0.25
SA-7-BassLake	Bass Lake Outlet	877.98	880.05	2.07	0.24
SA-2-OttenPond	Otten Pond	876.72	878.37	1.65	0.19
Cedar_Manor_Lake	Cedar Manor Lake	898.46	900.39	1.93	0.21
Hannan_Lake	Hannan Lake	897.87	899.57	1.7	0.19
Landlocked	Landlocked Basin	900.15	903.37	3.22	0.36
SA-6-CandlestickPond	Candlestick Pond	879.02	880.6	1.58	0.18
4-CC-09J-12	3100 Oregon Avenue South	897.14	896.8	–0.34	-0.04
4-MC-56UFN14	Upstream 37th St Bridge	901.03	903.08	2.05	0.23
4-SC-11N-05	Louisiana Street and Oxford Street	891.24	891.72	0.48	0.05
4-SC-10N-21	Oregon Street and Lake Street	892.42	892.37	–0.05	-0.01
SA-4-032	Oak Hill Park	895.71	896.81	1.1	0.12
SA-4-CobblecrestLake	Cobblecrest Lake	899.64	896.91	–2.73	-0.30
SA-4-MC-53	Minnehaha Creek Wetlands	899.49	903.6	4.11	0.46
SA-4-MC-54	Upstream 34th Street Bridge	902.34	903.6	1.26	0.14
SA-4-MC-69	Upstream Excelsior Boulevard	888.58	891.51	2.93	0.33
SA-4-OakPond	Oak Lake	892.21	893.12	0.91	0.10
SA-4-WestingPond	Westling Pond	897.62	899.58	1.96	0.22
SA-5-004	7520 Cedar Lake Road and Oregon Court Sink	885.09	886.4	1.31	0.15
SA-5-Boneyard	Boneyard Ditch	879.38	882.36	2.98	0.34
SA-5-Lamplighter	Lamplighter Pond	885.32	886.34	1.02	0.12
SA-5-Natchez	Natchez Pond	874.51	874.36	–0.15	–0.02
SA-5-TwinLakes	Twin Lake	875.68	874.2	–1.48	–0.17
SA-1-KilmerLake	Kilmer Pond	905.72	910.34	4.62	0.51
SA-1-WestwoodLake	Westwood Lake	888.45	888.7	0.25	0.03

3.3 WATER QUALITY RESULTS

Using the EMC data collected for the various land use types in the City and a 10-year rainfall record, the watershed loading rates were calculated in the models.

Table 3-2. City of St. Louis Park Lakes With Modeled Negative Freeboard

Lake	10-Year Technical Paper-40	100-Year Technical Paper-40	10-Year Atlas 14	100-Year Atlas 14
Bass Lake		●	●	●
Browndale Pond				●
Candlestick Pond				●
Kilmer Pond				●
Lamplighter Pond				●
Natchez Pond		●		●
Oak Pond		●		●
Oregon Pond	●	●	●	●
Otten Pond		●		●
Rhino Pond				●
South Oak Pond	●	●	●	●
Sumter Pond				●

Table 3-3. Intercommunity Peak Outflows From the City of St. Louis Park

Receiving Cities	Drainage District	10-Year Technical Paper-40	100-Year Technical Paper-40	10-Year Atlas 14	100-Year Atlas 14
Minneapolis	Bass Lake	85	177	141	365
Edina	Edina	208	299	243	410
Minneapolis	Edina	127	190	153	276
Golden Valley/MnDOT	Golden Valley	177	256	218	322
Minneapolis/Storm Sewer	Minneapolis	82	114	101	169
Minneapolis/Cedar Lake	Minneapolis	128	156	137	177
Minneapolis/MnDOT	Minneapolis	145	201	164	244
Plymouth (Bassett Creek)	Westwood	247	294	274	353
Golden Valley	Westwood	69	99	83	143

Note that all units are in cubic feet per second (cfs).

Given the significant area occupied by state highways in the City, the pollutant loading from MnDOT right-of-way was separated out along I-394, Trunk Highways 7 and 100, and US 169. Loading rates from the watershed were allocated to each entity based on their proportional areas in each subwatershed. The results are provided in Table 3-5. The loads within the drainage areas of the three impaired lakes in the City are included in Table 3-6. Note that a very small part of the Bass Lake drainage area is located within the City of Minneapolis.

Table 3-4. City of St. Louis Park Modeled Pollutant Loading

	Model Total	St. Louis Park Only
Area (ac)	9,489	6,864
Annual TP Load (2008-2017) (lb/yr)	11,465	8,538
TP Loading Rate (lb/ac/yr)	1.21	1.24
Annual TSS Load (2008-2017) (lb/yr)	4,079,726	3,068,247
TSS Loading Rate (lb/ac/yr)	429.94	447.04

ac = acres.
lb/yr = pounds per year.
lb/ac/yr = pounds per acre per year.

Table 3-5. Allocated Watershed Loading From the City of St. Louis Park and Minnesota Department of Transportation

	City of St. Louis Park	Minnesota Department of Transportation
Area (ac)	6,645	219
Annual TP Load (2008-2017) (lb/yr)	7,989	549
TP Loading Rate (lb/ac/yr)	1.20	2.51
Annual TSS Load (2008-2017) (lb/yr)	2,893,431	174,816
TSS Loading Rate (lb/ac/yr)	435.45	798.84

Table 3-6. Annual Total Phosphorus Load (2008–2017) to Nutrient-Impaired Waters in St. Louis Park

Impaired Water	City of St. Louis Park (lb/yr)	MnDOT (lb/yr)	External to St. Louis Park (lb/yr)
Bass Lake	1,975.7	276.7	0.5 (City of Minneapolis)
Cobblecrest Lake	327.6	0.1	n/a
Twin Lake	2,303.9	28.1	n/a

lb/yr = pounds per year.

4.0 CONCLUSIONS

4.1 HYDRAULIC RECOMMENDATIONS

As the City is well-aware, multiple flood-prone areas exist in the City. The areas identified in this study should be verified against the Public Works' maintenance records or resident complaints to validate the model results, in absence of calibration data. Additional efforts are recommended and include the following:

- Establishing a monitoring and data collection network for future calibration efforts. Because the models appear to be overestimating runoff, the catchment width factor should be closely reviewed during any calibration effort.
- Reviewing model assumptions. Some of these locations may indicate the need for future City maintenance, given the high groundwater table and underlying soils in the City.
- Reviewing surface inundation areas with the City Engineer and Public Works Department to validate these problem areas against citizen complaint and/or maintenance records.
- Confirming pump operations with the Public Works Department. Available as-built data were used, but the records were incomplete, and in many cases, pump size and rules were assumed.
- Reviewing intercommunity and inter-model flows and assumptions. The inflow hydrographs from Minnehaha Creek could not be obtained in the time frame for finalizing this report; however, the model results have been verified against the current FEMA mapping and are consistent with FEMA's results in the creek.
- Coordinating routine street reconstruction projects with flood improvement projects to maximize opportunities to improve drainage.

4.2 WATER QUALITY RECOMMENDATIONS

The model results indicate that the City contributes nearly 8,000 pounds of TP and 4 million pounds of TSS annually. The City intends to improve these numbers and has made progress toward that goal with projects such as the Carpenter Park Underground Stormwater Facility. The watershed loading identified in this study is recommended to prioritize the siting of future regional water quality projects and modeling efforts. Future work includes:

- Refining the models to allow for long-term simulation of flow routing and water quality data and establishing the City's reductions and contributions to meeting existing total maximum daily loads (TMDLs).
- Incorporating private BMPs. These BMPs were not generally included in this modeling effort, but they do play a role in improving water quality.
- Combining maintenance projects in the Birchwood, Bronx Park, Fern Hill, and Elliot View neighborhoods with water quality improvement projects, as the runoff from these neighborhoods contributes to the nutrient-impaired Twin Lake.
- Coordinating with future private and public developments in the Aquila and Meadowbrook neighborhoods to look for enhanced water quality improvements to benefit the impaired Minnehaha Creek.

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APPENDIX A

FIGURES

St. Louis Park
MINNESOTA

FIGURE A-1: STORM SEWER CONVEYANCE SYSTEM AND IMPAIRED WATERBODIES

LEGEND

- Intercommunity Flow Locations
- Stormwater Lift Stations
- Stormwater Discharge Points
- Storm Mains (Pressure)
- Storm Mains (Gravity)
- Flow Arrows
- 01-Westwood Lake District (740 acres)
- 02-Golden Valley District (219 acres)
- 03-Hannan Lake District (605 acres)
- 04-Minnehaha Creek District (3,783 acres)
- 05-Twin Lake District (1,636 acres)
- 06-Minneapolis District (649 acres)
- 07-Bass Lake District (1,362 acres)
- 08-Edina District (497 acres)
- Impaired Streams
- Impaired Lakes
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-2: NOAA ATLAS 14 100-YEAR 24-HOUR SURFACE FLOODING

LEGEND

- Critical Infrastructure
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Modeled Storm Mains

Depth of Flooding

- No Flooding
- 0 - 2-ft
- > 2-ft
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-3: NOAA ATLAS 14 100-YEAR 24-HOUR SYSTEM CAPACITY

LEGEND

- Critical Infrastructure

Modeled Conduits Percent Full

- 0% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-4: NOAA ATLAS 14 10-YEAR 24-HOUR SURFACE FLOODING

LEGEND

- Critical Infrastructure
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Modeled Storm Mains

Depth of Flooding

- No Flooding
- 0 - 2-ft
- > 2-ft
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-5: NOAA ATLAS 14 10-YEAR 24-HOUR SYSTEM CAPACITY

LEGEND

- Critical Infrastructure

Modeled Conduits Percent Full

- 0% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-6: NOAA TP-40 100-YEAR 24-HOUR SURFACE FLOODING

LEGEND

- Critical Infrastructure
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Modeled Storm Mains

Depth of Flooding

- No Flooding
- 0 - 2-ft
- > 2-ft
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-7: NOAA TP-40 100-YEAR 24-HOUR SYSTEM CAPACITY

LEGEND

- Critical Infrastructure

Modeled Conduit Percent Full

- 0% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-8: NOAA TP-40 10-YEAR 24-HOUR SURFACE FLOODING

LEGEND

- Critical Infrastructure
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Modeled Storm Mains

Depth of Flooding

- No Flooding
- 0 - 2-ft
- > 2-ft
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-9: NOAA TP-40
10-YEAR 24-HOUR SYSTEM CAPACITY

LEGEND

- Critical Infrastructure

Modeled Conduit Percent Full

- 0% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-10: TOTAL PHOSPHORUS MASS LOADING

LEGEND

- Flow Arrows
- Impaired Streams
- Impaired Lakes

Annual Loading (lb/ac/yr)

- 0.00 - 0.78
- 0.79 - 1.43
- 1.44 - 1.99
- 2.00 - 2.76
- 2.77 - 3.50
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

St. Louis Park
MINNESOTA

FIGURE A-11: TOTAL SUSPENDED SOLIDS MASS LOADING

LEGEND

- Flow Arrows
- Impaired Streams
- Impaired Lakes

Annual Loading (lb/ac/yr)

- 0 - 236
- 237 - 439
- 440 - 640
- 641 - 869
- 870 - 1,213
- Creeks
- Lakes
- City Boundary

0 0.25 0.5 1 MILES

1 INCH = 0.25 MILES

Scale: As Shown	
Drawn By: KAT	
Checked By:	
Proj. #: 03259	
Date: 2018.11.08	

RESPEC

APPENDIX B

LAKE RESULTS

APPENDIX B: MODELED LAKE RESULTS

For all of the tables in this appendix, the Lowest Adjacent Grade was determined from the nearest light and detection ranging (LiDAR) contour to the lowest primary residential structure.

B.1 BASS LAKE MODEL LAKE RESULTS

Table B-1. Bass Lake Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	876.58	877.08	+0.5
100-year, 24-hour Water Surface Elevation	878.51	879.85	+1.34
Lowest Adjacent Grade	877.00		
Minimum Freeboard (10-year, 24-hour)	0.42	–0.08	–0.5
Minimum Freeboard (100-year, 24-hour)	–1.51	–2.85	–1.34

ft = feet.

Table B-2. Cattail Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	877.58	877.66	+0.08
100-year, 24-hour Water Surface Elevation	878.48	879.8	+1.32
Lowest Adjacent Grade	880.00		
Minimum Freeboard (10-year, 24-hour)	2.42	2.34	–0.08
Minimum Freeboard (100-year, 24-hour)	1.52	0.20	–1.32

Table B-3. Harvey Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	881.6	881.75	+0.15
100-year, 24-hour Water Surface Elevation	882.16	883.15	+0.99
Lowest Adjacent Grade	886.00		
Minimum Freeboard (10-year, 24-hour)	4.40	4.25	–0.15
Minimum Freeboard (100-year, 24-hour)	3.84	2.85	–0.99

Table B-4. Hoiigaard Pond

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	887.01	887.07	+0.06
100-year, 24-hour Water Surface Elevation	887.31	887.7	+0.39
Lowest Adjacent Grade	898.00		
Minimum Freeboard (10-year, 24-hour)	10.99	10.93	–0.06
Minimum Freeboard (100-year, 24-hour)	10.69	10.30	–0.39

Table B-5. Roxbury Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	898.24	898.55	+0.31
100-year, 24-hour Water Surface Elevation	899.4	902.53	+3.13
Lowest Adjacent Grade	904.00		
Minimum Freeboard (10-year, 24-hour)	5.76	5.45	–0.31
Minimum Freeboard (100-year, 24-hour)	4.60	1.47	–3.13

Table B-6. Wolfe Lake Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	876.63	877.05	+0.42
100-year, 24-hour Water Surface Elevation	878.48	879.8	+1.32
Lowest Adjacent Grade	880.00		
Minimum Freeboard (10-year, 24-hour)	3.37	2.95	–0.42
Minimum Freeboard (100-year, 24-hour)	1.52	0.20	–1.32

Table B-7. Wooddale Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	880.9	881.18	+0.28
100-year, 24-hour Water Surface Elevation	881.84	882.77	+0.93
Lowest Adjacent Grade	889.00		
Minimum Freeboard (10-year, 24-hour)	8.10	7.82	–0.28
Minimum Freeboard (100-year, 24-hour)	7.16	6.23	–0.93

B.2 EDINA MODEL LAKE RESULTS

Table B-8. Browndale Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	876.97	877.33	+0.36
100-year, 24-hour Water Surface Elevation	877.98	879.22	+1.24
Lowest Adjacent Grade	878.00		
Minimum Freeboard (10-year, 24-hour)	1.03	0.67	–0.36
Minimum Freeboard (100-year, 24-hour)	0.02	–1.22	–1.24

B.3 GOLDEN VALLEY MODEL LAKE RESULTS

Table B-9. Otten Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	876.3	876.46	+0.16
100-year, 24-hour Water Surface Elevation	877.12	878.37	+1.25
Lowest Adjacent Grade	877.00		
Minimum Freeboard (10-year, 24-hour)	0.70	0.54	–0.16
Minimum Freeboard (100-year, 24-hour)	–0.12	–1.37	–1.25

B.4 HANNAN LAKE MODEL LAKE RESULTS

Table B-10. Cedar Manor Lake Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	898.7	899.09	+0.39
100-year, 24-hour Water Surface Elevation	899.62	900.27	+0.65
Lowest Adjacent Grade	902.00		
Minimum Freeboard (10-year, 24-hour)	3.30	2.91	–0.39
Minimum Freeboard (100-year, 24-hour)	2.38	1.73	–0.65

Table B-11. Hannan Lake Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	898.02	898.24	+0.22
100-year, 24-hour Water Surface Elevation	898.81	899.58	+0.77
Lowest Adjacent Grade	907.00		
Minimum Freeboard (10-year, 24-hour)	8.98	8.76	–0.22
Minimum Freeboard (100-year, 24-hour)	8.19	7.42	–0.77

B.5 MINNEAPOLIS MODEL LAKE RESULTS

Table B-12. Blackstone Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	878.15	878.79	+0.64
100-year, 24-hour Water Surface Elevation	879.99	881.35	+1.36
Lowest Adjacent Grade	882.82		
Minimum Freeboard (10-year, 24-hour)	4.67	4.03	–0.64
Minimum Freeboard (100-year, 24-hour)	2.83	1.47	–1.36

Table B-13. Candlestick Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	876.22	876.92	+0.7
100-year, 24-hour Water Surface Elevation	879.02	880.33	+1.31
Lowest Adjacent Grade	879.82		
Minimum Freeboard (10-year, 24-hour)	3.60	2.90	-0.70
Minimum Freeboard (100-year, 24-hour)	0.80	–0.51	–1.31

B.6 MINNEHAHA CREEK MODEL LAKE RESULTS

Table B-14. Amhurst Ponds Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	918.52	918.77	+0.25
100-year, 24-hour Water Surface Elevation	919.25	919.83	+0.58
Lowest Adjacent Grade	920.00		
Minimum Freeboard (10-year, 24-hour)	1.48	1.23	–0.25
Minimum Freeboard (100-year, 24-hour)	0.75	0.17	–0.58

Table B-15. Cobblecrest Lake Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	894.33	894.77	+0.44
100-year, 24-hour Water Surface Elevation	895.89	897.63	+1.74
Lowest Adjacent Grade	907.00		
Minimum Freeboard (10-year, 24-hour)	12.67	12.23	–0.44
Minimum Freeboard (100-year, 24-hour)	11.11	9.37	–1.74

Table B-16. Oak Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	891.3	891.58	+0.28
100-year, 24-hour Water Surface Elevation	892.22	893.14	+0.92
Lowest Adjacent Grade	892.00		
Minimum Freeboard (10-year, 24-hour)	0.70	0.42	–0.28
Minimum Freeboard (100-year, 24-hour)	–0.22	–1.14	–0.92

Table B-17. Oregon Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	894.13	894.69	+0.56
100-year, 24-hour Water Surface Elevation	895.34	896.65	+1.31
Lowest Adjacent Grade	894.00		
Minimum Freeboard (10-year, 24-hour)	–0.13	–0.69	–0.56
Minimum Freeboard (100-year, 24-hour)	–1.34	–2.65	-1.31

Table B-18. Rhino Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	914.06	914.43	+0.37
100-year, 24-hour Water Surface Elevation	914.77	915.39	+0.62
Lowest Adjacent Grade	915.00		
Minimum Freeboard (10-year, 24-hour)	0.94	0.57	–0.37
Minimum Freeboard (100-year, 24-hour)	0.23	–0.39	–0.62

Table B-19. South Oak Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	891.3	891.54	+0.24
100-year, 24-hour Water Surface Elevation	892.18	892.76	+0.58
Lowest Adjacent Grade	890.00		
Minimum Freeboard (10-year, 24-hour)	–1.30	–1.54	–0.24
Minimum Freeboard (100-year, 24-hour)	–2.18	–2.76	–0.58

Table B-20. Sumter Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	893.84	894.53	+0.69
100-year, 24-hour Water Surface Elevation	895.32	897.32	+2.00
Lowest Adjacent Grade	896.00		
Minimum Freeboard (10-year, 24-hour)	2.16	1.47	–0.69
Minimum Freeboard (100-year, 24-hour)	0.68	–1.32	–2.00

Table B-21. Victoria Lake Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	901.1	901.48	+0.38
100-year, 24-hour Water Surface Elevation	902.47	903.77	+1.3
Lowest Adjacent Grade	905.00		
Minimum Freeboard (10-year, 24-hour)	3.90	3.52	–0.38
Minimum Freeboard (100-year, 24-hour)	2.53	1.23	–1.3

Table B-22. Westling Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	898.64	898.78	+0.14
100-year, 24-hour Water Surface Elevation	899.02	899.57	+0.55
Lowest Adjacent Grade	900.00		
Minimum Freeboard (10-year, 24-hour)	1.36	1.22	–0.14
Minimum Freeboard (100-year, 24-hour)	0.98	0.43	–0.55

B.7 TWIN LAKE MODEL LAKE RESULTS

Table B-23. Boneyard Ditch Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	881.28	881.5	+0.22
100-year, 24-hour Water Surface Elevation	882.09	882.85	+0.76
Lowest Adjacent Grade	887.00		
Minimum Freeboard (10-year, 24-hour)	5.72	5.50	–0.22
Minimum Freeboard (100-year, 24-hour)	4.91	4.15	–0.76

Table B-24. Lamplighter Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	883.73	884.4	+0.67
100-year, 24-hour Water Surface Elevation	885.57	886.77	+1.2
Lowest Adjacent Grade	886.00		
Minimum Freeboard (10-year, 24-hour)	2.27	1.60	–0.67
Minimum Freeboard (100-year, 24-hour)	0.43	–0.77	–1.2

Table B-25. Natchez Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	871.8	872.03	+0.23
100-year, 24-hour Water Surface Elevation	871.14	874.44	+1.3
Lowest Adjacent Grade	873.00		
Minimum Freeboard (10-year, 24-hour)	1.20	0.97	–0.23
Minimum Freeboard (100-year, 24-hour)	–0.14	–1.44	–1.3

Table B-26. Twin Lake Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	874.1.8	874.31	+0.21
100-year, 24-hour Water Surface Elevation	874.89	875.38	+0.49
Lowest Adjacent Grade	877.00		
Minimum Freeboard (10-year, 24-hour)	2.90	2.69	–0.21
Minimum Freeboard (100-year, 24-hour)	2.11	1.62	–0.49

Table B-27. Utah Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	915.64	915.7	+0.06
100-year, 24-hour Water Surface Elevation	915.81	916.04	+0.23
Lowest Adjacent Grade	917.00		
Minimum Freeboard (10-year, 24-hour)	1.36	1.30	–0.06
Minimum Freeboard (100-year, 24-hour)	1.19	0.96	–0.23

B.8 WESTWOOD LAKE MODEL LAKE RESULTS

Table B-28. Kilmer Pond Modeled Water Surface Elevations

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	905.15	905.96	+0.81
100-year, 24-hour Water Surface Elevation	907.27	909.51	+2.24
Lowest Adjacent Grade	909.00		
Minimum Freeboard (10-year, 24-hour)	3.85	3.04	–0.81
Minimum Freeboard (100-year, 24-hour)	1.73	–0.51	–2.24

Table B-29. Westwood Lake Modeled Water Surface Elevations*

	TP-40 Results (NVGD29) (ft)	Atlas 14 Results (NGVD29) (ft)	Change (ft)
10-year, 24-hour Water Surface Elevation	887.82	887.89	+0.07
100-year, 24-hour Water Surface Elevation	888.2	888.56	+0.36
Lowest Adjacent Grade	889.00		
Minimum Freeboard (10-year, 24-hour)	1.18	1.11	–0.07
Minimum Freeboard (100-year, 24-hour)	0.80	0.44	–0.36

Please note, elevations presented in these tables are for information and planning purposes only. Contact Minnehaha Creek Watershed District or Bassett Creek Watershed Management Commission for the regulatory floodplain elevations, as they may be higher than presented in this study. The SWMM modeling assumed clean and as-built conditions in order to evaluate the existing system's capacity and may result in locally lower flood elevations in some areas. For example, sediment build up in the outlet channel of Westwood Lake has been shown to affect the water elevations in the lake. As a result, BCWMC has adopted an elevation of 889.8 NGVD29 for the regulatory 100-year flood elevation of Westwood Lake, due to the outlet channel sedimentation.

DIVISION 11. FLOODPLAIN DISTRICTS

Sec. 36-291. Statutory Authorization. The legislature of the State of Minnesota has, in Minnesota Statutes Chapter 103F and Chapter 462 delegated the responsibility to local government units to adopt regulations designed to minimize flood losses. Therefore, the City Council of St. Louis Park, Minnesota does ordain as follows:

Sec. 36-292. Purpose.

(a) This ordinance regulates development in the flood hazard areas of St. Louis Park. These flood hazard areas are subject to periodic inundation, which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base. It is the purpose of this ordinance to promote the public health, safety, and general welfare by minimizing these losses and disruptions.

(b) National Flood Insurance Program Compliance. This ordinance is adopted to comply with the rules and regulations of the National Flood Insurance Program codified as 44 Code of Federal Regulations Parts 59 -78, as amended, so as to maintain the community's eligibility in the National Flood Insurance Program.

(Code 1976, § 14:5-9.1, Ord. No. 2276-04, 8-16-2004, Ord. No. 2509-16, 9-19-16)

Sec. 36-293. General Provisions.

(a) How to Use this Ordinance. This ordinance adopts the floodplain maps applicable to the City of St. Louis Park includes three floodplain districts: Floodway, Flood Fringe, and General Floodplain.

(1) Where Floodway and Flood Fringe districts are delineated on the floodplain maps, the standards in Sections 4 or 5 will apply, depending on the location of a property.

(2) Locations where Floodway and Flood Fringe districts are not delineated on the floodplain maps are considered to fall within the General Floodplain district. Within the General Floodplain district, the Floodway District standards in Section 36-296 apply unless the floodway boundary is determined, according to the process outlined in Section 36-298. Once the floodway boundary is determined, the Flood Fringe District standards in Section 36-297 may apply outside the floodway.

(b) Lands to Which Ordinance Applies. This ordinance applies to all lands within the jurisdiction of St. Louis Park shown on the Official Zoning Map and/or the attachments to the map as being located within the boundaries of the Floodway, Flood Fringe, or General Floodplain Districts.

(1) The Floodway, Flood Fringe and General Floodplain Districts are overlay districts that are superimposed on all existing zoning districts. The standards imposed in the overlay districts are in addition to any other requirements in this ordinance. In case of a conflict, the more restrictive standards will apply.

(c) Incorporation of Maps by Reference. The following maps together with all attached material are hereby adopted by reference and declared to be a part of the Official Zoning Map and this ordinance. The attached material includes the Flood Insurance Study for Hennepin County, Minnesota, and Incorporated Areas, dated November 4, 2016 and the Flood Insurance Rate Map panels enumerated below, dated November 4, 2016, all prepared by the Federal Emergency Management Agency. These materials are on file in the office of the Zoning Administrator.

Effective Flood Insurance Rate Map panels:

27053C0331F	27053C0342F	27053C0353F	27053C0362F
27053C0332F	27053C0351F	27053C0354F	
27053C0334F	27053C0352F	27053C0361F	

(d) **Regulatory Flood Protection Elevation**. The regulatory flood protection elevation (RFPE) is an elevation no lower than two feet above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the floodplain that result from designation of a floodway.

(e) **Interpretation.** The boundaries of the zoning districts are determined by scaling distances on the Flood Insurance Rate Map.

(1) Where a conflict exists between the floodplain limits illustrated on the official zoning map and actual field conditions, the flood elevations shall be the governing factor. The Zoning Administrator must interpret the boundary location based on the ground elevations that existed on the site on the date of the first National Flood Insurance Program map showing the area within the regulatory floodplain, and other available technical data.

(2) Persons contesting the location of the district boundaries will be given a reasonable opportunity to present their case to the Board of Zoning Appeals and City Council and to submit technical evidence.

(f) **Abrogation and Greater Restrictions.** It is not intended by this ordinance to repeal, abrogate, or impair any existing easements, covenants, or other private agreements. However, where this ordinance imposes greater restrictions, the provisions of this ordinance prevail. All other ordinances inconsistent with this ordinance are hereby repealed to the extent of the inconsistency only.

(g) **Warning and Disclaimer of Liability.** This ordinance does not imply that areas outside the floodplain districts or land uses permitted within such districts will be free from flooding or flood damages. This ordinance does not create liability on the part of the City of St. Louis Park or its officers or employees for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

(h) **No stage increase permitted.** No structure, fill, deposit, obstruction or storage of materials or equipment shall be allowed in any floodway, or general floodplain district which will cause any increase in the stage of the 100-year flood or will cause an increase in flood damages in the reaches affected.

(i) **Compensating storage.** The city may approve such structure, fill, deposit, obstruction or storage of materials or equipment if it otherwise complies with the provisions of this chapter and provision is made for compensating storage of floodwaters displaced by the activity listed in this subsection (f). Such compensating storage shall be located where it will achieve the goal of eliminating a stage increase.
(Ord. No. 2496-16, 8-1-16; Ord. No. 2509-16, 9-19-16)

Sec. 36-294. Definitions.

Unless specifically defined below, words or phrases used in this ordinance must be interpreted according to common usage and so as to give this ordinance its most reasonable application. If any of the words defined are used elsewhere in this chapter, their meaning shall be those assigned by section 36-4.

Base Flood Elevation means the elevation of the "regional flood." The term "base flood elevation" is used in the flood insurance survey.

Basement means any area of a structure, including crawl spaces, having its floor or base subgrade (below ground level) on all four sides, regardless of the depth of excavation below ground level.

Equal degree of encroachment means a method of determining the location of floodway boundaries so that floodplain lands on both sides of a stream are capable of conveying a proportionate share of flood flows.

Flood means a temporary increase in the flow or stage of a stream or in the stage of a wetland or lake that results in the inundation of normally dry areas.

Flood frequency means the frequency for which it is expected that a specific flood stage or discharge may be equaled or exceeded.

Flood fringe means the portion of the Special Flood Hazard Area (one percent annual chance flood) located outside of the floodway. Flood fringe is synonymous with the term "floodway fringe" used in the Flood Insurance Study for Hennepin County, Minnesota.

Flood Insurance Rate Map (FIRM) means an official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.

Flood Prone Area means any land susceptible to being inundated by water from any source (see "Flood").

Floodplain means the beds proper and the areas adjoining a wetland, lake or watercourse which have been or hereafter may be covered by the regional flood.

Flood proofing means a combination of structural provisions, changes or adjustments to properties and structures subject to flooding, primarily for the reduction or elimination of flood damages.

Floodway means the bed of a wetland or lake and the channel of a watercourse and those portions of the adjoining floodplain which are reasonably required to carry or store the regional flood discharge.

Lowest Floor means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, used solely for parking of vehicles, building access, or storage in an area other than a basement area, is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of 44 Code of Federal Regulations, Part 60.3.

New Construction means structures, including additions and improvements, and placement of manufactured homes, for which the start of construction commenced on or after the effective date of this ordinance.

Obstruction means any dam, wall, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel modification, culvert, building, wire, fence, stockpile, refuse, fill, structure or matter in, along, across or projecting into any channel, watercourse or regulatory floodplain which may impede, retard or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water.

One Hundred Year Floodplain means lands inundated by the "Regional Flood" (see definition).

Reach means a hydraulic engineering term to describe a longitudinal segment of a stream or river influenced by a natural or man-made obstruction. In an urban area, the segment of a stream or river between two consecutive bridge crossings would most typically constitute a reach.

Regional flood means a flood which is representative of large floods known to have occurred generally in Minnesota and reasonably characteristic of what can be expected to occur on an average frequency in the magnitude of the 1% chance or 100-year recurrence interval. Regional flood is synonymous with the term "base flood" used in a flood insurance study.

Regulatory Flood Protection Elevation (RFPE) means an elevation not less than two feet above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the floodplain that result from designation of a floodway.

Repetitive Loss means flood related damages sustained by a structure on two separate occasions during a ten year period for which the cost of repairs at the time of each such flood event on the average equals or exceeds 25% of the market value of the structure before the damage occurred.

Special Flood Hazard Area means a term used for flood insurance purposes synonymous with "One Hundred Year Floodplain."

Start of Construction means includes substantial improvement, and means the actual start of construction, repair, reconstruction, rehabilitation, addition, placement or other improvement that occurred before the permit's expiration date. The actual start is either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, foundations, or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

Structure means anything constructed or erected on the ground or attached to the ground or on-site utilities, including, but not limited to, buildings, factories, sheds, detached garages, cabins, manufactured homes, recreational vehicles not meeting the exemption criteria specified in Section 36-295(b)(1) of this ordinance and other similar items.

Substantial Damage means damage of any origin sustained by a structure where the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Substantial Improvement means within any consecutive 365-day period, any reconstruction, rehabilitation (including normal maintenance and repair), repair after damage, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures that have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

(1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions.

(2) Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure." For the purpose of this ordinance, "historic structure" is as defined in 44 Code of Federal Regulations, Part 59.1.

(Code 1976, § 14:5-9.3, Ord. No. 2276-04, 8-16-2004, Ord. No. 2509-16, 9-19-16)
Cross reference(s) -- Definitions generally, § 1-2.

Sec. 36-295. Establishment of zoning districts.

(a) Districts.

(1) *Floodway district (FW).* The Floodway District includes those areas within Zones AE that have a floodway delineated as shown on the Flood Insurance Rate Map adopted in Section 36-293(c). For lakes, wetlands and other basins within Zones AE that do not have a floodway delineated, the Floodway District also includes those areas that are at or below the ordinary high water level as defined in Minnesota Statutes, Section 103G.005, subdivision 14.

(2) *Flood fringe district (FF).* The Flood Fringe District includes areas within Zones AE that have a floodway delineated on the Flood Insurance Rate Map adopted in Section 36-293(c), but are located outside of the floodway. For lakes, wetlands and other basins within Zones AE that do not have a floodway delineated, the Flood Fringe District also includes those areas below the 1% annual chance (100-year) flood elevation but above the ordinary high water level as defined in Minnesota Statutes, Section 103G.005, subdivision 14.

(3) *General floodplain district (FP).* The General Floodplain District includes those areas within Zones A and AH that do not have a delineated floodway as shown on the Flood Insurance Rate Map adopted in Section 36-293(c).

(b) Applicability. Within the floodplain districts established in this ordinance, the use, size, type and location of development must comply with the terms of this ordinance and other applicable regulations. In no cases shall floodplain development adversely affect the efficiency or unduly restrict the capacity of the channels or floodways of any tributaries to the main stream, drainage ditches, or any other drainage facilities or systems.

(c) Compliance. Provisions for compliance are as follows:

(1) Recreational vehicles that do not meet the exemption criteria specified in Section 36-295(c)(1)a below shall be subject to the provisions of this Ordinance and as specifically spelled out in Sections 36-295(c)(1)c below.

a. Exemption - Recreational vehicles are exempt from the provisions of this Ordinance if they are placed in any of the areas listed in Section 36-295(c)(1)b below and further they meet the following criteria:

   1. Have current licenses required for highway use.
   2. Are highway ready meaning on wheels or the internal jacking system, are attached to the site only by quick disconnect type utilities commonly used in campgrounds and recreational vehicle parks and the recreational vehicle has no permanent structural type additions attached to it.
   3. The recreational vehicle and associated use must be permissible in any preexisting, underlying zoning use district.

b. Areas Exempted For Placement of Recreational Vehicles:

   1. Individual lots or parcels of record.
   2. Existing commercial recreational vehicle parks or campgrounds.
   3. Existing condominium type associations.

c. Recreational vehicles exempted in Section 36-295(c)(1)b lose this exemption when development occurs on the parcel exceeding $500 for a structural addition to the recreational vehicle or exceeding $500 for an accessory structure such as a garage or storage building. The recreational vehicle and all additions and accessory structures will then be treated as a new structure and shall be subject to the elevation/flood proofing requirements and the use of land restrictions specified in Section 36-295(c) & Section 36-295(d) of this Ordinance. There shall be no development or

improvement on the parcel or attachment to the recreational vehicle that hinders the removal of the recreational vehicle to a flood free location should flooding occur.

(2) Modifications, additions, structural alterations normal maintenance and repair, or repair after damage to existing nonconforming structures and nonconforming uses of structures or land are regulated by the general provisions of this chapter.

(Ord. No. 2276-04, 8-16-04; Ord. No. 2509-16, 9-19-16)

(d) Annexations. The Flood Insurance Rate Map panels adopted by reference into Section 36-293(c) above may include floodplain areas that lie outside of the corporate boundaries of the City of St. Louis Park at the time of adoption of this ordinance. If any of these floodplain land areas are annexed into the City of St. Louis Park after the date of adoption of this ordinance, the newly annexed floodplain lands will be subject to the provisions of this ordinance immediately upon the date of annexation.

(Ord. No. 2509-16, 9-9-16)

Sec. 36-296. Floodway district (FW). Within the floodway district, all uses not listed as permitted uses or conditional uses shall be prohibited. No new structure or land shall hereafter be used and no structure shall be located, extended, converted or structurally altered without full compliance with the terms of this chapter and other applicable regulations which apply to uses within the jurisdiction of this chapter.

(a) Permitted uses. The following uses, subject to the standards set forth in Section 36-296(b), are permitted uses if otherwise allowed in the underlying zoning district or any applicable overlay district:

(1) Outdoor plant nurseries, horticulture, forestry, sod farming, and wild crop harvesting.

(2) Industrial-commercial loading areas, and parking areas.

(3) Open space uses and public golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, boat launching ramps, swimming areas, parks, wildlife and nature preserves, fish hatcheries, fishing areas, and single or multiple purpose recreational trails.

(4) Residential lawns, gardens, parking areas, and play areas.

(5) Railroads, streets, bridges, utility transmission lines and pipelines, provided that the Department of Natural Resources' Area Hydrologist is notified at least ten days prior to issuance of any permit.

(b) Standards for Floodway Permitted Uses.

(1) The use shall have a low flood damage potential.

(2) The use shall be permissible in the underlying zoning district.

(3) The use shall not obstruct flood flows or increase flood elevations and must not involve structures, obstructions, or storage of materials or equipment.

(4) Any facility that will be used by employees or the general public must be designed with a flood warning system that provides adequate time for evacuation if the area is inundated to a depth and velocity such that the depth (in feet) multiplied by the velocity (in feet per second) would exceed a product of four upon occurrence of the regional (1% chance) flood.

(c) Conditional Uses. The following uses shall require a conditional use permit following the standards and procedures set forth in Section 36-301(c) of this ordinance and further subject to the standards set forth in Section 36-296(d), if otherwise allowed in the underlying zoning district or any applicable overlay district.

(1) Structures and parking lots accessory to the uses listed in Section 36-296(a)(1) - Section 36-296(a)(3), above and the uses listed in Section 36-296(c)(2) - Section 36-296(c)(3) below.

(2) Docks, piers, wharves, and water control structures.

(3) Placement of fill or construction of fences that obstruct flood flows.

(4) Structural works for flood control such as levees, dikes and floodwalls, constructed to any height where the intent is to protect individual structures for a frequency flood event equal to or less than the 10-year frequency flood event.

(d) Standards for Floodway Conditional Uses. The standards for floodway conditional uses are as follows:

(1) All Uses. A conditional use must not cause any increase in the state of the 1% chance or regional flood or cause an increase in flood damages in the reach or reaches affected.

(2) The conditional use shall be permissible in the underlying zoning district.

(3) Fill; Storage of Materials and Equipment:

a. The storage or processing of materials that are, in time of flooding, flammable, explosive, or potentially injurious to human, animal, or plant life is prohibited.

b. Fill, dredge spoil, and other similar materials deposited or stored in the floodplain must be protected from erosion by vegetative cover, mulching, riprap or other acceptable method. Permanent sand and gravel operations and similar uses must be covered by a long-term site development plan.

c. Temporary placement of fill, other materials, or equipment which would cause an increase to the stage of the 1% percent chance or regional flood may only be allowed if the City Council has approved a plan that assures removal of the materials from the floodway based upon the flood warning time available.

(4) *Accessory Structures*. Accessory structures, as identified in Section 36-296(c)(1), may be permitted, provided that:

a. Structures are not intended for human habitation;

b. Structures will have a low flood damage potential;

c. Structures will be constructed and placed so as to offer a minimal obstruction to the flow of flood waters;

d. Service utilities, such as electrical and heating equipment, within these structures must be elevated to or above the regulatory flood protection elevation or properly floodproofed;

e. Structures must be elevated on fill or structurally dry floodproofed in accordance with the FP1 or FP2 floodproofing classifications in the State Building Code. All floodproofed structures must be adequately anchored to prevent flotation, collapse or lateral movement and designed to equalize hydrostatic flood forces on exterior walls.

f. As an alternative, an accessory structure may be internally/wet floodproofed to the FP3 or FP4 floodproofing classifications in the State Building Code, provided the accessory structure constitutes a minimal investment and does not exceed 576 square feet in size. Designs for meeting this requirement must either be certified by a registered professional engineer or meet or exceed the following criteria:

1. To allow for the equalization of hydrostatic pressure, there must be a minimum of two "automatic" openings in the outside walls of the structure, with a total net area of not less than one square inch for every square foot of enclosed area subject to flooding; and
2. There must be openings on at least two sides of the structure and the bottom of all openings must be no higher than one foot above the lowest adjacent grade to the structure. Using human intervention to open a garage door prior to flooding will not satisfy this requirement for automatic openings.4.44. Structural works for flood control that will change the course, current or cross section of protected wetlands or public waters are subject to the provisions of Minnesota Statutes, Section 103G.245.

(5) A levee, dike or floodwall constructed in the floodway must not cause an increase to the 1% chance or regional flood. The technical analysis must assume equal conveyance or storage loss on both sides of a stream.

(6) Floodway developments must not adversely affect the hydraulic capacity of the channel and adjoining floodplain of any tributary watercourse or drainage system.

(Ord. No. 2509-16, 9-19-16)

Sec. 36-297. Flood fringe district (FF).

(a) Permitted Uses. Permitted uses are those uses of land or structures allowed in the underlying zoning district(s) that comply with the standards in Section 36-297(b).

(b) Standards for Flood Fringe Permitted Uses.

(1) All structures, including accessory structures, must be elevated on fill so that the lowest floor including basement floor, is at or above the regulatory flood protection elevation. The finished fill elevation for structures shall be no lower than the regulatory flood protection elevation and the fill shall extend at such elevation at least 15 feet beyond the outside limits of the structure erected thereon.

(2) For all structures constructed after June 15, 1998, the lowest floor elevations shall be no lower than the regulatory flood protection elevation. For all structures existing on June 15, 1998, and additions to structures existing on June 15, 1998, the lowest floor shall be no lower than one foot below the regulatory flood protection elevation.

(3) *Accessory Structures.* As an alternative to the fill requirements of Section 36-297(b)(1), structures accessory to the uses identified in Section 36-297(a) may be permitted to be internally/wet floodproofed to the FP3 or FP4 floodproofing classifications in the State Building Code, provided that:

a. The accessory structure constitutes a minimal investment, does not exceed 576 square feet in size, and is only used for parking and storage.

b. All portions of floodproofed accessory structures below the Regulatory Flood Protection Elevation must be:

1. Adequately anchored to prevent flotation, collapse or lateral movement and designed to equalize hydrostatic flood forces on exterior walls, and
2. Constructed with materials resistant to flood damage, and
3. Must have all service utilities be water-tight or elevated to above the regulatory flood protection elevation.

c. Designs for meeting this requirement must either be certified by a registered professional engineer or meet or exceed the following criteria:

1. To allow for the equalization of hydrostatic pressure, there must be a minimum of two "automatic" openings in the outside walls of the structure, with a total net area of not less than one square inch for every square foot of enclosed area subject to flooding; and
2. There must be openings on at least two sides of the structure and the bottom of all openings must be no higher than one foot above the lowest adjacent grade to the structure. Using human intervention to open a garage door prior to flooding will not satisfy this requirement for automatic openings.

(4) The cumulative placement of fill or similar material on a parcel must not exceed 400 cubic yards, unless the fill is specifically intended to elevate a structure in accordance with Section 36-297(b)(1) of this ordinance, or if allowed as a conditional use under Section 36-297(c)(3) below.

(5) The storage of any materials or equipment must be elevated on fill to the regulatory flood protection elevation.

(6) All service utilities, including ductwork, must be elevated or water-tight to prevent infiltration of floodwaters.

(7) The storage or processing of materials that are, in time of flooding, flammable, explosive, or potentially injurious to human, animal, or plant life is prohibited.

(8) Compacted fill; protected slopes. Fill shall be properly compacted and the slopes shall be properly protected by the use of rip rap, vegetative cover or other acceptable methods. The Federal Emergency Management Agency (FEMA) has established criteria for removing the special flood hazard area designation for certain structures properly elevated on fill above the 100-year flood elevation. FEMA's requirements incorporate specific fill compaction and side slope protection standards for multistructure or multilot developments. These standards should be investigated prior to the initiation of site preparation if a change of special flood hazard area designation will be requested.

(9) Vehicular access. All new principal structures must have vehicular access at or above an elevation not more than two feet below the regulatory flood protection elevation.

(10) Commercial uses. Accessory uses such as yards, railroad tracks, and parking lots may be at an elevation lower than the regulatory flood protection elevation. However, any facilities used by employees or the general public must be designed with a flood warning system that provides adequate time for evacuation if the area is inundated to a depth and velocity such that the depth (in feet) multiplied by the velocity (in feet per second) would exceed a product of four upon occurrence of the regional (1% chance) flood.

(11) Hydraulic capacity. Floodplain developments shall not adversely affect the hydraulic capacity of the channel and adjoining floodplain of any tributary watercourse or drainage system where a floodway or other encroachment limit has not been specified on the official zoning map.

(12) Manufacturing and industrial uses. Certain accessory land uses such as yards and parking lots may be at lower elevations subject to requirements set out in subsection (b)(10) of this section. In considering permit applications, consideration shall be given to needs of an industry whose business requires that it be located in floodplain areas.

(13) Anchoring. All manufactured homes must be securely anchored to an adequately anchored foundation system that resists flotation, collapse and lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state or local anchoring requirements for resisting wind forces.

(c) Conditional Uses. The following uses and activities may be allowed as conditional uses, if allowed in the underlying zoning district(s) or any applicable overlay district, following the procedures in Section 36-301(c) of this ordinance.

(1) Any structure that is not elevated on fill or floodproofed in accordance with Section 36-297(b)(1) and Section 36-297(b)(3) of this ordinance.

(2) Storage of any material or equipment below the regulatory flood protection elevation.

(3) The cumulative placement of more than 400 cubic yards of fill when the fill is not being used to elevate a structure in accordance with Section 36-297(b)(1) of this ordinance.

(4) The use of methods to elevate structures above the regulatory flood protection elevation, including stilts, pilings, parallel walls, or above-grade, enclosed areas such as crawl spaces or tuck under garages, shall meet the standards in Section 36-297(d)(6).

(d) Standards for Flood Fringe Conditional Uses.

(1) The standards listed in Section 36-297(b)(5) through Section 36-297(b)(13) apply to all conditional uses.

(2) Basements, as defined by Section 36-297 of this ordinance, are subject to the following:

a. Residential basement construction is not allowed below the regulatory flood protection elevation.

b. Non-residential basements may be allowed below the regulatory flood protection elevation provided the basement is structurally dry floodproofed in accordance with Section 36-297(d)(3).

(3) All areas of nonresidential structures, including basements, to be placed below the regulatory flood protection elevation must be floodproofed in accordance with the structurally dry floodproofing classifications in the State Building Code. Structurally dry floodproofing must meet the FP1 or FP2 floodproofing classification in the State Building Code, which requires making the structure watertight with the walls substantially impermeable to the passage of water and with structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.

(4) The placement of more than 400 cubic yards of fill or other similar material on a parcel (other than for the purpose of elevating a structure to the regulatory flood protection elevation) must comply with an approved erosion/sedimentation control plan.

a. The plan must clearly specify methods to be used to stabilize the fill on site for a flood event at a minimum of the regional (1% chance) flood event.

b. The plan must be prepared and certified by a registered professional engineer or other qualified individual acceptable to the City Council.

c. The plan may incorporate alternative procedures for removal of the material from the floodplain if adequate flood warning time exists.

(5) Storage of materials and equipment.

a. The storage or processing of materials that are, in time of flooding, flammable, explosive or potentially injurious to human, animal or plant life is prohibited.

b. Storage of other materials or equipment may be allowed if readily removable from the area within the time available after a flood warning and in a manner required by a plan approved by the city.

(6) Alternative elevation methods other than the use of fill may be utilized to elevate a structure's lowest floor above the regulatory flood protection elevation. The base or floor of an enclosed area shall be considered above-grade and not a structure's basement or lowest floor if: 1) the enclosed area is above-grade on at least one side of the structure; 2) it is designed to internally flood and is constructed with flood resistant materials; and 3) it is used solely for parking of vehicles, building access or storage. The above-noted alternative elevation methods are subject to the following additional standards:

a. *Design and Certification* - The structure's design and as-built condition must be certified by a registered professional engineer as being in compliance with the general design standards of the State Building Code and, specifically, that all electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities must be at or above the regulatory flood protection elevation or be designed to prevent flood water from entering or accumulating within these components during times of flooding.

b. *Specific Standards for Above-grade, Enclosed Areas* - Above-grade, fully enclosed areas such as crawl spaces or tuck under garages must be designed to internally flood and the design plans must stipulate:

1. The minimum area of openings in the walls where internal flooding is to be used as a floodproofing technique. There shall be a minimum of two openings on at least two sides of the structure and the bottom of all openings shall be no higher than one foot above grade. The automatic openings shall have a minimum net area of not less than one square inch for every square foot of enclosed area subject to flooding unless a registered professional engineer or architect certifies that a smaller net area would suffice. The automatic openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of flood waters without any form of human intervention; and

2. That the enclosed area will be designed of flood resistant materials in accordance with the FP3 or FP4 classifications in the State Building Code and shall be used solely for building access, parking of vehicles or storage.

(Ord. No. 2509-16, 9-19-16)

36-298. General floodplain district (GF).

(a) Permitted Uses.

(1) The uses listed in Section 36-296(a) of this ordinance, Floodway District Permitted Uses, are permitted uses.

(2) All other uses are subject to the floodway/flood fringe evaluation criteria specified in Section 36-298(b) below. Section 36-296 applies if the proposed use is determined to be in the Floodway District. Section 36-297 applies if the proposed use is determined to be in the Flood Fringe District.

(b) Procedures for Floodway and Flood Fringe Determinations.

(1) Upon receipt of an application for a permit or other approval within the General Floodplain District, the applicant shall be required to furnish such information deemed necessary by the Zoning Administrator for the determination of the regulatory flood protection elevation and whether the proposed use is within the floodway or flood fringe district. This information may include the following:

a. A plan (surface view) showing elevations or contours of the ground; pertinent structure, fill or storage elevations; size, location and spatial arrangement of all proposed and existing structures on the site; and the location and elevations of streets.

b. The drainage area contributing to the waterbody and existing type and level of development in the drainage area.

c. A typical valley cross-section(s) showing the channel of the stream, elevation of land areas adjoining each side of the channel, cross-sectional areas to be occupied by the proposed development, and high water information.

d. Photographs showing existing land uses, vegetation upstream and downstream, and soil types.

e. Profile showing the slope of the bottom of the channel or flow line of the stream for at least 500 feet in either direction from the proposed development.

(2) If regional flood elevation and floodway data are not readily available, the applicant must furnish additional information, as needed, to determine the regulatory flood protection elevation and whether the proposed use would fall within the Floodway or Flood Fringe District. Information must be consistent with accepted hydrological and hydraulic engineering standards and the standards in Section 36-298(b)(3) below.

(3) The determination of floodway and flood fringe must include the following components, as applicable:

a. Estimate the peak discharge of the regional (1% chance) flood.

b. Calculate the water surface profile of the regional flood based upon a hydraulic analysis of the stream channel and overbank areas.

c. Compute the floodway necessary to convey or store the regional flood without increasing flood stages more than one-half (0.5) foot. A lesser stage increase than 0.5 foot is required if, as a result of the stage increase, increased flood damages would result. An equal degree of encroachment on both sides of the stream within the reach must be assumed in computing floodway boundaries.

(4) The Zoning Administrator will review the submitted information and assess the technical evaluation and the recommended Floodway and/or Flood Fringe District boundary. The assessment must include the cumulative effects of previous floodway encroachments. The Zoning Administrator may seek technical assistance from a designated engineer or other expert person or agency, including the Department of Natural Resources. Based on this assessment, the Zoning Administrator may approve or deny the application.

(5) Once the Floodway and Flood Fringe District boundaries have been determined, the Zoning Administrator must process the permit application consistent with the applicable provisions of Section 36-296 and Section 36-297 of this ordinance.

(Code 1976, § 14:5-9.4, Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-9-16)

Sec. 36-299. Land development standards.

(a) In General. Recognizing that flood prone areas may exist outside of the designated floodplain districts, the requirements of this section apply to all land within the City of St. Louis Park.

(b) Subdivisions. No land may be subdivided which is unsuitable for reasons of flooding or inadequate drainage, water supply or sewage treatment facilities.

(1) All lots within the floodplain districts must be able to contain a building site outside of the Floodway District at or above the regulatory flood protection elevation.

(2) All subdivisions must have road access both to the subdivision and to the individual building sites no lower than two feet below the regulatory flood protection elevation.

(3) For all subdivisions in the floodplain, the Floodway and Flood Fringe District boundaries, the regulatory flood protection elevation and the required elevation of all access roads must be clearly labeled on all required subdivision drawings and platting documents.

(4) In the General Floodplain District, applicants must provide the information required in Section 36-296 of this ordinance to determine the regional flood elevation, the Floodway and Flood Fringe District boundaries and the regulatory flood protection elevation for the subdivision site.

(5) If a subdivision proposal or other proposed new development is in a flood prone area, any such proposal must be reviewed to assure that:

a. All such proposals are consistent with the need to minimize flood damage within the flood prone area, and

b. All public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage, and

c. Adequate drainage is provided to reduce exposure of flood hazard.

(c) Building Sites. If a proposed building site is in a flood prone area, all new construction and substantial improvements (including the placement of manufactured homes) must be:

(1) Designed (or modified) and adequately anchored to prevent floatation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;

(2) Constructed with materials and utility equipment resistant to flood damage;

(3) Constructed by methods and practices that minimize flood damage; and

(4) Constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

(Code 1976, § 14:5-9.5; Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Sec. 36-300. Public utilities, railroads, roads, and bridges.

(a) Public Utilities. All public utilities and facilities such as gas, electrical, sewer, and water supply systems to be located in the floodplain must be floodproofed in accordance with the State Building Code or elevated to the regulatory flood protection elevation.

(b) Public Transportation Facilities. Railroad tracks, roads, and bridges to be located within the floodplain must comply with Section 36-296 and Section 36-297 of this ordinance. These transportation facilities must be elevated to the regulatory flood protection elevation where failure or interruption of these facilities would result in danger to the public health or safety or where such facilities are essential to the orderly functioning of the area. Minor or auxiliary roads or railroads may be constructed at a lower elevation where failure or interruption of transportation services would not endanger the public health or safety.

(c) On-site Water Supply and Sewage Treatment Systems*:* Where public utilities are not provided:

(1) On-site water supply systems must be designed to minimize or eliminate infiltration of flood waters into the systems and are subject to the provisions in Minnesota Rules Chapter 4725.4350, as amended; and

(2) New or replacement on-site sewage treatment systems must be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters, they must not be subject to impairment or contamination during times of flooding, and are subject to the provisions in Minnesota Rules Chapter 7080.2270, as amended.

(Code 1976, § 14:5-9.6; Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Sec. 36-301. Administration.

(a) Zoning Administrator. A Zoning Administrator or other official designated by the City Council must administer and enforce this ordinance.

(b) Permit Requirements.

(1) *Permit Required.* A permit must be obtained from the Zoning Administrator prior to conducting the following activities:

a. The erection, addition, modification, rehabilitation, or alteration of any building, structure or portion thereof.

b. The use or change of use of a building, structure, or land.

c. The construction of a dam, fences, or on-site septic system.

d. The change or extension of a nonconforming use.

e. The repair of a structure that has been damaged by flood, fire, tornado, or any other source.

f. The placement of fill, excavation of materials, or the storage of materials or equipment within the floodplain.

g. Relocation or alteration of a watercourse (including new or replacement culverts and bridges), unless a public waters work permit has been applied for.

(2) *Application for permit.* Permit applications must be submitted to the Zoning Administrator on forms provided by the Zoning Administrator. The permit application must include the following as applicable:

a. A site plan showing all pertinent dimensions, existing or proposed buildings, structures, and significant natural features having an influence on the permit.

b. Location of fill or storage of materials in relation to the stream channel.

c. Copies of any required municipal, county, state or federal permits or approvals.

d. Other relevant information requested by the Zoning Administrator as necessary to properly evaluate the permit application.

(3) *Certificate of Zoning Compliance for a New, Altered or Nonconforming Use.* No building, land or structure may be occupied or used in any manner until a certificate of zoning compliance has been issued by the Zoning Administrator stating that the use of the building or land conforms to the requirements of this ordinance.

(4) *Certification.* The applicant is required to submit certification by a registered professional engineer, registered architect, or registered land surveyor that the finished fill and building elevations were accomplished in compliance with the provisions of this ordinance. Floodproofing measures must be certified by a registered professional engineer or registered architect.

(5) *Record of First Floor Elevation.* The Zoning Administrator must maintain a record of the elevation of the lowest floor (including basement) of all new structures and alterations or additions to existing structures in the floodplain. The Zoning Administrator must also maintain a record of the elevation to which structures and alterations or additions to structures are floodproofed.

(6) *Notifications for Watercourse Alterations.* Before authorizing any alteration or relocation of a river or stream, the Zoning Administrator must notify adjacent communities. If the applicant has applied for a permit to work in public waters pursuant to Minnesota Statutes, Section 103G.245, this will suffice as adequate notice. A copy of the notification must also be submitted to the Chicago Regional Office of the Federal Emergency Management Agency (FEMA).

(7) *Notification to FEMA When Physical Changes Increase or Decrease the Base Flood Elevations.* As soon as is practicable, but not later than six months after the date such supporting information becomes available, the Zoning Administrator must notify the Chicago Regional Office of FEMA of the changes by submitting a copy of the relevant technical or scientific data.

(c) Factors for Conditional Use Approval.

(1) *Administrative Review.* An application for a conditional use permit under the provisions of this ordinance will be processed and reviewed in accordance with Section(s) 36-33 Conditional Use Permits (CUP) of the zoning ordinance.

(2) The factors upon which the decision of the city council shall be based when considering conditional use applications are as follows:

a. All relevant factors specified in other sections of this chapter.

b. The danger to life and property due to increased flood heights or velocities caused by encroachments.

c. The danger that materials may be swept onto other lands or downstream to the injury of others or they may block bridges, culverts or other hydraulic structures.

d. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination and unsanitary conditions.

e. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.

f. The importance of the services provided by the proposed facility to the community.

g. The requirements of the facility for a waterfront location.

h. The availability of alternative locations not subject to flooding for the proposed use.

i. The compatibility of the proposed use with existing development and the development anticipated in the foreseeable future.

j. The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.

k. The safety of access to the property in times of flood for ordinary and emergency vehicles.

l. The expected heights, velocity, duration, rate of rise, and sediment transport of the floodwaters expected at the site.

m. Such other factors which are relevant to the purposes of this division.

(3) *Conditions Attached to Conditional Use Permits.* Upon consideration of the factors listed above and the purpose of this Ordinance, the city council shall attach such conditions to the granting of conditional use permits as it deems necessary to fulfill the purposes of this Ordinance. Such conditions may include, but are not limited to, the following:

a. Modification of waste treatment and water supply facilities.

b. Limitations on period of use, occupancy, and operation.

c. Imposition of operational controls, sureties, and deed restrictions.

d. Requirements for construction of channel modifications, compensatory storage, dikes, levees, and other protective measures.

e. Flood proofing measures, in accordance with the State Building Code and this Ordinance. The applicant shall submit a plan or document certified by a registered professional engineer or architect that the flood proofing measures are consistent with the regulatory flood protection elevation and associated flood factors for the particular area.

(4) *Submittal of Hearing Notices to the Department of Natural Resources (DNR).* The Zoning Administrator must submit hearing notices for proposed conditional uses to the DNR sufficiently in advance to provide at least ten days' notice of the hearing. The notice may be sent by electronic mail or U.S. Mail to the respective DNR area hydrologist.

(5) *Submittal of Final Decisions to the DNR.* A copy of all decisions granting conditional uses must be forwarded to the DNR within ten days of such action. The notice may be sent by electronic mail or U.S. Mail to the respective DNR area hydrologist.

(Code 1976, § 14:5-9.7; Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Sec. 36-302. Nonconformities.

(a) Continuance of Nonconformities. A use, structure, or occupancy of land which was lawful before the passage or amendment of this ordinance but which is not in conformity with the provisions of this ordinance may be continued subject to the following conditions. Historic structures, as defined in Section 36-294 of this ordinance, are subject to the provisions of Section 36-302(1) through Section 36-302(6) of this ordinance.

(1) A nonconforming use, structure, or occupancy must not be expanded, changed, enlarged, or altered in a way that increases its nonconformity, its flood damage potential or degree of obstruction to flood flows except as provided in Section 36-302(2) below. Expansion or enlargement of uses, structures or occupancies within the Floodway District is prohibited.

(2) Any addition or structural alteration to a nonconforming structure or nonconforming use that would result in increasing its flood damage potential must be protected to the regulatory flood protection elevation in accordance with any of the elevation on fill or floodproofing techniques (i.e., FP1 thru FP4 floodproofing classifications) allowable in the State Building Code, except as further restricted in Section 36-302(3) and Section 36-302(7) below.

(3) The cost of any structural alterations or additions to any nonconforming structure over the life of the structure shall not exceed 50 percent of the market value of the structure unless the conditions of this section are satisfied. The cost of all structural alterations and additions constructed since the adoption of the city's initial floodplain controls must be calculated into today's current cost which will include all costs such as construction materials and a reasonable cost placed on all labor. If the current cost of all previous and proposed alterations and additions exceeds 50 percent of the current market value of the structure, then the structure must meet the standards of this chapter for new structure.

(4) If any nonconforming use, or any use of a nonconforming structure, is discontinued for more than one year, any future use of the premises must conform to this ordinance. The Assessor must notify the Zoning Administrator in writing of

instances of nonconformities that have been discontinued for a period of more than one year.

(5) If any nonconformity is substantially damaged, as defined in Section 36-294 of this ordinance, it may not be reconstructed except in conformity with the provisions of this ordinance. The applicable provisions for establishing new uses or new structures in Section 36-296 or Section 36-297 will apply depending upon whether the use or structure is in the Floodway or Flood Fringe, respectively.

(6) If any nonconforming use or structure experiences a repetitive loss, as defined in Section 36-294 of this ordinance, it must not be reconstructed except in conformity with the provisions of this ordinance.

(7) Any substantial improvement, as defined in Section 36-294 of this ordinance, to a nonconforming structure requires that the existing structure and any additions must meet the requirements of Section 36-296 or Section 36-297 of this ordinance for new structures, depending upon whether the structure is in the Floodway or Flood Fringe District.

(Code 1976, § 14:5-9.8, Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Sec. 36-303. Penalties and Enforcement.

(a) Violation Constitutes a Misdemeanor. Violation of the provisions of this ordinance or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with grants of variances or conditional uses) constitute a misdemeanor and will be punishable as defined by law.

(b) Nothing herein contained shall prevent the city from taking such other lawful action as is necessary to prevent or remedy any violation. Such actions may include but are not limited to:

(1) In responding to a suspected Ordinance violation, the Zoning Administrator and Local Government may utilize the full array of enforcement actions available to it including but not limited to prosecution and fines, injunctions, after-the-fact permits, orders for corrective measures or a request to the National Flood Insurance Program for denial of flood insurance availability to the guilty party. The Community must act in good faith to enforce these official controls and to correct Ordinance violations to the extent possible so as not to jeopardize its eligibility in the National Flood Insurance Program.

(2) When an Ordinance violation is either discovered by or brought to the attention of the Zoning Administrator, the Zoning Administrator shall immediately investigate the situation and document the nature and extent of the violation of the official control. As soon as is reasonably possible, this information will be submitted to the appropriate Department of Natural Resources' and Federal Emergency Management Agency Regional Office along with the Community's plan of action to correct the violation to the degree possible.

(3) The Zoning Administrator shall notify the suspected party of the requirements of this Ordinance and all other official controls and the nature and extent of the suspected violation of these controls. If the structure and/or use is under construction or development, the Zoning Administrator may order the construction or development immediately halted until a proper permit or approval is granted by the Community. If the construction or development is already completed, then the Zoning Administrator may either: (1) issue an order identifying the corrective actions that must be made within a specified time period to bring the use or structure into compliance with the official controls; or (2) notify the responsible party to apply for an after-the-fact permit/development approval within a specified period of time not to exceed 30-days.

(4) If the responsible party does not appropriately respond to the Zoning Administrator within the specified period of time, each additional day that lapses shall constitute an additional violation of this Ordinance and shall be prosecuted accordingly. The Zoning Administrator shall also upon the lapse of the specified response period notify the landowner to restore the land to the condition which existed prior to the violation of this Ordinance.

(Ord. No. 2276-04, 8-16-2004; Ord No. 2462-15, 2-2-2015; Ord. No. 2509-16, 9-19-16)

Sec. 36-304. Amendments.

(a) Floodplain Designation – Restrictions on Removal. The floodplain designation on the Official Zoning Map must not be removed from floodplain areas unless it can be shown that the designation is in error or that the area has been filled to or above the elevation of the regulatory flood protection elevation and is contiguous to lands outside the floodplain. Special exceptions to this rule may be permitted by the Commissioner of the Department of Natural Resources (DNR) if the Commissioner determines that, through other measures, lands are adequately protected for the intended use.

(b) Amendments Require DNR Approval. All amendments to this ordinance must be submitted to and approved by the Commissioner of the Department of Natural Resources (DNR) prior to adoption. The Commissioner must approve the amendment prior to community approval.

(c) Map Revisions Require Ordinance Amendments. The floodplain district regulations must be amended to incorporate any revisions by the Federal Emergency Management Agency to the floodplain maps adopted in Section 36-293(c) of this ordinance.

(Code 1976, § 14:5-9.9, Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Secs. 36-305--36-320. Reserved.

(Ord. No. 2462-15, 2-2-2015; Ord. No. 2509-16, 9-19-16)

Chapter 12

ENVIRONMENT AND PUBLIC HEALTH*

Article I. In General

(Ord. No. 2440-13, 5-6-2013)

Article II. Nuisances

Division 1. Generally

Division 2. Junk Vehicles

Article III. Litter

***Cross reference(s)--**Animals, ch. 4; buildings and building regulations, ch. 6; moving buildings, § 6-101 et seq.; parks and recreation, ch. 20; solid waste management, ch. 22; streets, sidewalks and other public places, ch. 24; subdivisions, ch. 26; design standards for erosion and sediment control, § 26-155; utilities, ch. 32; vegetation, ch. 34; zoning, ch. 36; erosion control, § 36-80.

State law reference(s)--Environmental protection, M.S.A. chs. 114C--116I.

Article IV. Noise, Noise Pollution and Vibration

Article V. Stormwater, Soil Erosion, And Sedimentation

ARTICLE I. IN GENERAL

Sec. 12-1. Definition

Private residential pool means a pool connected with a single-family residence or owner-occupied duplex, located on private property under the control of the homeowner, the use of which is limited to family members or the family's invited guests. A private residential pool is not a pool used as part of a business.
(Ord. No. 2440-13, 5-6-2013)

Sec. 12-2. Environmental and public health regulations adopted by reference.

(a) *Air quality environmental emissions.* The city adopts and incorporates by reference the air emissions standards adopted by the air quality division of the state pollution control agency as Minnesota Rules Chapters 7011 and 7023, as amended. A copy of the regulations, together with any applicable amendments, shall be marked "St. Louis Park--Official Copy" and shall be kept on file in the office of the city clerk and open to inspection and use by the public.
(Ord. No. 2440-13, 5-6-2013)

Sec. 12-3. Private residential pools.

(a) *Scope.* The requirements of this section shall apply to all private residential swimming pools, wading pools, hot tubs, or spas having a potential water depth greater than 24 inches at any point, and either a surface area exceeding 250 square feet or a potential water volume of over 3,250 gallons.

(b) *Permit required.* No person may install, construct, move, or alter a private residential swimming pool, wading pool, hot tub, or spa without first obtaining a permit.

(c) *Fees.* The applicant for a pool permit must pay the appropriate fee for the type of pool installation or construction requested. Such fee shall be set from time to time by the city and a schedule of such fees is listed in appendix A to this Code.

(d) Requirements.

(1) All new equipment purchased or installed on any swimming pool shall comply with the National Sanitation Foundation Listings for Swimming Pools, Spas, and Hot Tubs, when applicable. Equipment not covered by the standard must be preapproved by the city.

(2) Pool use is limited to swimming or bathing by the family or their invited guests.

(3) Fencing a minimum of four feet high from grade or other acceptable barrier, including but not limited to walls or buildings, providing equivalent restriction of access shall be provided to positively control all access to private swimming pools. Fencing shall be without handholds or footholds that would enable a child to climb over it and shall include gates at least four feet in height equipped with self-closing and self-latching apparatus capable of being locked. Openings in the gates or fence shall not allow a four-inch sphere to pass through. Maximum openings under gate and fences shall not exceed two inches.

(4) Water depth shall be plainly marked at or above the water surface on the vertical pool wall or on the edge of the deck or walk next to inground pools. Depth markings shall be located at the minimum and maximum points, at the points of change of slope between the deep and shallow portions of the pool, and at intermediate increments of depth spaced not more than 25 feet between markers.

(5) Decking at least three feet wide, measured from the pool water's edge, shall be provided and shall extend completely around inground pools. Aboveground pools may be provided with decking a minimum of four feet by four feet at the pool entry points provided the decking complies with the building code. A self-closing and self-latching gate shall be installed at the top or bottom of the stairs. Openings in the gate or fence shall not allow a four-inch sphere to pass through. Maximum openings under gates and fences shall not exceed two inches.

(6) All residential private pools with a depth greater than five feet shall be provided with an outlet at the deepest point to permit the pool to be completely emptied and to provide adequate circulation. The outlet opening shall be covered by grating which is securely fastened and not readily removable by bathers. Outlet openings in the floor of the pool shall be at least four times the area of the discharge pipe or provide sufficient area so the maximum velocity of water passing through the grate will not exceed 1 1/2 feet per second. The maximum width of the grate openings shall be one-half inch. An antivortex type drain may be used in lieu of grating.

(7) No person shall operate, maintain, or permit any swimming pool that creates a nuisance by annoying, injuring, or endangering the safety, health, comfort or repose of the public. The city shall have access to inspect all pools and equipment as deemed necessary to enforce the provisions of this Code. When a private swimming pool is deemed to be in such condition that endangers the health, safety or welfare of the public, the health authority may immediately close the pool and post a placard stating the closure. No one may remove the placard except the health authority.

Secs. 12-4--12-30. Reserved.
(Ord. No. 2440-13, 5-6-2013)

ARTICLE II. NUISANCES*

DIVISION 1. GENERALLY

Sec. 12-31. Creation; declaration of.

(a) Any person who shall knowingly cause or create any nuisance, or permit any nuisance to be created, or to be placed upon, or to remain upon, any premises owned or occupied by the individual shall be guilty of a misdemeanor.

(b) Conditions declared to be a nuisance in other sections of this Code are subject to all conditions relating to penalties and abatement unless otherwise stated in the section specific to the nuisance.

(Code 1976, § 11-101)

***Cross reference(s)--**Certain dogs declared public nuisance, § 4-83; certain cats declared nuisance, § 4-131; abatement of nuisance when owner of cat is unknown, § 4-133; litter nuisance defined, § 22-151; excavations nuisances, § 24-194; diseased trees declared public nuisance, § 34-52.

State law reference(s)--Environmental impact statements, M.S.A. § 116C.01 et seq.; authority to define and abate nuisances, M.S.A. § 412.221, subd. 23.

Sec. 12-32. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Nuisance means a thing, act, occupation or use of property which shall:

(1) Annoy, injure or endanger the safety, health, comfort or repose of the public.

(2) Offend public decency.

(3) Unlawfully interfere with, obstruct or tend to obstruct or render dangerous for passage, a lake, stream, basin, public park, square, street, alley or highway.

(4) In any way render the public insecure in life or in use of property.

Cross reference(s)--Definitions generally, § 1-2.

Sec. 12-33. Nuisances affecting health.

In addition to those conditions identified elsewhere, the following are declared to be nuisances affecting health:

(1) All diseased animals running at large.

(2) Carcasses of animals not buried or destroyed or otherwise disposed of within 24 hours after death.

(3) Accumulations of decaying animal or plant material, animal or human feces, trash, refuse, yard waste, rubbish, garbage, rotting lumber, packing material, scrap metal, tires or any other substances which can be breeding places for flies, mosquitoes or vermin, except compost maintained in compliance with chapter 22, article III.

(4) Privy vaults and garbage cans which are not fly tight.

(5) All noxious weeds and other rank growths of vegetation upon public or private property.

(6) Dense smoke, noxious fumes, gas and soot, dust or cinders in such quantities as to render the occupancy of property uncomfortable to a person of ordinary sensibilities.

(7) All public exposure of persons having a contagious disease.

(8) All other acts, omissions of acts, occupations and uses of property which are a menace to the public health.

(9) The intentional or negligent discharge of items including but not limited to refuse, leaves, grass clippings, solvents, antifreeze, oil, gas, fireplace ashes, paint, swimming pool water or cement rein sate into a street, storm sewer system, or water resource such as a wetland, creek, pond or lake. This includes illegal discharge or discard of any item on to any land within the City limits.

(10) Improper sewage disposal to such degree that sewage or effluent is discharging onto the surface of the ground, backing up into a structure or discharging into a body of water.

(11) Infestations of flies, fleas, cockroaches, lice, rats, mice, fly larvae or hookwork larvae.

(12) Breeding grounds not naturally occurring which support mosquito larvae or mosquitoes carrying West Nile Virus, La Crosse Encephalitis Virus or any other disease causing microorganism.

(13) Outdoor burners of fuel, including, but not limited to, wood, trash, corn, pellets and biomass, that are detached from or exterior to a principal building and intended for use as a water or space heating source are considered to produce excessive smoke and therefore prohibited.

(Code 1976, § 11-102; Ord. No. 2491-16, 5-2-16)

Sec. 12-34. Nuisances affecting peace and safety.

In addition to those conditions identified elsewhere, the following are declared to be nuisances affecting public peace, welfare and safety:

(1) All limbs of trees, shrubs, bushes, weeds or any other vegetative growth which are less than eight feet above the surface of any street or sidewalk.

(2) All wires which are strung less than 15 feet above the surface of the ground.

(3) All buildings, walls and other structures which have been damaged by fire, decay or otherwise, and which are situated as to endanger the safety of the public.

(4) All explosives, inflammable liquids and other dangerous substances stored in any manner or in any amount other than that provided by ordinance or state or federal law.

(5) All use or display of fireworks except as provided by ordinance or state or federal law.

(6) All loud or unusual noises and annoying vibrations which offend the peace and quiet of persons of ordinary sensibilities or which violate article IV of this chapter.

(7) Obstructions and excavations affecting the ordinary use by the public of streets, alleys and sidewalks, or public grounds, except under such conditions as are provided by ordinance.

(8) Radio aerials strung or erected over streets or alleys or attached to poles of public service companies.

(9) Any use of the public street or sidewalk which causes large crowds of people to gather, obstructing traffic and the free use of the streets or sidewalks.

(10) All hanging signs, awnings and other similar structures over the streets or sidewalks, and so situated as to endanger public safety.

(11) All barbed wire fences except for barbed wire on top of non-residential fences, where barbed wire is at least six (6) feet above grade and at least three (3) feet from all public sidewalks.

(12) All dangerous, unguarded machinery in any public place, or so situated or operated on private property as to attract the public.

(13) All other acts, omissions of acts, occupations and uses of property which are a menace to safety as determined by the Director of Inspections.

(14) Feeding of deer, raccoons, wild turkeys, coyotes, opossum, Canada goose or prohibited animals identified in Section 4-42.

(15) The existence and creation of graffiti. For the purpose of this subsection, the term "graffiti" shall mean any unauthorized inscription, word, figure, painting, printing, marks, signs, symbols, figures, designs, inscriptions, or other drawings or other defacement which are written, marked, etched, scratched, sprayed, drawn, painted or engraved on or otherwise placed or affixed to any surface of objects such as buildings, walls, fences, sidewalks, curbs, vehicles, trees, rocks, or other structures or objects on public and private property or the interior surfaces of those parts of buildings accessible to the general public and which has the effect of defacing the property.

(16) The exterior storage of firewood that either:

a. Is infested with rodents, insects or other nuisance animals;

b. Is stacked less than six inches or more than five feet above grade;

c. Exceeds a maximum ground coverage of 64 square feet for each stack;

d. Has stacks on a lot that are within ten feet of each other;

e. Is stacked in a disorderly manner; or

f. Is otherwise a threat to health and safety.

(17) Any condition that interferes with, obstructs, or renders dangerous for passage a public roadway, highway or right-of-way or waters used by the public.

(18) Any construction materials or equipment left in the open on a residential site ninety (90) or more days after authorized work has stopped.

(19) Discarded construction material or other litter at a construction site that is not placed in an adequate waste container or that is allowed to blow around or off the site.

(20) Any structure that has become dangerous for further us or occupancy because of structural or sanitary defects or grossly unsanitary conditions.

(21) Principle, accessory and other structures or improvements that have been so poorly maintained that their physical condition and appearance detract from the surrounding neighborhood are declared to be public nuisances affecting the general welfare because they are unsightly, decrease adjoining landowners' and occupants' enjoyment of their property and neighborhood, and adversely affect property values and neighborhood patterns. Nuisances include:

a. Exterior walls with holes, breaks or loose or rotting materials, or which are not maintained as weatherproof and properly surface coated where required to prevent deterioration.

b. Exterior surfaces, including but not limited to, doors, door and window frames, cornices, porches, trim, balconies, decks or fences not maintained in good condition. Exterior wood surfaces, other than decay-resistant woods, not protected from the elements and decay by painting or other protective covering or treatment. Peeling, flaking or chipped paint. All siding or masonry joints as well as those between the building envelope and the perimeter of windows, doors, and skylights not maintained weather resistant and water tight. All metal surfaces subject to rust or corrosion not coated to inhibit such rust and corrosion. Surfaces with untreated rust or corrosion. Oxidation stains.

c. Windows, skylights, doors or frames not kept in sound condition, good repair or weather tight. Glazing materials with cracks or holes.

d. Exterior doors, door assemblies or hardware not maintained in good condition. Locks at all entrances to dwelling units, rooming units or guestrooms which do not tightly secure the door.

e. Cornices, belt courses, corbels, terra cotta trim, wall facings or similar decorative features not maintained in good repair with proper anchorage or in a safe condition.

f. Roof drains, gutters or downspouts not maintained in good repair and free from obstructions. Roof or flashing not sound, tight or having defects that admit rain. Roof drainage inadequate to prevent dampness or deterioration in the walls or interior portion of the structure.

g. Chimneys, cooling towers, smoke stacks or similar appurtenances not maintained as structurally sound, or in good repair. All exposed surfaces of metal or wood not protected from the elements or against decay or rust by periodic application of weather-coating materials, such as paint or similar surface treatment.

h. Foundation walls not maintained plumb or free from open cracks or breaks or kept in such condition so as to prevent the entry of rodents or other pests.

(22) An unsecured hole or opening caused by improperly abandoned cistern, well pit, sewage treatment system, unused or non-maintained swimming pool, foundation, mine shaft or tunnel or any other hole or opening in the ground of sufficient size or depth to pose a danger to the public or an attractive nuisance.

(23) Accumulations of personal property, rubbish or debris in any residence that could prevent emergency egress.

(24) Accumulations of animal feces, rubbish or junk remaining in any place as to become dangerous or injurious to the safety of any individual or to the public.

(25) At single-family and two-family dwelling units, the non-temporary parking or storage of more than four vehicles, including abandoned, junk and inoperable vehicles, per unit outside of a garage or on street.

(Code 1976, § 11-103; Ord. No. 2117-98, § 1, 5-4-1998; Ord. No. 2174-00, § 1, 8-21-2000; Ord. No. 2257-03, § 3, 11-17-03; Ord. No. 2416-12, § 3, 08-10-2012, Ord. No. 2491-16, 05-02-2016)

Sec. 12-35. Nuisance abatement and assessment.

(a) *Purpose of section.* The purpose of this section is to provide the city with the authority, pursuant to M.S.A. § 429.101, as may be amended from time to time, to remove or eliminate public health or safety hazards from private property and to provide for the collection of unpaid special charges for all or any part of the costs incurred by the city to remove or eliminate the hazards.

(b) *Notice of need to abate nuisance.* Whenever the existence of any nuisance defined in this article, constituting a public health or safety hazard, within any lots or parcels of real estate situated within the city, shall come to the attention of the Director of Inspections, the Director shall cause an investigation of the reported nuisance. After the investigation, the Director of Inspections shall determine whether a nuisance exists. Upon finding a nuisance, the Director of Inspections shall prepare a written notice and mail the notice to the owner of the property. The term "owner" shall be defined as the person listed as owner according to the current records of the county auditor. Such notice shall contain the name of the owner, his address (if known), the address of the property containing the nuisance and a description of the nuisance which must be abated at the owner's expense, and the time frame within which the nuisance must be abated as determined in the sole discretion of the health official. In determining the time within which owner must abate the nuisance, the Director of Inspections shall consider, among other factors, the following:

(1) The severity of the threat to public health and safety;

(2) The size or magnitude of the nuisance; and

(3) The number of persons affected by the nuisance.

The notice shall further state if owner fails to abate the nuisance within the time provided in such notice, the city may enter onto the owner's property for purpose of abating the nuisance. Noncompliance with the required action will result in city action to abate the nuisance the cost of

which will subsequently be assessed as a lien against the owner's property. If the owner's address is not known, service of the notice may be made upon a tenant, lessee or owner's agent and shall also be posted upon the property. Where no owner or owner's agent can be found, the city clerk shall cause the notice to be published once in the official city newspaper within ten days of issuance of the notice. If publication is required, the city shall allow an additional ten days from the date of publication for owner to comply with the notice of violation and abatement.

(c) *Time to respond.* The owner shall abate the nuisance, at the owner's expense, within the period of time contained within the notice. In the instance of publication of the notice, the owner shall have ten days following the date of publication of the notice, plus the amount of time provided in the notice to abate the nuisance. The Director of Inspections shall cause an inspection of the property containing the nuisance to be made the day after the last day for abatement as stated in the notice or within such other time as may be reasonable and practical.

(d) *Appeal.* The owner shall have a right to appeal the notice as served by presenting the appeal to the city manager within 48 hours of service of the notice or within two days of its publication, excluding weekends and legal holidays. Within 72 hours of presentation of the appeal, the city manager shall meet with the owner and the official to hear the matter. The city manager shall consider the issues and make a final decision within 48 hours following the meeting. The owner shall be served by mail of the manager's decision. The owner may appeal the city manager's decision to the city council. Within ten days of receipt of the mailed decision of the city manager, the owner shall make a request, in writing, to the city manager to be placed on the agenda at the next regularly scheduled city council meeting, to consider the owner's appeal of the city manager's decision. The city council shall consider the appeal and make a final decision. A final decision by the city council is not appealable.

(e) *Enforcement/abatement.* If the owner of the property does not respond to the served, posted or published notice itemizing the nuisance and ordering its abatement, within the given time as specified in such notice, the Director may order the nuisance condition to be abated by either the city or contracted employees. The cost of abating the nuisance shall be compiled and a resolution prepared containing the name of the owner, the address and legal description of the property containing the nuisance, the costs of abating the nuisance, and a recommendation to assess the property, as a special assessment, for the costs. The assessment proceedings shall be conducted as outlined in M.S.A. § 429.101. Upon its passage, the resolution shall be submitted to the county auditor by November 10 of that year for assessment of the costs as a lien against the property with the real estate taxes. The lien may be collected in a single annual installment, or spread over a period of up to ten equal annual installments, to be determined at the sole discretion of the city council.

(f) *Payment of assessment.* Upon passage by the city council of the resolution of approval for assessment of costs incurred by the city to abate such nuisance, the city clerk shall send a bill for the assessment amount to the owner. The owner may then pay the bill in full prior to its submission to the county auditor. If the owner fails to pay the assessment prior to its submission to the county auditor, the city shall forward the assessment information to the county auditor to create a lien against the owner's real estate as per M.S.A. § 429.101.

(g) *Expenses allowed.* Expenses to be included in the abatement and assessment procedure may include the cost of the abatement and any removal, publication of notice or of any notice of action of the city council, posting and service of notices, departmental costs and expenses including legal fees, allowance for city employee time, overtime and expense of any equipment used. Such costs shall be compiled and prepared for presentation to the city council by the official.

(Code 1976, §§ 11-113, 11-115--11-120; Ord. No. 2415-12, 8-10-2012)

Secs. 12-36--12-60. Reserved.

DIVISION 2. JUNK VEHICLES*

Sec. 12-61. Definitions.

The following words, terms and phrases, when used in this division, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Junk car means any motor vehicle which is not in street operable condition, or which is partially dismantled, or which is used for sale of parts or as a source of repair or replacement parts for other vehicles, or which is kept for scrapping, dismantling or salvage of any kind, or which is not properly licensed for operation within the state.

Junk car parts means abandoned, old or unattached automotive equipment, or parts thereof not currently being used as an integral part of a vehicle or trailer. This includes, but is not limited to, batteries, tires, snow plow attachments, car racks and toppers, or other car parts normally found on a vehicle or trailer.

Racing car means any motor vehicle designed or intended for operation on a speedway, race track or other facility used or designed for high speed contests between two or more vehicles or for timing of speed.

Stock car means any motor vehicle of standard design and construction which is modified, adapted or altered in any manner to increase its speed or safety, and designed or intended for operation on a speedway, race track or other facility used or designed for high speed contests between two or more vehicles or for timing of speed.

(Code 1976, § 11-710)

Cross reference(s)--Definitions generally, § 1-2.

Sec. 12-62. Parking and storage.

No person shall park, keep, place or store, or permit the parking or storage of a stock car, racing car, junk car or junk car parts on a public street or alley, or on any private lands or premises which he owns, occupies or controls unless it shall be within a building on such private premises. Such acts are hereby declared a nuisance under this article.

(Code 1976, § 11-711; Ord. No. 2491-16, 5-2-16)

Sec. 12-63. Repair, service or maintaining.

No person shall service, repair, replace parts or do maintenance work on a stock car, racing car or junk car on a public street nor on any private lands or premises unless it shall be within a building on such private premises. Such acts are hereby declared a nuisance under this article.

(Code 1976, § 11-712; Ord. No. 2491-16, 5-2-16)

Secs. 12-64--12-90. Reserved.

***Cross reference(s)--**Traffic and vehicles, ch. 30.

ARTICLE III. LITTER*

Sec. 12-91. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Authorized private receptacle means a litter storage and collection receptacle as required and authorized in article II of this chapter.

Garbage means putrescible animal and vegetable wastes resulting from the handling, preparation, cooking and consumption of food.

Litter means garbage, refuse and rubbish, and all other waste material which, if thrown or deposited as prohibited in this article, tends to create a danger to public health, safety and welfare.

Newspaper means any newspaper of general circulation as defined by general law, any newspaper duly entered with the Post Office Department of the United States, in accordance with federal statute or regulation, and any newspaper filed and recorded with any recording officer as provided by general law; and, in addition thereto, shall mean and include any periodical or current magazine regularly published with not less than four issues per year, and sold to the public.

Handbill means any printed or written matter, sample, device, dodger, circular, leaflet, pamphlet, newspaper, magazine, paper, booklet, or any other printed or otherwise reproduced original or copies of any matter of literature.

Park means a park, reservation, playground, beach,
recreation center or any other public area in the city, owned or used by the city and devoted to active or passive recreation.

Private premises means any dwelling, house, building or other structure, designed or used either wholly or in part for private residential purposes, whether inhabited or temporarily or continuously uninhabited or vacant, and shall include any yard, grounds, walk, driveway, porch, steps, vestibule or mailbox belonging or appurtenant to such dwelling, house, building or other structure.

Public place means any and all streets, sidewalks, boulevards, alleys or other public ways and any and all public parks, squares, spaces, grounds and buildings.

Refuse means all putrescible and nonputrescible solid wastes (except body wastes), including garbage, rubbish, trash, ashes, street cleanings, dead animals, junk, abandoned automobiles, and solid market and industrial wastes.

Rubbish means nonputrescible solid wastes consisting of both combustible and noncombustible wastes, such as paper, wrappings, cigarettes, cardboard, tin cans, wood, glass, bedding, crockery and similar materials.

***State law reference(s)--**Littering from a vehicle, M.S.A. § 169.42; unlawful deposit of garbage or litter, M.S.A. § 609.68.

Vehicle means every device in, upon, or by which any person or property is or may be transported or drawn upon a highway, including devices used exclusively upon stationary rails or tracks.

(Code 1976, § 11-401)

Cross reference(s)--Definitions generally, § 1-2.

Sec. 12-92. Littering prohibited.

No person shall, throw, sweep, scatter, drop or otherwise deposit litter in or upon any public or private lands, parks, roadways, sidewalks, fountains, shorelines or waters in the city.

Sec. 12-93. Public and private garbage receptacles.

Persons placing litter in public or authorized private receptacles shall do so in such a manner as to prevent the litter from being scattered by the elements. Where receptacles are not provided, all litter shall be carried away by the person responsible for its presence and properly disposed of elsewhere.

Sec. 12-94. Truck loads causing litter to be deposited on any public place.

No person shall drive or move any truck or other vehicle within the city unless such vehicle is equipped with covers or is so constructed or loaded as to prevent any load, contents or litter from being blown from or otherwise deposited upon any street, alley or other public place.

Sec. 12-95. Owner to maintain premises free from litter.

The owner or person in control of any private property shall at all times maintain the premises free of litter.

Sec. 12-96. Commercial and noncommercial handbills allowed.

Commercial and noncommercial handbills may be distributed in the city if handed to or transmitted directly to a person willing to accept it.

Sec. 12-97. Commercial and noncommercial handbills; prohibitions.

No person shall throw, deposit or post any commercial or noncommercial handbill in or upon any vehicle; uninhabited or vacant premises; occupied private property; vacant lot; lamppost, public utility pole or shade tree, public structure or building except as may be authorized or required by law.

Sec. 12-98. Commercial and noncommercial handbills at inhabited private premises.

(a) No person shall throw, deposit or distribute any commercial or noncommercial handbill upon any private premises if requested by anyone thereon not to do so, or if there is a sign placed in a conspicuous position indicating that the occupants do not wish to receive solicitations.

(b) In the case of an inhabited private premises which is not posted, handbills may be placed or deposited in such a manner as to secure or prevent the handbill from being blow or drifted about.

Sec. 12-99. Merchant equally liable.

Any merchant who advertises his goods, wares or merchandise by causing advertising material to be thrown or deposited in violation of any of the provisions of this article shall be guilty of violating this article along with the person throwing or depositing the litter.

Sec. 12-100. Nuisance declared.

Each of the acts forbidden by this article are hereby declared a nuisance under article II of this chapter.

Secs. 12-101--12-120. Reserved.

ARTICLE IV. NOISE, NOISE POLLUTION AND VIBRATION

Sec. 12-121. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section. Any other word or phrase used in this article, and defined in regulations of the state pollution control agency noise pollution control rules, chapter 7030, has the meaning given in those regulations.

Air circulation device means a mechanism designed and used for the controlled flow of air used in ventilation, cooling or conditioning, including, but not limited to, central and window air conditioning units.

City means the City of St. Louis Park or any representative of the department of inspections, department of public safety or any other representative of the city designated by the city manager.

Cut-out, bypass and similar device means any mechanism which varies the exhaust system gas flow so as to discharge the exhaust gas and acoustic energy to the atmosphere without passing through the entire length of the exhaust system including all exhaust system sound attenuation components.

Exhaust system means a combination of components, which provides for enclosed flow of exhaust gas from engine parts to the atmosphere.

Highway means any street, road, alley or public way in the city.

Holiday means any day fixed by the United States or by state law for suspension of business, in whole or in part.

Noise means any sound not occurring in the natural environment, including, but not limited to, sounds emanating from aircraft and highways, and industrial, commercial and residential sources.

Noise pollution means the presence of any noise or combination of noises in such quantity, at such levels, or of such nature and duration or under such conditions as could potentially be injurious to human health, safety, welfare or property, or to animal life, or could interfere unreasonably with the enjoyment of life or property.

Sound means an oscillation in pressure, stress, particle displacement, particle velocity, etc., in an elastic or partially elastic medium, or the superposition of such propagated alterations.

Sound level means a weighted sound pressure level obtained by the use of a sound level meter having characteristics, including the "A" weighting, as specified in ANSI Specifications for Sound Level Meters S1.4-1971. The reference pressure is 20 micronewtons per square meter.

Sound receiving unit means a unit of property or a building containing a person, business, activity, animal life, or property, which is affected by noise or noise pollution.

Vibration means the oscillation of a solid body or material, including, but not limited to, earth, concrete, machinery, building structures, or other similar materials. Within this article, the term vibration shall refer to those oscillations, which are disturbing, injurious, damaging or dangerous.

Cross reference(s)--Definitions generally, § 1-2.

Sec. 12-122. Source requirements.

(a) *Maximum noise levels by receiving land use districts.* No person shall operate or cause or permit to be operated any source of noise in such a manner as to create a noise level exceeding the limit set in table I for the receiving land use category specified when measured at the location identified in subsection (c) of this section. The source sound levels in any zoning district shall be the responsibility of any person who owns or operates a sound source contributing to the sound level, whether or not such sound source is in the zoning district in question.

Table I. Sound Levels by Receiving Land Use Districts

	Day (7:00 a.m. to 10:00 p.m.)		*Night (10:00 p.m. to 7:00 a.m.)*	
Zoning District	*L50*	*L10*	*L50*	*L10*
Residential	60	65	50	55
Industrial	75	80	75	80
Others	65	70	65	70

(b) *Exemptions.* The levels prescribed in subsection (a) of this section do not apply to noise generated by railroads or the travel of motor vehicles on state and county highways, but such noise shall be subject to other applicable sections of this article.

(c) *Measurement of noise level.*

(1) Except as otherwise provided in this article, the source sound level requirements of this section shall apply at the area of human activity or, if such area is ill-defined, at the property or zoning lines of the receiving unit. If a receiving unit changes its area of human activity, the source sound level requirements of this section shall apply at the new area of human activity or, if such area is ill-defined, at the property or zoning lines of the receiving unit. Measurements may be made at any location in zoning districts for evaluation purposes and to aid the enforcement of other sections of this article.

(2) All sound levels originating in any development or property which contains one or more buildings and which is without property lines for each building shall not exceed the source requirements for the applicable zoning district measured at the area of human activity or, if this is ill-defined, at any point on a line, all of whose points are equidistant from any two buildings.

Sec. 12-123. Requirements for air circulation devices.

Any person installing or placing any air circulation device including, but not limited to, window or central air conditioning units, in any location which results in or contributes to a violation of section 12-122, shall attenuate the excessive sound level by means deemed appropriate to bring the equipment or device into compliance with this Code, including but not limited to sound barrier screening, new equipment meeting city and state noise requirements, or relocation of such units or devices.

Sec. 12-124. Hourly restrictions on certain operations.

(a) *Recreational vehicles* No person shall drive or operate any minibike, snowmobile, or other similar recreational vehicle, not licensed for travel on public highways, between the hours of 10:00 p.m. and 7:00 a.m.

(b) *Domestic power equipment.* No person may operate any domestic power implement including, but not limited to, a power lawnmower, power hedge clipper, power saw or other such implement except between the hours of 7:00 a.m. and 10:00 p.m. on weekdays and between the hours of 9:00 a.m. and 10:00 p.m. on weekends and holidays. The operation of equipment for snow removal shall be exempt from the provisions of this section when initiated within 12 hours of the completion of the most recent snowfall.

(c) *Power equipment used in construction activities.* No person shall engage in, permit, or allow construction activities involving the use of power equipment, manual tools, movement of equipment, or other activities except between the hours of 7:00 a.m. and 10:00 p.m. on weekdays and between the hours of 9:00 a.m. and 10:00 p.m. on weekends and holidays.

(d) *Garbage collection.* Except in a general industrial zoning district, no person shall collect or remove garbage or refuse except between the hours of 7:00 a.m. and 10:00 p.m. on weekdays and between the hours of 9:00 a.m. and 10:00 p.m. on weekends and holidays.

(e) *Participation in noisy parties or gatherings.* No person shall, between the hours of 11:00 p.m. and 7:00 a.m. on Sunday through Thursday and between 12:00 midnight and 7:00 a.m. on Friday and Saturday, participate in any party or gathering of people which creates noise pollution or which unreasonably disturbs the peace, quiet, or repose of another person as determined at the property line of a building, structure, rental unit, or other enclosure or area in which such party or gathering occurs. If such party or gathering is declared to be a noise pollution nuisance by a city official, all persons except the owner, renter, lessee, or other occupant shall promptly leave the premises in an orderly manner. Every owner or tenant of such premises who has knowledge of the disturbance shall make every reasonable effort to see that the disturbance is stopped.

Sec. 12-125. Prohibited noises.

(a) *Internal combustion engine, fuel-operated device or electrically powered device.* No person shall operate, permit, or allow the operation of any internal combustion engine, fuel-operated device, or electrically powered device associated with construction, home improvement, or other similar activity unless it is operated or in repair according to the manufacturer's specifications. Any internal combustion engine or fuel-operated devices, which is designed to have a muffler, shall be maintained in good working order to prevent noise pollution.

(1) No person shall operate, permit or allow the operation of any portable air compressor or similar device which produces a sound level in excess of 81 dBA, measured at 50 feet from the compressor when the compressor is operating at its maximum related capacity. Portable air compressors with a rated capacity equal to or above 75 cubic feet per minute, which deliver air at pressures greater than 50 psig, and which are manufactured on or after July 1, 1978, shall not produce a sound level in excess of 70 dBA, measured at 50 feet from the compressor when the compressor is operating at its maximum rated capacity.

(2) No person shall operate, permit or allow the operation of any powered, walk behind lawnmower or other similar device which produces a sound level in excess of 72 dBA, measured at 50 feet from the mower. No person shall operate, permit, or allow the operation of any powered, sit down lawnmower or other similar device, which produces a sound level in excess of 82 dBA, measured at 50 feet from the mower.

(b) *Blower, power fan or exhaust unit.* No person shall operate, permit, or allow the operation of any blower, power fan, exhaust unit or other similar device which produces noise pollution due to improper maintenance or due to operation or repair which does not conform to the manufacturer's specifications.

(c) *Cut-out, bypass or similar device.* No person shall use a cut-out, bypass, or similar device upon an internal combustion engine or its exhaust system. No person shall modify, alter, or repair any exhaust system or any internal combustion engine in any manner that amplifies or otherwise increases engine sound above that emitted by the engine as equipped according to the manufacturer's specifications.

(d) *Motor vehicles.*

(1) No person shall operate a motor vehicle in the city in violation of the motor vehicle noise limits established by state law or the Minnesota Pollution Control Agency as set forth under Minn. Rules Chapter 7030.

(2) No person shall operate any motor vehicle or any minibike or other similar vehicle or device in any way which results in the squealing of tires or the creation of any other noise pollution on any highway, private road, public or private parking lot, driveway, or other property in the city, except when there is reason to do so for the safe operation of the vehicle.

(3) No person shall repair, build, rebuild, or test any motor vehicle or other internal combustion engine within the city in such a manner as to create noise pollution.

(e) *Horn, siren or other signaling device.* No person may sound or permit the sounding of any horn, siren or other signaling device on any motor vehicle within the city except in cases of imminent danger or emergency. The modification or installation of signaling devices on any motor vehicle or emergency vehicle which amplifies or otherwise increases the level of sound beyond that emitted by the signaling device installed or designed for the vehicle is prohibited. Burglar alarms, sirens, or similar devices, installed and operated for the use specified by the manufacturer, are exempt from the provisions of this subsection.

(f) *Radios, phonography, paging system, etc.* No person may use, operate, or permit to be used or operated any radio receiving set, musical instrument, phonograph, stereo or other machine or device used for the production or reproduction of sound in such a manner as to disturb the peace, quiet or comfort of a person in its vicinity. The operation of any receiving set, instrument, phonograph, stereo machine, or device between 10:00 p.m. and 7:00 a.m. shall be prima facie evidence of a violation of this section if done in such manner as to be plainly audible at:

(1) The real property boundary of the building, structure, or residence, or other area in which it is located;

(2) The property line of the area or premises owned, rented, leased, or used within a multiuse or apartment building; or

(3) A distance of 50 feet from any motor vehicle in which it is located.

(g) *Loudspeakers, amplifiers, etc., for advertising.* Except as permitted by section 12-127, no person shall advertise or attract the attention of the public to any commercial establishment, business, vehicle or other area by creating noise pollution, including but not limited to crying out, sounding a horn, ringing a bell, or use or operation of any loudspeaker, sound amplifier, or other device for the production or reproduction of sound on a street or other public place. In addition, no person shall create noise pollution through the use of any such sound production or reproduction devices in any activities or proceedings of his business, including, but not limited to, the use of loudspeakers for communication.

(h) *Apartment or multiuse building.* No person may cause, allow, or permit any noise pollution in any multiuse or apartment building as determined beyond the property line of the area or premises owned, rented, leased, or used by such person.

(i) *Loading and unloading.* No person shall load or unload any motor vehicle or handle any bales, boxes, crates, or containers in such a manner as to cause noise pollution.

(j) *Schools, churches, hospitals, etc.* No person shall create or allow the creation of noise pollution on any street adjacent to any school, learning institution, religious institution, or court, or adjacent to any hospital, or home for the aged, or other similar institutions which unreasonably interferes with the working of such institution or disturbs or annoys an inhabitant in the institution, provided that conspicuous signs indicated the presence of such institutions or buildings are displayed in such streets by such institutions.

(k) *Snowmobiles.* No person shall operate a snowmobile unless it is equipped with a muffler in good working order, which will prevent noise pollution and will meet the source requirements in section 12-122. However, this shall not apply to snowmobiles which are designed and used for organized races or similar competitive events which are held with the permission of the city council and in areas designated by the city council.

(l) *Railways.* Except as otherwise required by federal law, no person driving or operating a locomotive or other powered vehicle adapted for travel on any railway in the city may ring a bell or sound a whistle upon such locomotive or vehicle, or cause the same to be rung or sounded at any time other than in cases in which the locomotive or vehicle is at or within 1,320 feet before any place where the railway crosses a traveled highway on the same level or in cases of imminent danger.

Sec. 12-126. Prohibiting vibration.

Any vibration discernible to the human sense of feeling or any vibration producing a particle velocity of more than 0.035 inches per second for five minutes or more duration (cumulative) in any one hour at the property line are prohibited. For properties abutting an "R" use district, no vibration producing a particle acceleration velocity of more than 0.035 inches per second at the property line are permitted between the hours of 7:00 p.m. and 7:00 a.m.

Sec. 12-127. Exceptions to article.

(a) *Emergency work.* Operations and acts performed exclusively for emergency work not exceeding a period of 24 hours to preserve the safety, welfare, or public health of the citizens of the city or for emergency work necessary to restore a public service or to eliminate a public hazard shall be exempt from the noise and vibration limitations under this article. Any person performing emergency work under this section shall inform the city at the time of the need to initiate such work or, if during nonbusiness hours of the city offices, then upon resumption of business hours of the city. Any person responsible for such emergency work shall take all reasonable actions to minimize the amount of noise pollution or vibration.

(b) *Exception for food/beverage vehicles.* Notwithstanding any other provisions to the contrary, food/beverage vehicles may sound a bell between 12:00 noon and 9:00 p.m. daily which produces a noise level measured at a distance of 50 feet from the source no greater than 65 decibels in all zoning districts.

Sec. 12-128. Inspections.

A city official shall inspect existing or potential noise, noise pollution, and vibration sources, and noise pollution control measures as frequently as may be necessary to ensure compliance with this article.

Sec. 12-129. Access to premises and records.

The person on the premises who is responsible for any noise pollution control measure or allowing or causing any noise, noise pollution or vibration shall, upon request of the city official, permit access to all parts of the area at any reasonable time for purposes of inspection and monitoring and shall exhibit and allow copying of any records relating to noise, noise pollution or vibration, or noise pollution control as is necessary to determine compliance with this Code. A city official shall be permitted access to any sound receiver unit affected or potentially affected by a sound source under inspection in order to determine compliance with this Code.

Sec. 12-130. Removal and correction of violations.

Any person responsible for noise, noise pollution or vibration control measures, or allowing or causing noise, noise pollution, or vibration and having received a report from the city official giving notification of one or more violations of this Code shall correct or remove each violation within the length of time set by the city official. The length of time for the correction or removal of each violation shall be stated on the inspection report. The failure to remove or correct each such violation within the time period noted on the inspection report shall constitute a separate violation of this article.

Sec. 12-131. Temporary noise permit.

(a) Permit.

(1) *Required.* A temporary noise permit is required to create temporary noise conditions which may exceed the requirements of this article. A person making application for a permit shall include the reason for requesting the temporary noise permit, the nature of the event occurring, the time period for which the temporary noise permit is requested and the operation or procedure to be employed during the period of the temporary noise permit.

(2) *Exception.* City-performed street and utility maintenance and construction do not require a temporary noise permit.

(b) *Fee required.* The fee for a temporary noise permit shall be set from time to time by the city and a schedule of such fees is listed in appendix A to this Code. Such fees must be submitted to the city before a permit will be issued.

(c) *Special provisions.*

(1) *Permits for 24 hours and less.* When a temporary noise permit is issued for an event 24 hours or less in duration, the applicant must notify all immediate neighbors to the property for which the permit is issued. The notification must be in advance of the event and provide information on the date, time and type of event for which the permit was issued.

(2) *Permits for over 24 hours.* The applicant must submit a set of address labels for all property owners within 350 feet of the boundaries of the parcel with the application when the permit request is for an event occurring more than 24 hours. The names and addresses must be officially prepared by the county auditor's office or other source approved by the city. Applications with address labels must be received in the department of inspections 14 days prior to the event to be considered for a permit. The city shall use the labels to mail notification of the requested event to the property owners. The permit will be considered for approval after any public comment is received, not less than seven days after the notification is mailed or more than ten days after receiving the completed application and labels.

(3) *Mobile noise sources.* When a temporary noise permit application is for a mobile source of noise, the applicant shall provide information on the type of equipment, dates and times of proposed operation, and location in which the equipment or noise will be heard. Before a permit is issued, the applicant shall request an inspection with the city to have the temporary noise source measured to ensure compliance with applicable sections of this article.

(d) *Duration.* Any temporary noise permit granted by the city shall not exceed 90 days and may be renewed once for a period not to exceed 30 days upon request of the original applicant and upon approval from the city.

(e) *Criteria for issuance of permit.* A temporary noise permit to create noise which is not in compliance with this Code may be granted upon a finding that:

(1) The activity, operation, or noise or vibration source will be of temporary duration and cannot be performed or operated in a manner that would comply with the provisions of this Code;

(2) The costs of abatement, control or alternative activity or time sequence are unreasonably high in relation to the benefits achieved;

(3) The measures necessary to abate or avoid potential noise, noise pollution or vibration conflict with other important values, including, but not limited to, aesthetic quality, ecological conditions or safety; or

(4) No other reasonable alternative is available to the applicant.

In granting a temporary noise permit, the city shall prescribe any conditions, requirements or restrictions reasonably necessary to minimize adverse effects upon the community or surrounding neighborhood.

(f) *Grounds for denial of permit.* History of complaints about excessive noise in violation of this article or past permit is grounds for denial of a temporary noise permit.

Sec. 12-132. Appeal.

(a) Any person affected by any decision under this article or by any action taken in accordance with this article, including, but not limited to, an applicant for a temporary noise permit, extension of compliance date or a person objecting to the issuance of a temporary permit or the extension of a compliance date may, within ten days of the issuance of the order or action, appeal to the city manager. Appeals shall be held no sooner than ten days and not more than 30 days after a request for such appeal is filed unless good cause is shown for an extension. Requests shall be made by filing with the city manager a notice of appeal specifying the grounds and relief sought. The city manager shall forthwith set a date, time and place for the appeal and shall notify the person appealing at least ten days in advance of the appeal date.

(b) Any person affected by a decision of the city manager may appeal the decision to the city council. A notice of appeal must be filed with the city clerk within five days after the city manager's decision. Notice of the date, time, place, and nature of the matter under consideration shall be given by publication at least once in the official newspaper not less than ten days prior to the appeal.

Secs. 12-133--12-150. Reserved.

ARTICLE V. STORMWATER, SOIL EROSION, AND SEDIMENTATION

Sec. 12-151 Purpose.

The purpose of this ordinance is to provide for the health, safety and general welfare of the residents of St. Louis Park by reducing and controlling stormwater, soil erosion and sedimentation within the City. It establishes standards and specifications for conservation practices and planning activities which enhance water quality, minimize stormwater pollution, soil erosion, and sediment in waterways, and control the volume of water runoff to receiving streams and other water resources.

Sec. 12-152. Definitions

The following words, terms and phrases, when used in this division, shall have the meanings ascribed to them in the section , except where the context clearly indicates a different meaning:

Authorized Enforcement Agency means employees or designees of the City or other governing authorities designated to enforce this ordinance.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

City refers to the City of St Louis Park, any employees, agents, contractors or designee.

Clean Water Act refers to the Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

CWRMP means the Comprehensive Water Resources Management Plan on record in the City offices.

Discharge means any substance entering the stormwater system by any means.

Discharge, Illicit means any direct or indirect non-stormwater discharge to the stormwater system, except as exempted in Section 12-157 of this ordinance.

Discharge, Non-Stormwater means any discharge to the stormwater system that is not composed entirely of stormwater.

Erosion means any process that wears away the surface of the land by the action of water, wind, ice or gravity. Erosion can be accelerated by the activities of people and nature.

Erosion Control refers to methods employed to prevent erosion. Examples include soil stabilization practices, horizontal slope grading, temporary or permanent cover, and construction phasing.

Erosion Control Plan means a plan detailing erosion control during construction activity as defined in the Comprehensive Water Resources Management Plan (CWRMP), Appendix M.

Hazardous Materials means any material, including any substance, waste, or combination thereof, which because of its quantity, concentration; or, physical, chemical, or infectious characteristics, may cause or significantly contribute to a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illicit Connections means either

1) Any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the stormwater system, including but not limited to any conveyances which allow any non-stormwater discharge including wastewater, process wastewater, and wash water to enter the stormwater system and any connections to the stormwater system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency or;

2) Any drain or conveyance connected from a commercial or industrial land use to the stormwater system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Industrial Activity means activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

Land Disturbing Activity means any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface, including the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation or any activity which bears soil or rock, or involves the diversion or piping of any natural or man-made watercourse.

NPDES means National Pollutant Discharge Elimination System as established pursuant to 33 USC § 1342(b) to regulate discharges of pollutants to waters of the United States.

NPDES Permit means a National Pollutant Discharge Elimination System Stormwater discharge permit issued by the Minnesota Pollution Control Agency (pursuant to 33 USC § 1342(b)) that regulates discharges of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Non-Point Source Pollution means pollution from any source other than any discernable, confined and discreet conveyances, and shall include but not be limited to pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

Permanent Stabilization Plan means a written plan to establish permanent vegetation to prevent erosion of soil. This plan may be in the form of a letter. Permanent vegetation includes sod, native grasses, trees or other acceptable forms of landscaping.

Person means any individual, association, organization, partnership, firm, corporation or other private or public entity recognized by law and acting as either the owner or as the owner's agent.

Pollutant means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Premises means any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Sediment means solid matter carried by water, wastewater or other liquids.

Stormwater means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation.

Stormwater Facility means anything within the stormwater system that collects, conveys or stores stormwater, including, but not limited to any inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Stormwater Management means the use of structural or non-structural practices that are designed to reduce stormwater runoff pollutant loads, discharge volumes, peak flow discharge rates and detrimental changes that affect water quality and habitat.

Stormwater Management Plan means a plan which describes how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices. This final plan must be signed by a licensed professional engineer (PE), who will verify that the design of all stormwater management practices meet the submittal requirements of the Comprehensive Water Resources Management Plan (CWRMP).

Stormwater Pollution Prevention Plan (SWPPP) means a document which describes the Best Management Practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to stormwater, stormwater systems, and/or receiving waters to the maximum extent practicable.

Stormwater System means facilities by which stormwater is collected and/or conveyed, including but not limited to any roads with drainage systems, streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Structure means anything manufactured, constructed, or erected, which is normally attached to, or positioned on land, including portable structures, earthen structures, roads, parking lots and paved storage areas.

Watercourse means a stream or body of water, or a natural or artificial channel for the passage of stormwater.

Wastewater means any water or other liquid, other than uncontaminated stormwater, discharged from a facility.

Waters of the U.S. means any water in the United States per definition as specified 33 CFR 328.a.

Wetlands as defined in Minnesota Rules 7050.0130, subpart F, means areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Sec. 12-153. Responsibility for Administration.

The City shall administer, implement, and enforce the provisions of this ordinance.

Sec. 12-154. Applicability.

This ordinance shall apply to all water entering the stormwater system generated on any developed and undeveloped lands unless explicitly exempted by an authorized enforcement agency or in this ordinance.

Sec. 12-155. Severability.

The provisions of this ordinance are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Ordinance or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this Ordinance.

Sec. 12-156. Construction Site Stormwater Runoff and Erosion Control.

(a) Purpose. The purpose of this section is to regulate land disturbing activities, to preserve and enhance the natural environment by reducing sedimentation in streams, lakes, stormwater systems and other waterways, protect the quality of surface water resources, preserve and protect wildlife habitat, restore sites to reduce the negative environmental effects of land disturbing activities, provide effective practices for erosion and sedimentation control, and to comply with local, state and federal regulations.

(b) Scope. Except where an exemption applies, any person proposing a land disturbing activity within the City shall apply to the City for the approval of erosion control plan. No land shall be disturbed until the plan is approved by the City and conforms to the standards set forth herein.

(c) Erosion control plan and permit required.

1. *Review and approval.* No person may grade, fill, excavate, store, dispose of soil and earth materials, or perform any other land disturbing or land filling activity without first submitting an erosion control plan for review and approval by the City and obtaining a permit as required in this section. The erosion control permit is not a replacement for a City Conditional Use Permit as required in section 36-79 of the City Ordinance, nor is it a replacement for a watershed district permit or a state NPDES permit.

2. *General exemptions.* Land disturbing activities, which meet all the following criteria, are exempt from the requirements of this section:

   a. The disturbed or filled area is 5,000 square feet or less in area, and;

   b. The volume of soil or earth material stored or moved is 50 cubic yards or less, and;

   c. No drainage way is blocked or has its stormwater-carrying capacities or characteristics modified; and

   d. The activity does not take place within 100 feet by horizontal measurement from the top of the bank of a watercourse, the ordinary high water mark of a water body, or the ordinary high water mark of a wetland associated with a watercourse or water body. The activity does not take place within an established 100-year floodplain.

3. *Categorical exemptions.* Notwithstanding the requirements of the City Code, the following activities are exempt from the permit requirements:

   a. Emergency activities necessary to prevent or alleviate immediate dangers to life or property.

   b. General farming, gardening and nursery activities.

   c. One and two family residential construction activity limited to:
      1) additions to the existing structure,
      2) landscaping and landscaping structures, and
      3) construction of a garage.

(d) Submission requirements for erosion control permit.

1. *Application items.* Application for an erosion control permit shall include submittal of:

   a. Application form and fee.
   b. Site map and grading plan.
   c. Interim erosion and sediment control plan as defined in the City's Comprehensive Water Resources Management Plan, Appendix M.
   d. As defined in the Comprehensive Water Resources Management Plan, Appendix M: Stormwater management plan or permanent stabilization plan as required.
   e. Work schedule.
   f. Cost estimate.

2. *Fees.* All applications shall be accompanied by a permit fee. Fees for permits shall be fixed and determined by the City council, adopted by resolution and uniformly enforced. Such permit fees may, from time to time, be amended by City council resolution. A copy of the resolution setting forth currently effective permit fees shall be kept on file by the City and shall be open to inspection during regular business hours.

(e) Review Procedure.

1. *Process.* City staff will review each complete application for an erosion control permit to determine its conformance with the provisions of this ordinance. Within 60 days of receiving an application, City staff shall either approve, approve with conditions, or deny an erosion control permit application.

2. *Appeal.* An appeal by an applicant of a denial of a permit under this section shall be made under the manner prescribed in section 36-31 of this Code.

3. *Site Review.* When a permit is granted, City staff shall inspect the property for erosion control compliance with city code, permit conditions and site plans prior to the onset of construction activities.

(f) Form of security. Before a permit is issued, the City may require the permittee to post security in a form acceptable to the City equal to 125 percent of the cost estimate stated in the application and agreed by the City to be the cost of the work to be done under the permit. The security may take the form of cash in United States currency or an irrevocable letter of credit issued by a financial institution and in a form acceptable to the City.

1. *Release of security.*

   a. Any security deposited with the City to guarantee performance of the grading and erosion control work shall be released to the person holding the permit upon determination by the City that the conditions of the permit have been satisfactorily performed if no action has been taken by the City to recover all or a part of the security before that determination has been made.

   b. Securities held to ensure the successful completion of the final plan and an interim plan shall be released to the permittee either one year after termination of the permit, or when a final plan is submitted for the unimproved site, whichever is later, if no action has been taken by the City to recover all or a part of the security filed by the permittee before that date.

(g) Suspension of permit. In enforcing the permit:

1. The City may suspend the permit and issue a stop work order and the permittee shall cease all work on the work site except for work necessary to remedy the cause of the suspension.

2. The permittee may request a reinstatement of a suspended permit upon correction of the causes for suspension and, if the conditions of the permit have been complied with in full, the City shall reinstate the permit.

3. If the permittee fails or refuses to cease work as required under subsection 6.H. [*Actions against security*] of this section, the City shall revoke the permit.

4. The City shall not reinstate a revoked permit but shall proceed to act against the security as provided in subsection 6.H. [*Actions against security*] of this section.

(h) Action against security. The City may act against the appropriate security if any of the following conditions exist:

1. The permittee stops performing the land disturbing activities or filling, and abandons the work site prior to completion of the grading plan.

2. The permittee fails to conform to the interim plan or final plan as approved, and has had its permit revoked as provided in subsection (g) *Suspension of Permit* of this section.

3. The techniques utilized under the interim or final plan fail within one year of installation or before the final plan is implemented for the site or portion of the site, whichever comes later.

4. The City determines that action by the City is necessary to prevent excessive erosion from occurring on the site, or to prevent sediment from occurring on adjacent or nearby properties.

The City shall use funds recovered from the security to reimburse the City for all direct and indirect costs incurred in doing the remedial work undertaken by the City or private contractor under contract with the City.

Sec. 12-157. Illicit Discharge and Connection

(a) Objectives. The objectives are to regulate the introduction of pollutants to the stormwater system by any user; to prohibit illicit connections and discharges to the stormwater system; and to establish authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this ordinance.

(b) Discharge Prohibitions.

1. *Prohibition of Illicit Discharges.* No person shall discharge or cause to be discharged into the stormwater system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater.

    a. The commencement, execution or continuance of discharge of pollutants to the stormwater system is prohibited except as follows: water line flushing or other potable water sources, landscape irrigation or lawn watering, diverted stream flows, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater de-watering systems), crawl space pumps, air conditioning condensation, springs, non-commercial washing of vehicles, natural riparian habitat or wet-land flows, fire fighting activities, and any other water source not containing pollutants.

    b. Discharges specified in writing by the authorized enforcement agency as being necessary to protect public health and safety are allowed.

    c. Dye testing is an allowable discharge, but requires a verbal notification to the authorized enforcement agency prior to the time of the test.

d. The prohibition shall not apply to any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, Minnesota Pollution Control Agency, or other agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the stormwater system.

2. *Prohibition of Illicit Connections.* The construction, use, maintenance or continued existence of such connections to the stormwater system is prohibited. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

A person is considered to be in violation of this ordinance if the person connects a line conveying wastewater to the stormwater system, or allows such a connection to continue.

(c) Suspension of Stormwater System Access.

1. *Suspension due to Illicit Discharges in Emergency Situations.* The City may, without prior notice, suspend stormwater system discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent or substantial danger to the environment, or to the health or welfare of persons, or to the stormwater system or waters of the United States. If the violator fails to comply with a suspension order issued in an emergency, the authorized enforcement agency may take such steps as deemed necessary to prevent or minimize damage to the stormwater system or waters of the United States, or to minimize danger to persons.

2. *Suspension due to the Detection of Illicit Discharge.* Any person discharging to the stormwater system in violation of this ordinance may have their stormwater system access terminated if such termination would abate or reduce an illicit discharge. The City will notify a violator of the proposed termination of its stormwater system access. The violator may petition the City for a reconsideration and hearing. A person commits an offense if the person reinstates stormwater system access to premises terminated pursuant to this Section, without the prior approval of the City.

(d) Monitoring of Discharges.

1. *Access to Facilities.*

a. The City shall be allowed to enter and inspect facilities and properties subject to regulation under this ordinance as often as may be necessary to determine compliance with this ordinance and for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by state and federal law.

b. The City shall have the right to set up on any permitted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's stormwater discharge.

c. The City has the right to require the discharger to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense.

d. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the owner or operator at the written or oral request of the City and shall not be replaced. The costs of clearing such access shall be borne by the owner of operator.

e. Unreasonable delays in allowing the City access to a permitted facility is a violation of a stormwater discharge permit and of this ordinance. A person who is the operator of a facility with a NPDES permit to discharge stormwater associated with industrial activity commits an offense if the person denies the City reasonable access to the permitted facility for the purpose of conducting any activity authorized or required by this ordinance.

(e) Requirement To Prevent, Control, And Reduce Stormwater Pollutants By The Use Of Best Management Practices.

1. *Owner Responsibility.* The owner or operator of any property shall provide, at owner/operator's expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal stormwater system or watercourses through the use of structural and non-structural Best Management Practices (BMPs). Further, any person responsible for a property or premise, which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the stormwater system. These BMPs are listed in the Stormwater Pollution Prevention Plan (SWPPP) and the Minnesota Pollution Control Agency's current BMPs, and are necessary for compliance with requirements of the NPDES permit and Appendix J of the City's Comprehensive Water Resources Management Plan.

(f) Water Course Protection.

1. *Owner Responsibility.* Every owner of a property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within their property free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly impact the flow of water through the watercourse. All owners or lessees shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

(g) Notification of Spills.

1. Notwithstanding other requirements of law, as soon as any person responsible for a facility, vehicle or operation, or responsible for emergency response for a facility or operation has knowledge of any known or suspected release of materials of any amount, which are resulting or may result in illicit discharges or pollutants discharging into the stormwater system or water of the United States, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify the City and other emergency response agencies of the occurrence via emergency dispatch services.

   In the event of a release of non-hazardous materials, said person shall notify the City in person or by phone no later than the next business day.

   If the discharge of prohibited materials emanates from a commercial or industrial establishment or vehicle, the owner or operator of such establishment or vehicle shall also retain a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

Sec. 12-158. Post construction stormwater runoff.

(a) Objectives. The objectives of this Section are to establish minimum stormwater management requirements and controls to protect and safeguard the general health, safety, and welfare of the public residing in watersheds within this jurisdiction. This section seeks to meet that purpose through the following objectives:

1. Reduce stormwater runoff rates and volumes, soil erosion and non-point source pollution, wherever possible, through stormwater management controls and to ensure that these management controls are properly maintained and pose no threat to public safety;
2. Control stormwater runoff in any development to reduce flooding, silt deposits, stream bank erosion and maintain the integrity of stream channels;
3. Control non-point source pollution caused by stormwater runoff from development; and
4. Control the total annual volume of surface water runoff, which flows from any specific site following development.

(b) Applicability. The rules of applicability are as set forth in Sec. 12-156. *[Construction Site Stormwater Runoff and Erosion Control]* of this ordinance, with some exceptions. A stormwater management plan is not required for construction or redevelopment of a single or double family home. A stormwater management plan is not required for residential construction on less than two (2) acres with a density of two (2) units or less per acre. However, a permanent stabilization plan is required for projects that meet these exceptions.

(c) Stormwater Management Plan.

1. *Stormwater Management Plan Required for All New Developments and Redevelopments.* No application for development or redevelopment will be approved unless it includes a stormwater management plan detailing in concept

how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices.

The stormwater management plan(s) shall be referred for comment to interested agencies, and any comments must be addressed in a final stormwater management plan. This final plan must be signed by a licensed professional engineer (PE), who will verify that the design of all stormwater management practices meet the submittal requirements of the Comprehensive Water Resources Management Plan.

2. *Maintenance of Existing Stormwater Facilities.* Any stormwater facility in existence prior to adoption of this ordinance shall be maintained by the owner of the stormwater facility and in a manner to conform to design standards for that facility. Any redevelopment of the stormwater facility shall require that the facility meet current stormwater design standards as set forth in this ordinance.

   The thresholds for maintenance are triggered once sediment deposition reaches a point greater than is allowed under the design standard criteria, or such deposition begins to have a substantial effect on the water quality or holding capacity of the pond.

3. *Inspection of Stormwater Facilities.* Inspection programs may be established on a reasonable basis, including but not limited to an inspection at least once every five years or more often if deemed necessary to ensure proper functioning of the stormwater management facility. Inspections are the responsibility of the owner of the stormwater facility and must be completed by a licensed professional engineer (PE) hired for that purpose. Inspection results must be completed and submitted to the City of St Louis Park every five years beginning five years from the completion of development or from the date of this ordinance for a pre-existing stormwater facility.

   Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and evaluating the condition of drainage control facilities and other stormwater treatment practices.

   All new and existing stormwater management facilities must undergo, at a minimum, an inspection every five years to document maintenance and repair needs and ensure compliance with the requirements of this ordinance and accomplishment of its purposes. This maintenance may include: removal of silt, litter and other debris from all catch basins, inlets and drainage pipes; grass cutting and vegetation removal; and necessary replacement of landscape vegetation. Any maintenance needs found must be addressed in a timely manner, as determined by the City of St. Louis Park. The inspection and maintenance requirement may be increased as deemed necessary to ensure proper functioning of the stormwater management facility.

(d) Maintenance Covenants. Maintenance of all stormwater management facilities shall be ensured through the creation of a formal maintenance covenant that must be approved by the City of St. Louis Park and recorded at the Hennepin County Recorders Office prior to final plan approval. As part of the covenant, a schedule shall be developed for when and how often maintenance will occur to ensure proper function of the stormwater management facility. The covenant shall also include plans for periodic inspections to ensure proper performance of the facility between scheduled cleanouts.

The owner/operator shall show in the maintenance covenant how it will utilize Best Management Practices (BMPs) to prevent discharge of pollutants into the stormwater system. These BMPs are listed in the City's Stormwater Pollution Prevention Plan (SWPPP) and the current Minnesota

Pollution Control Agency BMP standards, and are necessary for compliance with requirements of the NPDES permit and Appendix J of the City's Comprehensive Water Resources Management Plan. The threshold for maintenance is triggered once sediment deposition reaches a point greater than is allowed under the design standard criteria, or such deposition begins to have a substantial effect on the water quality or holding capacity of the pond.

(e) Right-of-Entry for Inspection. When any new drainage control facility is installed on private property, or when any new connection is made between private property and a public stormwater system, the property owner shall grant to the City of St. Louis Park the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This includes the right to enter a property when the City has a reasonable basis to believe that a violation of this ordinance is occurring or has occurred, and to enter when necessary for abatement of a public nuisance or correction of a violation of this ordinance.

(f) Records of Installation and Maintenance Activities. Parties responsible for the operation and maintenance of a stormwater management facility shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least ten years. These records shall be made available to the City during inspection of the facility and at other reasonable times upon request.

Reference Appendix "T" of the Comprehensive Surface Water Management Plan, entitled *Stormwater Management Guidelines for New Development or Redevelopment within the City of St. Louis Park*.

Sec. 12-159. Wetland Protection.

All land disturbing activities, which impact or may impact a wetland, must be in conformance with the City's Wetland Management Plan, which is Appendix "B" of the City's Comprehensive Surface Water Management Plan, as adopted by Council Resolution.

Sec. 12-160. Enforcement.

(a) Violation. Any action, failure to act or land use practice that would impair water quality if allowed to continue, shall constitute a public nuisance and be treated as a misdemeanor under this Code.

(b) Notice of Violation. Whenever the City finds that a person has violated any section of this Code or failed to meet a requirement of this Ordinance, the City shall order compliance by written Notice of Violation to the responsible person. Such notice may require:

1. Monitoring, analyses and reporting;
2. Elimination of illicit discharges or connections;
3. Abatement of pollution and hazards;
4. Restoration of affected property;
5. Remediation of issue;
6. Payment of a fine to cover administrative and remediation costs;
7. Implementation of source control or treatment BMPs; and
8. Other actions as deemed necessary by the City.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. The notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by the City or other local governmental unit or a contractor and the expense thereof shall be charged to the violator.

(c) Failure to maintain practices. If a responsible party fails or refuses to meet the requirements of the maintenance covenant, the City of St. Louis Park, after reasonable notice, may correct a violation of the design standards or maintenance needs by performing all necessary work to place the facility in proper working condition. In the event that the stormwater management facility becomes a danger to public safety or public health, the City of St. Louis Park shall notify the party responsible for maintenance of the stormwater management facility in writing. Upon receipt of that notice, the responsible person shall have 30 days to effect maintenance and repair of the facility in an approved manner. After proper notice, the City of St. Louis Park may assess the owner(s) of the facility for the cost of repair work and any penalties; and the cost of the work shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes by the county.

Sec. 12-161. Appeal of Notice of Violation.

Any person receiving a Notice of Violation may appeal the determination of the City. The notice of appeal must be received within 5 days from the date of the Notice of Violation. Hearing on the appeal before the appropriate authority or designee shall take place within 30 days from the date of receipt of the notice of appeal. The decision of the City or the local government unit or designee shall be final.

Sec. 12-162. Enforcement Measures After Appeal.

If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or, in the event of an appeal, within 5 days of the decision of the City or local government unit upholding the decision of the authorized enforcement agency, then representatives of the authorized enforcement agency shall enter upon the subject private property and are authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the government agency or designated contractor to enter upon the premises for the purposes set forth above.

Sec. 12-163. Cost of Abatement of the Violation.

Within 30 days after abatement of the violation, the owner of the property will be notified of the cost of abatement, including administrative costs. The property owner must file any objection to the amount of the assessment in writing with the City within 30 days. If the amount due is not paid within a timely manner as determined by the decision of the City or by the expiration of the time in which to file an appeal, the costs shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment. Any person violating any of the provisions of this article shall become liable to the City by reason of such violation.

Sec. 12-164. Injunctive Relief.

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Ordinance. If a person has violated or continues to violate the provisions of this Ordinance, the authorized enforcement agency may petition for a preliminary or permanent injunction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

Sec. 12-165. Compensatory Action.

In lieu of enforcement proceedings, penalties, and remedies authorized by this Ordinance, the authorized enforcement agency may impose upon a violator alternative compensatory actions, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, and similar programs.

Sec. 12-166. Violations Deemed A Public Nuisance.

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this Ordinance is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

Sec. 12-167. Criminal Prosecution.

Any person that has violated or continues to violate this ordinance shall be liable to criminal prosecution to the fullest extent of the law.

The authorized enforcement agency may recover all attorney’s fees court costs and other expenses associated with enforcement of this ordinance, including sampling and monitoring expenses.

Sec. 12-168. Remedies Not Exclusive.

The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable federal, state or local law and it is within the discretion of the authorized enforcement agency to seek cumulative remedies.

(Ordinance No. 2264-04, 3-30-04)

St. Louis Park
MINNESOTA
Experience LIFE in the Park

Surface Water Management Plan
Appendix M1 - Erosion and Sediment Control Plans Guidelines

Outlined below are the city's guidelines for erosion and sediment control plans.

Regulated activities: All projects disturbing 5,000 square feet or excavating, filling or stockpiling 50 cubic yards of material within the city.

Projects meeting minimum threshold must be compliant with the guidelines outlined in this document, the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General (CSW) and Municipal Separate Storm Sewer System permits (MS4), Minnehaha Creek Watershed District (MCWD), Bassett Creek Watershed Management Commission (BCWMC) or any other regulatory agency having jurisdiction within the city. All plans will be required to adhere to the most stringent requirements applicable.

Exceptions: Emergency activity necessary to protect life or prevent physical harm to a person or property, provided erosion control measures, including necessary remedial action, are implemented as soon as possible.

Erosion and sediment control site plan requirements: Site plan design must be adequate to prevent erosion and the transport of sediment and other pollutants from permitted site to the satisfaction of the city engineer. At a minimum, the site plan must include the following items before the packet is considered complete and review can begin.

1. Plans and specification shall conform to the provision of the city and all other applicable regulatory entities.
2. Provide schedule for overall project construction, phasing and erosion and sediment control plan implementation, maintenance and final stabilization.
3. Show site location including surrounding roads, steep slopes, other significant geographic features, buildings and other significant structures.
4. Show existing and final grades/contours and the direction of flow for all pre- and post-construction runoff from the site. Include areas of grubbing, clearing, tree removal, grading, excavation, fill and other disturbance; areas of soil or earth material storage; quantities of soil or earth material to be removed, placed, stored or otherwise moved on site; and delineated limits of disturbance.
5. Show site property lines.
6. Identity, locate and graphically represent all existing and planned underground utilities concentrated within the project area, where safe, practical and feasible.
7. Identify and show all receiving waterbodies and/or stormwater conveyance systems to which the site discharges. Specify impaired or special management waters status of each receiving waterbody or conveyance system and any existing or proposed wetland buffers on site.

8. Locate all trees and vegetation intended for removal or to be retained. Incorporate installation of protective fencing to exclude all fill and equipment from the drip line or critical root zone, whichever is greater, of all vegetation to be retained.
9. Show all onsite buildings and structures, existing and proposed stormwater management facilities, including, but not limited to: infiltration basins, biofiltration basins, stormwater ponds, porous pavers, underground storage and swales
10. Locate all proposed runoff control, erosion prevention, sediment control and temporary and permanent soil stabilization BMPs, including but not limited to: inlet protection, perimeter control, temporary and permanent soil stabilization, concrete wash areas, slope breaks, energy dissipation, rock construction entrance and silt curtains.
11. When silt fence is used, it must conform to Standard Specifications for Construction, Minnesota Department of Transportation, 2018 or as amended.
12. Show areas where compaction is to be prevented and/or mitigated. These areas shall be protected from construction vehicle traffic where practical and feasible. These areas include but are not limited to: filtration and infiltration stormwater facilities and areas that are proposed to be permanently landscaped as green space.
13. Location of all onsite, existing and proposed stormwater management facilities, including, but not limited to: infiltration basins, biofiltration basins, stormwater ponds, porous pavers, underground storage and swales.
14. Location of any wetland buffers on site (existing or to be established).
15. Provide site inspection plan to include the following:
    a. Maintain inspection and maintenance records on site with the erosion control plan and made available at the city's request within 24 hours.
        i. City performs inspections twice a week and within 24 hours after a 2.5-inch rainfall event.
    b. Date and time of inspection.
    c. Name of person conducting inspections.
    d. Findings of inspection, including recommendations for corrective actions and corrective actions taken, including dates, times and party completing maintenance activities.
    e. Date and amount of rainfall events greater than 0.5 inches within 24 hours.
16. Provide the credentials and contact information of a qualified/ adequately trained erosion control supervisor who will be responsible for implementing the erosion and sediment control plan and/or SWPPP.
17. Identify Best Management Practices (BMPs) to minimize erosion.
18. All exposed soils shall be stabilized within seven days of inactivity.
19. Slopes along surface waters require soil stabilization within 72 hours.
20. Slopes greater than 3:1 require a category three erosion control blanket.
21. Identify BMPs to minimize sedimentary and other pollutant discharges.

22. All down gradient slopes will have adequate sediment and pollutant controls that will not allow sediment or other pollutants to overtop or to undermine the BMPs.
23. Dewatering activates are regulated by the city, the Minnesota Department of Natural Resources and the Metropolitan Council Environmental Services (see the city's dewatering webpage for permitting information.).

    https://www.stlouispark.org/government/departments-divisions/engineering/engineering-permits/dewatering-permit
24. All dewatering activities require an individual site plan to be submitted to the city engineer and must include, at a minimum, sampling protocol for selected pollutants, identification and protection plan for downstream receiving waters, adequate treatment process to reduce pollutants and to protect downstream receiving waters.
25. Plans shall provide that stockpiles of soil or other materials subject to erosion by wind or water shall be covered, vegetated and install effective sediment controls at the base of stockpiles on the downgradient perimeter in accordance with the amount of time the material will be on site and the manner of its proposed use.
26. Provide BMP maintenance timelines and practices per NPDES CSW and MS4 permit guidelines:
    a. Guidelines for maintenance of sediment control BMPs (24 hours).
    b. Implementation of erosion control BMPs (no greater than seven days).
    c. Stabilize ditches and outfalls with adequate BMPs (24 hours).
27. Define the management practices of solid and hazardous wastes per NPDES CSW and MS4 permit guidelines
    a. Storage, handling and disposal of construction products, materials and wastes: The permittee(s) shall comply with the following to minimize the exposure to stormwater of any of the products, materials or wastes. Products or wastes which are either not a source of contamination to stormwater or are designed to be exposed to stormwater are not held to this requirement:
        i. Building products that have the potential to leach pollutants must be under cover (e.g., plastic sheeting or temporary roofs) to prevent the discharge of pollutants or be protected by a similarly effective means designed to minimize contact with stormwater.
        ii. Pesticides, herbicides, insecticides, fertilizers, treatment chemicals and landscape materials must be under cover (e.g., plastic sheeting or temporary roofs) to prevent the discharge of pollutants or be protected by similarly effective means designed to minimize contact with stormwater.
        iii. Hazardous materials and toxic waste, including oil, diesel fuel, gasoline, hydraulic fluids, paint solvents, petroleum-based products, wood preservatives, additives, curing compounds and acids, must be properly stored in sealed containers to prevent spills, leaks or other discharge. Restricted access storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste or materials must be in compliance with Minn. R. ch. 7045 including secondary containment as applicable.

iv. Solid waste must be stored, collected and disposed of properly in compliance with Minn. R. ch. 7035.e. Portable toilets must be positioned so that they are secure and will not be tipped or knocked over. Sanitary waste must be disposed of properly in accordance with Minn. R. ch. 7041.

b. Fueling and maintenance of equipment or vehicles; spill prevention and response: The permittee(s) will take reasonable steps to prevent the discharge of spilled or leaked chemicals, including fuel, from any area where chemicals or fuel will be loaded or unloaded, including the use of drip pans or absorbents, unless infeasible. The permittee(s) must conduct fueling in a contained area unless infeasible. The permittee(s) must ensure adequate supplies are available at all times to clean up discharged materials and that an appropriate disposal method is available for recovered spilled materials. The permittee(s) must report and clean up spills immediately as required by Minn. Stat. § 115.061, using dry clean up measures where possible.

c. Vehicle and equipment washing: No vehicle washing or engine degreasing is allowed on site.

d. Concrete and other washouts waste: The permittee(s) must provide effective containment for all liquid and solid wastes generated by washout operations (concrete, stucco, paint, form release oils, curing compounds and other construction materials) related to the construction activity. The liquid and solid washout wastes must not contact the ground, and the containment must be designed so that it does not result in runoff from the washout operations or areas. Liquid and solid wastes must be disposed of properly and in compliance with Minnesota Pollution Control Agency (MPCA) rules. A sign must be installed adjacent to each washout facility that requires site personnel to utilize the proper facilities for disposal of concrete and other washout wastes.

28. Provide design calculations for the use of temporary sediment basins for sites greater than five acres.

29. Plan must implement construction phasing, maintain vegetative buffer strips, horizontal slope grading and minimize the need for disturbance.

30. Projects adjacent to special or impaired waters a must preserve a 50-foot natural buffer or, if a buffer is infeasible on the site, provide redundant (double) perimeter sediment controls when a surface water is located within 50 feet of the project's earth disturbances and stormwater flows to the surface water. Install perimeter sediment controls at least five feet apart, unless limited by lack of available space. Natural buffers are not required adjacent to road ditches, judicial ditches, county ditches, stormwater conveyance channels, storm drain inlets and sediment basins. If preserving the buffer is infeasible, the reasons why must be documented in the SWPPP. Sheet piling is a redundant perimeter control if installed in a manner that retains all stormwater.

31. Additional site plan design may be required to meet Total Maximum Daily Load (TMDL) requirements.

32. Review of erosion and sediment control plan cannot begin until all of these aforementioned criteria have been met.

33. Provide soils engineering and geology report. The city engineer may request of the following information:

    a. Data and information obtained from the requested site investigation.

b. Description of the types, composition, permeability, stability, erodibility and distribution of existing soils on site.

c. Description of site geology.

d. Conclusions and revisions, if any, to the proposed land-disturbing activity at the site or erosion control plan, including revisions of plans and specifications.

34. Plans shall provide that all fabric fences used for erosion and sedimentation control and all other temporary controls will not be removed until the city has determined that the site has been permanently re-stabilized and will be removed within 30 days thereafter.

Construction activity requirements: During the construction process, the owner and contractor must maintain site-wide compliance as defined within their SWPPP, NPDES CSW and MS4 permits and local watershed standards.

1. All plans will be required to adhere to the most stringent requirements of the aforementioned organizations.
2. All erosion and sedimentation controls proposed for compliance with this rule shall be in place before any land-disturbing activity commences.

Final stabilization plan: The plan to establish permanent perennial vegetative cover to prevent erosion of the soil must include the following:

1. Final soil stabilization and or landscaping plan.
2. Specific vegetation species and locations within the project.
3. Performance standard and schedule for desired vegetative cover.
4. Permanent stabilization of all areas subject to land disturbance, retention of native topsoil on site wherever practical and feasible and specify at least six inches of topsoil or organic matter be spread and incorporated into the underlying soil during final site treatment wherever topsoil has been removed.
5. Soil amendments and usage of fertilizers.
6. Plans must state that all fabric fences used for erosion and sedimentation control and all other temporary controls will not be removed until the city has determined that the site has been permanently re-stabilized and will be removed within 30 days thereafter.
7. Long-term vegetation maintenance practices.

Project closeout: The following outlines the city's project certification and permit closeout procedures to ensure the project has been completed in conformance with the plans and specifications developed for projects.

1. Permittee shall provide the city engineer with an as-built grading plan as defined in the city's erosion and sediment control plan requirements and design guidelines (section 02050 standard specifications).
2. The city will withhold all securities until the certified as-built grading plan has been approved by the city engineer.

Material testing and quantity verification requirements: Permittees and contractors are required to work closely with city to ensure that the installation, application, location and quantity of the selected erosion and sediment control BMP are in conformance with the approved plans and specifications for the project. The city reserves the right to refuse any work that is not in conformance with the approved plans and specifications for the project or is deemed to be inadequate due to existing conditions.

Surface Water Management Plan
Appendix M2 – Stormwater Management Requirements

Outlined below are the City of St. Louis Park's guidelines for stormwater management.

Stormwater management requirements: The stormwater management plan must detail how runoff and associated water quality impacts resulting from the project will be managed. This plan must indicate whether stormwater will be managed on-site or off-site and the general location and type of practices. Stormwater management plans must be compliant with National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General (CSW) and Municipal Separate Storm Sewer System permits (MS4), Minnehaha Creek Watershed District, Bassett Creek Watershed Management Commission (BCWMC) or any other regulatory agency having jurisdiction within the city, and the erosion and sediment control guidelines.

All plans will be required to adhere to the most stringent requirements applicable. Permittees are encouraged to use the Minnesota Stormwater Manual (MPCA, 2018) for additional guidance.

Regulated activities: A stormwater management plan is required for all new development and redevelopment projects which result in site disturbance that is one acre or greater or any project that proposes 10,000 square feet of new impervious surface.

Exemption: Construction of single-family homes is exempt from this requirement but is encouraged to comply with it.

Stormwater management plan requirements: A plan must be submitted to the city which describes how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices. This final plan must be signed by a licensed professional engineer (PE), who will verify that the design of all stormwater management practices meets the submittal requirements of the city's Environment and Public Health code.

1. Phosphorus control

    a. New development projects subject to this rule must result in no net increase in phosphorus loading from existing conditions, on an annual average basis.

    b. Redevelopment projects subject to this rule must result in a net new reduction in phosphorus loading from existing conditions, on an annual average basis.

    c. **Within BCWMC Jurisdiction*:*** If an applicant is unable to achieve the performance goal because site restrictions make it infeasible or it is prohibited by the MPCA, then the applicant must implement the flexible treatment options, as shown in the BCWMC Design Sequence Flow Chart in Appendix A. Using the flow chart, applicants are taken through a step-by-step approach to document site restrictions and how they have attempted to meet the 1.1 inches performance goal. If the performance goal is shown to be infeasible, a 0.55-inch performance and a 75 percent annual total phosphorus removal goal is explored, followed by a maximum extent practicable volume reduction and a 60 percent annual total phosphorus removal goal, and then a final option to meet the 1.1 inches volume reduction goal at an off-site location

2. Total suspended solids

    a. New development projects subject to this rule must result in no net increase in total suspended solids loading from existing conditions, on an annual average basis.

3. Redevelopment projects subject to this rule must result in a net reduction in total suspended solids loading from existing conditions, on an annual average basis. The stormwater management system must be design so that the water quality volume will discharge through the soil surface or filter media in 48 hours or less. Additional flows that cannot be infiltrated or filtered in 48 hours should be routed to bypass the system through a stabilized discharge point.

4. Rate control:

    a. For all projects subjected to this rule, the site design will provide on-site facilities for post-construction conditions to ensure that discharge rates from the 6-inch 24-hour rainfall event is no greater than the existing discharge rates from a 4.2-inch 24-hour rainfall event.

    b. **Within BCWMC Jurisdiction**: Proposed, nonlinear projects containing one or more acres of new and/or fully reconstructed impervious surfaces must manage stormwater runoff such that peak flow rates leaving the site are equal to or less than the existing rate leaving the site for the 2-, 10-, and 100-year events based on Atlas 14 precipitation amounts and using a nested 24-hour rainfall distribution. See Table 1 below applicable Atlas 14 rainfall depths for the city.

Table 1: Atlas 14 Rainfall Depths for City of St. Louis Park, MN

Storm Event	Depth, inches
50% annual probability (2-year) 24-hour	2.9
10% annual probability (10-year) 24-hour	4.3
1% annual probability (100-year) 24-hour	7.4

5. Volume control: For all projects subjected to this rule, the stormwater management plan must provide for the abstraction of the first one inch of rainfall from the site's impervious surface.

    a. New development projects subject to this rule will result in no net increase of stormwater discharge volume, on an annual average basis, unless prohibited by the stormwater management limitations.

    b. Redevelopment projects subject to this rule will result in a net reduction of stormwater discharge volume, on an annual average basis, unless prohibited by the stormwater management limitations.

c. **Within BCWMC Jurisdiction**:

i. New development: Proposed new, nonlinear developments that create more than one acre of new impervious surface on sites without restrictions shall capture and retain onsite 1.1 inches of runoff from the new impervious surfaces. If the performance goal is not feasible and/or is not allowed for a proposed project, then the applicant must implement the flexible treatment options, as shown in the BCWMC Design Sequence Flow Chart in Appendix A. Site restrictions include those factors listed in the BCWMC flexible treatment options, which include, but are not limited to MPCA's prohibited site conditions.

ii. Redevelopment: Nonlinear redevelopment projects on sites without restrictions that create one or more acres of new and/or fully reconstructed impervious surfaces shall capture and retain onsite 1.1 inches of runoff from the new and/or fully reconstructed impervious surfaces. If the performance goal is not feasible and/or is not allowed for a proposed project, then the applicant must implement the flexible treatment options, as shown in the BCWMC Design Sequence Flow Chart in Appendix A. Site restrictions include those factors listed in the BCWMC flexible treatment options, which include, but are not limited to MPCA's prohibited site conditions.

1. Mill and overlay and other resurfacing activities are not considered fully reconstructed impervious surfaces. Trails and sidewalks are exempt from BCWMC water quality performance standards. Buffers should be provide for trails and sidewalks where possible.

iii. Linear Project: Linear projects on sites without restrictions that create one or more acres of net new impervious surfaces shall capture and retain onsite 1.1 inches of runoff from the net new impervious surfaces. If the performance goal is not feasible and/or is not allowed for a proposed project, then the applicant must implement the flexible treatment options, as shown in the BCWMC Design Sequence Flow Chart in Appendix A. Site restrictions include those factors listed in the BCWMC flexible treatment options, which include, but are not limited to MPCA's prohibited site conditions.

1. Mill and overlay and other resurfacing activities are not considered fully reconstructed impervious surfaces.

2. Net new impervious surface calculations will be based on the street surface from back of curb to back of curb; trails/sidewalks (as noted above) and driveways are not included in the net new impervious surface calculations.

6. Complete at least one soil boring, test pit or infiltrometer test in the location of the infiltration practice for determining infiltration rates. Field measured infiltration rates must be divided by two as a safety factor or soil boring results with the infiltration rate chart in the Minnesota Stormwater Manual (MPCA, 2018) at the start of the project to determine design infiltration rates. When soil borings indicate type A soils, field measurements should be performed to verify the rate is not above 8.0 inches per hour. Infiltration is prohibited if the field measured infiltration rate is above 8.0 inches per hour.

7. Complete MPCA's contamination screening checklist or self-conducted assessment to determine the suitability for infiltration. Permittees must retain the checklist or assessment with the SWPPP. For more information and to access the MPCA's contamination screening checklist, see the Minnesota Stormwater Manual (MPCA, 2018) at the start of design of the project.
    b. Existing drainage, including pre-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the time of concentration.
    c. Final drainage, including post-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the time of concentration.
    d. Off-site catchment areas draining to the site. Provide two-foot contours. Show land use and the direction of flow for each area and travel path used to determine the time of concentration.
    e. Existing public and private utilities.
    f. All receiving waters, including wetlands
    g. Property limits, labeled streets, lot and block information if platted, and street address if un-platted.
    h. Building pads, type of house to be built, garage floor elevation, lowest floor elevation and lowest opening elevation are shown.
    i. Driveway slope, from garage to the gutter.
    j. Lowest opening elevation: minimum 2 feet above 100-year high water level (HWL) and minimum one foot above emergency overflow elevation.
    k. Pipe size, length, grade and material.
    l. Top of castings and all inverts of catch basins and manholes
    m. Labeled storm drain structures
8. Overflow design to be considered for events greater than storm sewer system design event.
9. Infiltration/filtration
    a. Refer to the Minnesota Stormwater Manual (MPCA, 2018) at the start of design of the project for specific infiltration/filtration practices.
    b. Infiltration systems will meet volume control standards set by the city.
    c. Filtration systems will achieve approximately 80 percent removal of total suspended solids.
    d. During construction of infiltration or filtration systems, rigorous erosion prevention and sediment controls (e.g. diversion berms) should be used to keep sediment and runoff completely away from the infiltration or filtration area.
        i. The area must be staked off and marked so that heavy construction equipment will not compact the soil in the proposed infiltration or filtration area.
    e. Infiltration or filtration systems should not be excavated to final grade until the contributing drainage area has been constructed and fully stabilized.
        ii. Pretreatment practices are required for filtration and infiltration basins.

10. Calculations or computer model results that demonstrate the design adequacy of the infiltration or filtration system.

Stormwater management design requirements: The following must be included in the stormwater management plan and design:

1. Provide proposed drainage plan and hydraulic calculations dated and signed by a licensed professional.
2. Locate and describe existing vegetation, areas not to be disturbed, on-site soil characteristics and groundwater elevations
3. Drainage Area Maps
    a. Clearly draw and label two-foot contours
        i. Existing contours are dashed and proposed are solid.
        ii. Where applicable, extend existing 2-foot contour lines are a minimum 100 feet beyond the site boundary or more to accurately depict the drainage patterns.
    b. Existing drainage, including pre-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the time of concentration must be mapped.
    c. Final drainage, including post-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the time of concentration must be mapped
    d. Show existing public and private utilities.
    e. Show all receiving waters, including wetlands
    f. Show Property limits, labeled streets, lot and block information if platted, and street address if un-platted
    g. Show building pads, type of house to be built, garage floor elevation, lowest floor elevation and lowest opening elevation are shown. Show lowest opening elevation: minimum 2 feet above 100-year high water level (HWL) and minimum one foot above emergency overflow elevation.
    h. Show driveway slope, runoff from garage to the gutter.
    i. Show pipe size, length, grade and material.
    j. Detail top of castings and all inverts of catch basins and manholes
    k. Label existing and proposed storm drain structures
    l. Delineate infiltration or filtration areas.
    m. Provide adequate maintenance access (typically 12 feet wide)
4. Scaled drawing of infiltration or filtration BMP, with typical detail and typical cross section. Outline area which runoff is directed to the BMP. As part of the drawing set submittal, provide (in table form) the following information.
    a. A long-term inspection and maintenance plan for all permanent stormwater treatment practices
    b. Existing and proposed drainage easements shown and labeled.

c. All existing and proposed lot corner elevations shown to the nearest tenth of a foot.

d. Control/spot elevations for drainage ways provided.

5. A way to visually verify that the system is as designed must be provided.

6. Appropriate on-site testing is required and must be development and redevelopment projects consistent with the recommendations in the Minnesota Stormwater Manual (MPCA, 2018) at the start of design of the project. Testing shall be conducted to verify soil types, infiltration capacity characteristics, and to ensure a minimum of three feet of separation from the seasonally saturated soils (or from bedrock) and the bottom of the proposed infiltration system.

Buffer Requirements within BCWMC Jurisdiction

1. Width

    a. Wetland Buffer Width Requirements must meet the average minimum buffer widths according to the Minnesota Rapid Assessment Method (MnRAM) classification and as follows:

        i. An average of 75 feet and a minimum of 50 feet from the edge of wetlands classified as Preserve.

        ii. An average of 50 feet and a minimum of 30 feet from the edge of wetlands classified as Manage 1.

        iii. An average of 25 feet and a minimum of 15 feet from the edge of wetlands classified as Manage 2 or Manage 3.

    A plan showing the delineated boundary of the wetland, proposed buffer area, and MnRAM classification for the wetland must be submitted for city review. Maintenance of the buffer area must be included in the maintenance agreement developed between the city and the applicant.

    b. Stream Buffer Width Requirements: Adjacent to priority streams stream buffer width must be 10 feet or 25 percent of the distance between the ordinary high water level (i.e., the top of the bank of the channel) and the nearest existing structure, whichever is less.

    A plan showing the ordinary high water level of the stream (i.e., the top of the bank of the channel), nearest adjacent structure, and proposed buffer area must be submitted for city review. Maintenance of the buffer area must be included in the maintenance agreement developed between the city and the applicant.

2. Design

    a. Buffer required for all proposed projects shall be limited to property owned or managed by the applicant (i.e. to the extent of a drainage and utility easement owned by a city on a city stormwater project or to the property boundary on a commercial, institutional, or residential project).

    b. Buffer areas must be left native if not disturbed as part of the project and where acceptable natural vegetation exists. A buffer has acceptable natural vegetation if it:

        i. Has a continuous, dense layer of perennial grasses that have been uncultivated or unbroken for at least five consecutive years, or

ii. Has an overstory of trees or shrubs with at least 80 percent canopy closure that have been uncultivated or unbroken for at least five consecutive years, or

iii. Contains a mixture of the plant communities described above that have been uncultivated or unbroken for at least five consecutive years.

c. Buffer areas must be planted with native plants if disturbed as part of the project (plantings must be comprised of at least 75% native species).

d. Soil in the buffer areas disturbed as part of the project shall be amended, as necessary, to ensure that the soil has an organic content of not less than 10 percent and not more than 35 percent.

e. Buffers must be kept free of all structures and features, including fences and play equipment.

f. Buffers shall not be used for storage of household and personal items, lawn equipment, furniture, firewood, parts, yard waste, and the like.

g. A conservation easement or equivalent to the city for the buffer area is recommended to ensure appropriate maintenance of the buffer.

h. Buffer vegetation must not be cultivated, cropped, pastured, mowed, fertilized, subject to the placement of mulch or yard waste, or otherwise disturbed, except for periodic cutting or burning that promotes the health of the buffer, actions to address disease or invasive species, mowing for purposes of public safety, temporary disturbance for placement or repair of buried utilities, or other actions to maintain or improve buffer quality and performance.

i. The edge of the buffer must be indicated by permanent, free-standing markers at the buffer's upland edge. A marker will be placed along each lot line, with additional markers at an interval of no more than 200 feet or where needed to indicate the contour of the buffer area.

3. Maintenance: The affected property owner or homeowner association that is responsible for the maintenance must:

   a. Maintain and repair damage to buffer areas from such activities as mowing, cutting, grading or other prohibited activities, unless mowing is approved by city staff as a buffer management BCWMC Buffer Requirements. Permission must be obtained from the city before implementing buffer management strategies, which may include mowing, burning, and the use of herbicides.

   b. Be responsible for maintaining only the permitted vegetation in the buffer area and must remove all noxious weeds and invasive, non-native species such as European buckthorn.

   c. Ensure that all soil surfaces in the buffer area are planted with the permitted vegetation and that there is no open soil surface that may result in erosion.

4. Exemptions: Exempted areas from buffer requirements must be properly designed, maintained, and constructed to prevent erodible conditions. These areas area:

   a. Public recreational facilities adjacent to the feature (e.g. trails, stairways, and docks) up to 20 feet in width will be allowed, with that width being added to the required buffer width.

b. Minimally improved areas within the buffer for private access to the feature will be allowed (e.g. wood chip trails, stairways, and docks).

A perpendicular access to the feature is allowed up to 20 feet in width or 20 percent of the lot width, whichever is more restrictive.

Stormwater management limitations

1. Permittee will fully attempt to comply with the appropriate performance goals described above. Options considered and presented will examine the merits of relocating project elements to address varying soil conditions and other constraints across the site. If full compliance is not possible due to any of the factors listed below, the permittee must document the reasons why in the SWPPP.
2. Volume reduction techniques considered will include infiltration, reuse and rainwater harvesting, and canopy interception and evapotranspiration and or other commonly accepted techniques included in the Minnesota Stormwater Manual (MPCA, 2018) at the start of design of the project. Higher priority will be given to BMPs that include volume reduction. Secondary preference is to employ filtration techniques, followed by rate control BMPs. Factors to be considered for each alternative will include following restricted and prohibited site conditions.

Restricted infiltration areas

1. Poor soils (infiltration rates that are too low or too high, above 8.0 inches per hour, or problematic urban soils).
2. Within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features.
3. Zoning, setbacks or other land use requirements.

Prohibited infiltration areas

1. Constructing infiltration systems within a drinking water supply management area (DWSMA) is prohibited if the system will be located:
    a. In an Emergency Response Area (ERA) within a DWSMA classified as having high or very high vulnerability as defined by the Minnesota Department of Health.
    b. In an ERA within a DWSMA classified as moderate vulnerability unless a regulated MS4 permittee performed or approved a higher level of engineering review sufficient to provide a functioning treatment system and to prevent adverse impacts to groundwater.
    c. Outside of an ERA within a DWSMA classified as having high or very high vulnerability, unless a regulated MS4 permittee performed or approved a higher level of engineering review sufficient to provide a functioning treatment system and to prevent adverse impacts to groundwater.
2. Where industrial facilities are not authorized to infiltrate industrial stormwater under an NPDES/SDS, CSW, MS4 and industrial stormwater permits issued by the MPCA.
3. Where vehicle fueling, and maintenance occur.

4. With less than three feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock.
5. Where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater. Prohibited areas or other land use requirements.

Mitigation provisions: In the case that infiltration practices cannot be implemented on site, steps must be taken to mitigate stormwater runoff volume, rate and pollutant reduction. This may include off-site or regional treatment for additional volume retention, additional pollutant or reduction. The city engineer and all permitting agencies must approve all mitigation projects and document who is responsible for the long-term maintenance of the facility.

1. Mitigation projects must involve the creation of new structural stormwater BMPs, the retrofit of an existing structural stormwater BMPs, or the use of a properly designed regional structural stormwater BMP.
2. Routine maintenance of structural stormwater BMPs already required by this permit cannot be used to meet mitigation requirements of this part.
3. Mitigation projects shall be completed within two years after the start of the original construction activity.
4. The city's engineering department will determine and document who will be responsible for long-term maintenance on all mitigation projects of this part.
5. If a regional project has been identified, the City of St. Louis Park may consider a cash payment from the owner and/or operator of a construction activity for mitigation purposes in lieu of the owner or operator of that construction activity meeting the conditions for post-construction stormwater management. Upon receipt of a cash payment in lieu of onsite treatment, a project must be implemented with the designated funds. Mitigation projects must be completed within two years upon the start of construction of the project.
6. Mitigation projects are selected in the following order of preference:
    a. Locations that yield benefits to the same receiving water that receives runoff from the project.
    b. Locations within the same watershed area as the original project.
    c. Locations in the next adjacent upstream watershed.
    d. An alternate location within the City of St. Louis Park.
5. **Within BCWMC jurisdiction**: If the infiltration practices and/or performance goal is not feasible and/or is not allowed for a proposed project, then the applicant must implement the flexible treatment options, as shown in the BCWMC Design Sequence Flow Chart in Appendix A.

Maintenance: All stormwater management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to ensure they continue to function as designed. Permit permittees must provide a maintenance plan that identifies and protects the design, capacity and functionality of on-site and off-site stormwater management facilities; specifies the methods, schedule and responsible parties for maintenance; provides for the maintenance in perpetuity of the facility; and contains at a minimum the requirements in the City of St. Louis Park's standard maintenance declaration. The plan will be recorded on the deed in a form acceptable to the district. A public entity assuming the maintenance obligation may do so by filing with the district a document signed by an official with authority.

Alternative volume reduction and treatment practices: Green infrastructure techniques and practices (including, but not limited to, infiltration, evapotranspiration, reuse/harvesting, conservation design, urban forestry, green roofs), will be given preference as design options consistent with zoning, subdivision and planned unit development requirements. Alternative practices must follow requirements and recommendations in the Minnesota Stormwater Manual (MPCA, 2018) at the start of project design.

Shoreland Protection: All new and redevelopment projects with the BCWMC area are required to comply with the MnDNR's model shoreland management requirements.

Floodplain Requirements: All new and redevelopment projects **with the BCWMC jurisdiction** that will have floodplain affects must comply with BCWMC Floodplain Policy.

1. Background

On January 11, 2018, the Minnehaha Creek Watershed District ("MCWD" or "the District") adopted its fourth-generation watershed management plan ("the Plan"). The Plan, which sets forth the vision and priorities of the District, also presents its organizational philosophy, which centers on the recognition of the natural environment as an integral component of vibrant communities that creates a sense of place, provides vital connections, and enhances social and economic value. This philosophy stems from the District's Balanced Urban Ecology policy, which states that successful, sustainable communities are built on a foundation of integrated land use and water planning through early coordination with partners. To ensure that early and consistent coordination becomes second nature to both MCWD and its partners, the District, through its authority under Minnesota Statutes 103B and 103D and Minnesota Rules 8410, requires all municipalities to develop and implement a coordination plan.

This coordination plan framework ("Framework") ensures coordination and holistic planning between the City of St. Louis Park ("the city") and its watershed management organizations (WMOs). The Framework, an explicit requirement of MCWD, includes the Basset Creek Watershed Management Commission ("BCWMC" or "the Commission"). The Framework defines the roles and responsibilities of each entity, annual and regulatory coordination activities, and organizational contacts.

2. Coordination Plan Framework

2.1 Annual Meeting

The city, MCWD, and BCWMC staff members will meet during the first quarter of each year to discuss the following:

- Prior year-end summary: completed projects, challenges and opportunities encountered, and lessons learned
- Drafting annual National Pollutant Discharge Elimination System (NPDES) and Municipal Separate Storm Sewer System (MS4) permit reports
- Education and outreach activities for the current year
- Capital improvement program and projects (CIPs) for the current fiscal year and a three-year outlook

This meeting, which will be initiated and hosted by the city's Water Resources Manager each year, will be facilitated in a manner necessary to ensure that this partnership is always looking for ways to leverage the value of St. Louis Park's natural resources to enhance community connections and the built environment.

ANNUAL MEETING REQUIRED COORDINATION

- Conduct a Doodle poll or an equivalent means to set the annual meeting date
- Solicit agenda topics related to the areas highlighted
- Draft and transmit the meeting agenda
- Host and facilitate the meeting
- Send meeting summary and action items list to participants five business days after the meeting

Table 1. Required Participants for the Annual Meeting		
City of St. Louis Park	Minnehaha Creek Watershed District	Bassett Creek Watershed Management Commission
✓ Water Resources Manager ✓ Senior Engineering Project Manager	✓ Administrator ✓ Policy Planning Manager ✓ Project Planning Manager ✓ Communication and Education Manager	✓ Administrator ✓ District Engineer or Consultant

2.2 Regulatory Coordination

To streamline the regulatory process and identify opportunities to maximize integration of water resources features into projects, the city's Engineering, and Planning departments will route requests for land use approvals, including but not limited to infrastructure and park improvements, to WMOs at the concept plan phase or soon thereafter. Specific areas of regulatory coordination include the following:

- Permitting
- Private development and redevelopment
- Public development and redevelopment

Table 2. Required Participants for Regulatory Coordination		
City of St. Louis Park	Minnehaha Creek Watershed District	Bassett Creek Watershed Management Commission
✓ Water Resources Manager ✓ Senior Engineering Project Manager	✓ Administrator ✓ Policy Planning Manager ✓ Project Planning Manager ✓ Permitting Program Manager	✓ Administrator ✓ District Engineer or Consultant

2.2.1 Permitting

The following outlines the general permitting process and coordination for the City of St. Louis Park, MCWD, and BCWMC.

1. **Early Coordination**
    - Pre-application discussions and permit reviews will be coordinated with MCWD and BCWMC.
2. **Within BCWMC Jurisdiction**
    - Administer BCMWC standards through the city's permitting program.
    - Notify BCWMC of application(s) in its jurisdiction within three business days of receipt.
3. **Within MCWD Jurisdiction**
    - The city will require documentation of required MCWD permits in advance of issuing applicable city permits.
    - Approved MCWD permits will be stored with other project documentation for future reference.

- MCWD staff will be notified when the city staff has approved a development/redevelopment plan from the city on wetland conservation act administration, applications, and decisions.

2.2.2 Private development and redevelopment

The city will share known upcoming projects at the annual meeting. The city will inform permit applicants of the potential need for MCWD permits and criteria within BCWMC jurisdiction. The city will not issue permits until the MCWD permit application has been issued.

2.2.3 Public development and redevelopment

Because of our strong working relationship with MCWD, the City is continually seeking opportunities for coordination, which occurs through informal conversations as opportunities arise. Any future efforts, including small area plans, rezoning studies, resiliency plans, or other planning activity, will be shared at the annual meeting.

2.2.4 Electronic connections

The city will maintain links to the MCWD and BCWMC websites to its website with a map of watersheds in the City of St. Louis Park.

2.3 Public Outreach and Education

The city will implement the education and outreach initiative outlined in the city's Storm Water Pollution Prevention Program (see City of St. Louis Park SWPPP, Appendix B) and will continue to provide stormwater programming information and educational materials to the public through its annual newsletter, city mailings, website, and social media outlets. The city will also help to generate and promote WMO educational workshops and events to private homeowners and developers and will coordinate with WMOs on other educational efforts where possible to avoid duplicative efforts.

Table 3. Required Participants for Public Outreach and Education

City of St. Louis Park	Minnehaha Creek Watershed District	Bassett Creek Watershed Management Commission
✓ Water Resources Manager ✓ Volunteer Coordinator ✓ Web Coordinator	✓ Administrator ✓ Communication and Education Manager	✓ Administrator ✓ District Engineer or Consultant

2.4 Aligning Planning and Investments

The city understands that the process of aligning investments begins at the concept stage of project development and recognizes that, in addition to a future competitive grant program, MCWD and BCWMC may offer technical resources and planning to assist the city in aligning public and private investments. Below are opportunities to align investments as presented in the city's surface water management plan capital improvement program (CIP).

Table 4. Required Participants for Aligning Planning and Investments		
City of St. Louis Park	Minnehaha Creek Watershed District	Bassett Creek Watershed Management Commission
✓ Water Resources Manager ✓ Senior Engineering Project Manager ✓ Planning/Zoning Supervisor	✓ Administrator ✓ Policy Planning Manager ✓ Project Planning Manager ✓ Operation Manager	✓ Administrator ✓ District Engineer or Consultant

2.4.1 Opportunities for Both Watershed Management Organizations

Provide Opportunities for Volunteering: Continue annual partnerships with schools and community volunteer programs for participation in cleaning up trash and debris from parks and areas adjacent to creeks, lakes, and ponds.

Lake and Stream Monitoring: Continue partnership with the Metropolitan Council, BCWMC, and MCWD on annual monitoring of lakes and streams through the citizen-assisted monitoring program and staff or consultants.

2.4.2 Bassett Creek Watershed Management Commission Project Opportunities

Only a small portion of the city is within the BCWMC watershed boundaries, as such there has not been opportunities to partner together. The following projects have been identified for future collaboration efforts:

- Otten Pond Rehabilitation Project (2022)

2.4.3 Minnehaha Creek Watershed District Project Opportunities

Past Collaboration Efforts:

- Bass Lake Preserve Rehabilitation Project (2017)
- Oregon Pond Basin Rehabilitation Project (2018)

Current Projects:

- Louisiana Station Area Project (2019)
- Sumter Pond Rehabilitation Project (2019)
- Edgewood Business Park Project (2019)

Future Opportunities:

- Aquila Park Water Quality Improvement Project (2020)
- Minnehaha Creek Equalizer Pipe Project (2021)
- Louisiana Oaks and South Oak Water Quality Project (2021)
- Westdale Sediment Basin Rehabilitation Project (2021)
- Ainsworth Park Water Quality Improvement Project (2022)