III. GOALS AND POLICIES

Minnesota Rules, Part 8410.0170, subpart 5 (italics below), relating to Surface Water Management, requires local governments to establish goals and policies for the effective management of water resources. The seven goals established in this Plan support the City's Purpose Statement by translating each goal into specific policies and ultimately standards that are realized through the implementation plan. As a reference point for the basis of these goals and policies, the following italicized text is from Minnesota Rules.

> *M.R. 8410.0170, Subpart 5. Establishment of policies and goals (Local Plans). Each local (SWMP) plan must state specific goals and corresponding policies related to the purpose of these plans, be consistent with the policies and goals of the organization plans within the City or township, and address the relation of the local plan to the regional, state, and federal goals and programs outlined in Part 8410.0070.*

A ***goal*** is a desired end toward which surface water management efforts are directed. This section identifies goals for water resources planning and management functions throughout the City. The goals of this plan were established in accordance with the purposes of the water management programs required by Sections 103B.201 to 103B.251 and in conformance with the goals of the WMOs having jurisdiction in Chanhassen, including the MCWD, RPBCWD, the LMRWD and the CCWMO. Table 5 summarizes the City's seven goals and corresponding goal statements.

Each goal has several corresponding ***policies*** that form the governing principals that will be followed to achieve the goals. The seven goals and the corresponding policies is presented in more detail in the following pages. Plan ***standards*** (or storm water Development Criteria) are an extension of the goals and policies that provide detailed criteria on storm water management practices. Recommended surface water management design standards for development and redevelopment projects are provided in Appendix D of this Plan.

Implementation Plans have been developed for each of the seven goals which present identified or potential problems related to achieving the stated goals and recommended approaches and/or solutions for addressing the problems.

The Implementation Plans may include specific activity steps, references to the applicable NPDES Permit Best Management Practice (BMP), available resources, the means of measuring the completion of the activity step and a target date for completion. The combination of these implementation plans will formulate the overall strategy for implementing the City's second generation Surface Water Management Plan. Some of the action-implementation activities correspond directly to actions committed to in the City's NPDES Permit submittal, known as the Storm Water Pollution Prevention Program (SWPPP).

Table 5. Plan Goals and Goal Statements

Goal Number	Goal	Goal Statement
1	Water Quantity	Provide at least 100-year (1% chance) flood protection for all persons and structures.
2	Water Quality	Achieve water quality standards in lakes, streams, and wetlands consistent with their designated uses and established classifications.
3	Wetlands	Protect and rehabilitate wetlands to maintain or improve their function and value.
4	Erosion and Sediment Control	Minimize soil erosion and sedimentation.
5	Financing	Establish and maintain funding sources to finance surface water management activities.
6	Regulatory Responsibility	Maintain primary responsibility for managing water resources at the local level but continue coordination and cooperation with other agencies and organizations.
7	Public Education and Information	Provide information and educational resources to improve knowledge and promote an active public role in management of water resources.

A. Goal 1: Water Quantity

Development and the related changes in land use can increase runoff rates and volumes due to additional impervious surface. As areas develop or redevelop at a higher density, storm water runoff generally increases. This increase in runoff rates and volumes can cause flooding issues in the downstream system. It is important to control these increased runoff rates and volumes in order to ensure reduction of flooding in the downstream system and to control the potential effects of erosive flows on streams and waterways.

A relatively new issue has recently gained much more attention over the past two years for 30 selected municipalities due, in large part, to the revised NPDES MS4 Permit. While runoff volume has been regulated in many areas of Minnesota, and the country as a whole, the new non-degradation requirements of the revised NPDES permit may create the need for stricter controls in many communities, including Chanhassen. The non-degradation portion of the permit will require Chanhassen to assess the change in loading of three pollutants (runoff volume, total suspended solids, total phosphorus) over two time periods (approximately 1988 to 2000 and 2000 to 2020). The intent of these requirements is for the cities to develop a plan to address any significant increased loading of one or more of the three pollutants. At this time, it is too early to tell what additional long-term implementation efforts this will require of the City.

The City experienced two large storm events in the fall of 2005. The first storm occurred on September 3 and 4 and was on order of a “100-year” event, totaling approximately 5.55 inches of rainfall. The second occurred on October 4 and 5, 2005, and totaled approximately 4.61 inches of rainfall. The good news is that overall the City’s storm water system worked well and was able to handle the large storm events. However, there were a few exceptions. While significant damages did not occur, a few areas were subject to high water levels and short-term flooding of streets. Lotus Lake experienced extended high water levels. Residents of the lake experienced

submerged docks and users were subject to the City's emergency slow/no-wake restrictions for a period of about 15 days. Looking at opportunities to reduce the extent and/or duration of these high water levels is one of the key water quantity issues for the City. Because the lake discharges to Purgatory Creek, the solution is not a simple one. Coordination with RPBCWD, Lotus Lake area residents and the potentially impacted property owners downstream will be a critical step in developing a long term solution that does not push the problem downstream.

Another issue that was discovered during the large event of 2005 is the lack of emergency overflows and flow paths in some areas of the City. Ultimately, the City's focus is to operate and maintain the system so that it continues to function in the way it is intended, and provides flood protection for adjacent properties. During review of storm water management plans it is important for City staff to review the location of emergency overflow paths for storm water infrastructure in new developments.

The City has developed the water quantity policies listed in Table 6 to support the water quantity goals of this Plan.

Table 6. Water Quantity Policies

Goal Statement: Provide at least 100-year (1% chance) flood protection for all persons and structures.	
Policy No.	**Goal 1. Water Quantity – Policies**
1	Establish building elevations to provide at least 3 feet of freeboard adjacent to ponding areas and floodplains as an area develops or when drainage facilities are constructed for an area.
2	Establish and maintain overflow routes for ponds and low areas to provide relief during storm conditions that exceed design conditions.
3	Design, operate and maintain newly constructed storm water facilities in accordance with this Plan.
4	Where possible, regional ponding areas, as opposed to individual on-site ponds, should be used to reduce flooding, to control discharge rates, and to provide necessary storage volumes as indicated in this Plan.
5	As opportunities allow through development, redevelopment, and infrastructure replacement, stormwater facilities should be built or upgraded to provide or improve flood management and water quality.
6	Encourage the development of new and improvement of existing ponds located upstream of priority water bodies.
7	Permanently protect surface water impoundments and drainage systems by requiring the dedication of land and/or protective easements as required.
8	Creative and innovative Best Management Practices, including infiltration systems will be encouraged considering site limitations such as soil conditions, depth to groundwater, safety, snow removal, and maintenance issues.
9	Continue to stringently enforce impervious surface requirements set forth in City Code and development contracts.
10	Require all developments to construct nutrient detention ponds, enlarge regional ponds, and/or contribute to the construction or improvement of a regional facility for the purpose of reducing peak flows generated by the subject development, in accordance with Minnesota Statute 462.358, and in the general location indicated by the Surface Water Management Plan.
11	Preserve existing water storage below 100-year flood elevations.

An effective Flood Insurance Study (FIS) dated January 1979 was completed for the City of Chanhassen. As part of the FIS, Flood Insurance Rate Maps and Flood boundary and Floodway Maps were created for the City, and are available from the FEMA website, www.fema.gov. Flood profiles for the Riley, Purgatory and Bluff Creeks are provided in Appendix E.

1. Hydrologic Modeling Update

One of the larger tasks involved in the SWMP update was to update the City-wide hydrologic model. The 1994 HydroCAD Model was updated from the DOS-based version available in 1994 to Version 7.0, which is a more rigorous and versatile program that will provide City staff a better tool for evaluating proposed projects. One of the goals of this modeling effort was to improve the City's ability to predict and understand the urban hydrology and to evaluate potential future flooding issues resulting from development or redevelopment projects. This model update was created based on the 2020 Land Use Plan, soil hydrologic group data and drainage area characteristics. A digital terrain model (DTM), consisting of two-foot contours and GIS, was used to delineate watershed boundaries and identify detention/storage areas.

The watershed boundaries were compared with the subwatershed mapping from the 1994 Plan, the storm sewer structure survey, and the wetland inventory to ensure the boundaries are as accurate as possible for this planning-level analysis. Once the final watershed boundaries were established, this file was merged with the hydrologic soil group and future land use files. Curve numbers were generated using automated GIS procedures, and a weighted curve number was calculated for each drainage area. The updated curve numbers were compared to the original values to ensure they were logical and were revised as reasonable. Figure 2 (foldout map with individual drainage areas shown) illustrates the drainage network that forms the basis for the City-wide hydrologic model.

For the watersheds that were not altered significantly from the 1994 Plan boundaries, the time of concentration was not altered. For altered or new subwatersheds a new time of concentration was determined. Proposed ponds presented in the 1994 Plan were left in the model if the field work and/or aerial photography review confirmed the pond was constructed. Proposed ponds that were not constructed or observed in the field, but remain as implementation recommendations as part of this SWMP update, were left in the model as an unconnected node. If stage storage-data were available in as-built plans for new ponds, the data was included in the updated model. In many cases the data available consisted only of a pond surface area, a normal water elevation and an outlet pipe size. In general, the most recent and best available data was entered into the updated HydroCAD Model. The model will be continuously updated by the City as new and better data becomes available.

Modeling was completed for the critical duration storm events including the 2-year, 10-year, and 100-year, 24-hour NRCS Type II storm events with Antecedent Moisture Condition (AMC) 2. In addition to the updated boundaries and input parameters, information relating to lake, wetland and pond outlet conditions were also reviewed to develop a model that better represents the current condition of the drainage system. Several storm water ponds were also inventoried as part of the wetland inventory. The information available for these ponds in as-built plans was

added to the HydroCAD model. In many cases the data provided in the as-built plans was limited to surface area and normal water level information. Therefore the model does not include stage-storage data for all storm ponds.

There are several natural conveyances within the City, including the 5 streams discussed in this Plan. These streams are modeled as ponds or reaches in the HydroCAD model, since most streams are conveyed through wetlands that provide additional storage volume. Other more detailed hydrologic and hydraulic models are available for some of the natural conveyances within the City.

The hydrologic modeling results for the 2-year, 10-year, and 100-year events were compared to and evaluated against the data from the 1994 Plan. Results of this model were used to form recommendations on system improvements and development standards. The updated HydroCAD model will be used primarily for planning and development review efforts, and is not intended to be used for design purposes without further refinement of the drainage area and pond data. The modeling results for these storm events are provided in Appendix E. It is important to note that the 100-year modeling data was not developed to the level of detail required in a flood insurance study. Therefore, the data tables also include the regulatory flood elevation as defined in the most recent flood insurance study for the City. As part of the review of potential updates to the flood maps, it was determined that the mapping is generally accurate and updates to the detailed hydrologic studies are not warranted at this time.

MCWD has identified four subwatersheds with land-locked basins located partially within the City of Chanhassen. The MCWD requires these basins to continue to be managed as land-locked basins.

Nine neighborhood areas located within Chanhassen were studied further for opportunities to improve storm water quantity and quality with proposed street reconstruction projects. The neighborhoods that were analyzed are illustrated in Figure 8 and a summary Technical Memoranda and supporting computations for each completed study are provided in Appendix G.

2. Implementation Plan

Table 7 outlines activity steps intended to guide the City in achieving the water quantity goals of this Plan. Table 7 also shows a list of possible resources available, the measurement system and a project target date or schedule for each of the planned activities.

In general, the recommended activities and projects are to continue to review completed and proposed development projects and look for opportunities to improve maintenance and operation of the conveyance systems. In the process, some of the water quantity improvements will also have a positive impact on water quality. For example, if by initiating a project that will establish or improve the emergency overflow from a pond, the City may combine those efforts with expanding the pond or conducting removal of accumulated sediment. These efforts would be coordinated, in part, based on the (classification) priority system established for each lake or surface water's watershed. At the same time, the City would evaluate the existence of a drainage

easement and initiate establishment of an easement if none currently exists. These efforts would relate specifically to Activities 3 and 4 in Table 7.

Specific recommendations also relate to fixing identified current problems with the conveyance system. Both of the recommended projects (Activities 1 and 5) will involve coordination with the watershed district to evaluate the downstream impacts and to coordinate the compatibility of potential improvements with other plans and regulatory requirements. These projects would first involve completion of more detailed feasibility studies to determine the potential benefits and a planning-level opinion of the costs of the improvements. A critical aspect of the feasibility is, once a beneficial project is refined, a consideration of the funding sources must be included. Therefore, the planning-level costs for these items in the Implementation section of this Plan address only the costs the City would incur in participating in the feasibility studies. Additional costs may be incurred by the City in any project design or construction stages.

Table 7. Water Quantity Implementation Plan

ID	Activity / Project	Resources	Measurement	Schedule
1	Explore opportunities for discharge rate reductions or hydrograph modifications in the Bluff Creek System.	• Review of proposed development projects • Hydrologic / hydraulic models • Analysis of downstream impacts	• BMPs installed for additional detention • Reduction in peak and/or duration of erosive flows • Reduction in bank erosion	Ongoing
2	Refine City-wide hydrologic model as proposed projects are completed	• City-wide model • Engineering Dept. staff • Developer's plans and modeling submittals	• Improved system model	Ongoing (each project)
3	Review easement coverage on City owned and maintained storm systems relative to the 100-year HWL	• Property records • GIS data / parcel coverage • Property owners	• GIS evaluation of ponds / parcels • Dedicated easements over ponds to the 100-year HWL	2008 (Ongoing)
4	Initiate Private System Maintenance Program	• Example agreement in Appendix D of this plan • "www" access to O&M requirements • City inspection and maintenance staff	• Reduction of localized flooding • Improved water quality treatment efficiency	2007 Ongoing
5	Complete Feasibility Study to evaluate potential reductions of extended high water levels on Lotus Lake	• City-wide model • XP-SWMM model if needed • Coordinate with watershed district efforts	• Completed Study • Identified opportunities for volume and water quality benefits	2007

Activity 2 is primarily needed to continue to refine the City tools for surface water management and to comply with the City's NPDES MS4 permit program. The permit does not require a model to be established, but it does require an understanding of the City's storm water "system".

The expectation is that both the new storm sewer and pond areas will be added to the GIS database and City-wide hydrologic model for new development and verified and updated for existing developments as new data is collected.

Activity 4 is needed for special circumstance within the City where BMPs will be maintained by a private entity. The City owns and maintains the majority of the City's storm water system, but in areas where this will not be the case, private system maintenance agreements should be in place. An example agreement is included in Appendix D of this Plan.

B. Goal 2: Water Quality

The City of Chanhassen seeks to maintain and improve the water quality in its lakes, streams and wetlands. Water quality is often directly related to the level of available nutrients in a water body. While nutrients comprise only one category of substances that can affect water quality, nutrients (principally phosphorous) must be controlled to achieve the water quality goals of this Plan. Phosphorous is most often the limiting factor for plant growth, and increases in available phosphorous allow plant species to dominate the lakeshore, open water, or marsh. Two of the City's lakes are currently listed as impaired for nutrients (Lake Riley and Lotus Lake), and phosphorous is the key nutrient responsible for this listing.

There are several key activities that can be followed to minimize the delivery of phosphorus into these listed waters and all of the City's water bodies. These activities include better management of construction site erosion control measures, reducing the level of impervious cover, reducing the extent of managed lawn areas and replacing them with native vegetation, reducing stream bank erosion and using more open channel drainage systems with natural vegetative cover.

An assessment of the overall quality of the lakes and water resources in the City was completed as part of this planning process. The results of this review indicate that the City's lakes are generally in very good condition with steady to improving trends. There are a few exceptions that are discussed in more detail in Section IV of this Plan. In addition to focusing efforts on improving the few waters that are impaired, a number of activities can be accomplished on a routine basis to improve the quality of all City waters.

Housekeeping practices, such as removing leaves from streets and storm drains and limiting the use of phosphorus fertilizers, are examples of simple ways individuals (residents) and the City can make improvements in water quality. Many people do not realize that organic materials, like leaves and grass clippings, fertilizer and pet waste can disrupt the ecosystem of a lake. Once in the lakes these organic materials decay, releasing phosphorus. Excess phosphorus increases algae growth, inhibiting the growth of other aquatic plants. When algae die and decay, they exert a biological oxygen demand on the lake, depleting available oxygen for fish and other aquatic species. Limiting nutrients is one of the keys to maintaining or improving water quality.

Turbidity is another concern that is caused by pollutants such as total suspended solids (TSS). According to the MPCA, elevated turbidity reduces the depth of photosynthesis and the feeding ability of aquatic organisms. Riley and Bluff Creeks are both impaired for turbidity, and therefore sediment deposits into these creeks needs to be addressed.

As discussed in the water quantity section, a relatively new issue has recently gained much more attention over the past two years for 30 selected municipalities due, in large part, to the revised NPDES MS4 Permit. The new non-degradation requirements of the revised NPDES permit may create the need for stricter controls in many communities, including Chanhassen. The non-degradation portion of the permit will require Chanhassen to assess the change in loading of three pollutants (runoff volume, total suspended solids, total phosphorus) over two time periods (approximately 1988 to 2000 and 2000 to 2020). The intent of these requirements is for the cities to develop a plan to address any increased loading of one or more of the three pollutants. At this time, it is too early to tell what additional long-term implementation efforts this will require of the City.

The City has developed the water quality policies listed in Table 8 to support the water quality goals of this Plan.

Table 8. Water Quality Policies

Goal Statement: Achieve water quality standards in lakes, streams, and wetlands consistent with their designated use and established classifications.	
Policy No.	**Goal 2. Water Quality – Policies**
1	Categorize and manage each water body in the City's surface water system to best meet state, local, and federal water quality standards.
2	Establish and implement on-going programs designed to educate land owners in sensitive water quality management practices and develop and maintain a public education program to promote reduction of nutrient and sediment loading to water bodies.
3	Continue to monitor long term water quality trends on prioritized water bodies.
4	Focus management activities and capital improvements based on the priority ranking scheme included in this Plan. Update priorities annually with a 5 year horizon.
5	Evaluate the progress of the surface water management program on an annual basis in conjunction with the annual City Council Report/NPDES MS4 annual report.
6	The City may require higher water quality standards in areas identified as Preserve or Improve 1 subwatersheds.
7	The City will lead by example by following the standards of this Plan and encouraging BMPs to provide pollution prevention and water quality treatment on City-initiated projects.
8	The City will encourage residents and landowners to practice environmentally friendly lawn care and housekeeping practices, and to use native planting or natural landscapes rather than turf lawns, where appropriate.
9	Prohibit the discharge of foreign material into the storm water system. Such material should include, but not be limited to, waste oil, paint, grass clippings, leaves, commercial fertilizers, trash, construction debris, and miscellaneous chemicals.
10	Develop and implement a spill response program for the City personnel to prevent discharge of spilled materials into the storm sewer system. The response program should focus on containing, neutralizing, and properly disposing of spilled materials. The Fire Department, Public Safety Department, and Public Works Department should have a readily available supply of response material including oil absorbing pads.
11	Require owners of development or redevelopment projects to provide on-site treatment or contribute to the construction or improvement of a regional facility.
12	Continue to implement the erosion and sediment control policies and the construction site inspection program to ensure reduction of water quality impacts from lack of erosion and sediment control.

1. Water Quality Information

The City of Chanhassen requires new developments to construct storm water ponds that provide rate control and water quality treatment. The design standard for the storm water quality treatment is to meet removal efficiencies for total phosphorus (TP) and total suspended solids (TSS), as they relate to the Nationwide Urban Runoff Program (NURP) study that was completed by the Environmental Protection Agency (EPA). Removal efficiencies of at least 60% for TP and 90% for TSS are the criteria the City requires for all projects, which is the same as the criteria in the 1994 SWMP. The standards in Appendix D of this Plan require water quality modeling or computations to be submitted with the grading permit to support the stated removal efficiency.

The water bodies in the City are assigned a management classification for water quality treatment requirements. This management class designation is based on the water quality trends of the receiving water, along with its current designated use and if it is on the TMDL List of Impaired Waters. Development in watersheds that discharge to "Preserve" or "Improve-1" class water bodies may be required to provide water quality treatment beyond the baseline NURP levels established in the City development standards. This enhanced treatment requirement will be implemented by staff on a project specific basis and may include, for example, establishment of multi-cell treatment systems or infiltration/filtration BMPs to better treat the smaller "water quality" storms. Section IV of the Plan explains the management classification system and water quality trends of the water bodies in more detail

Nine neighborhood areas located with Chanhassen were studied further for opportunities to improve storm water quantity and quality with proposed street reconstruction projects. The neighborhoods that were analyzed are illustrated in Figure 8, and a summary Technical Memoranda and supporting computations for each completed study are provided in Appendix G. At the time of this Plan approval, one study has been completed; the intent is for the City to insert the remaining studies into the Appendix upon completion.

2. Implementation Plan

Table 9 outlines activity steps that are intended to guide the City in achieving the water quality goals of this Plan. Table 9 also shows a list of possible resources available, the measurement system and a project target date or schedule for each of the planned activities.

While many activities in this Plan are focused on maintaining or improving water quality, the recommendations in Table 9 focus primarily on the activities and projects that will restore, expand or create new treatment capacity throughout the City. These efforts will help comply with regulatory requirements of the NPDES program (e.g., including the future non-degradation assessment and implementation activities). More importantly, the projects will help to maintain the existing water quality trends and/or improve the water quality of receiving waters. For the most part, specifically Activities 1, 2, 4 and 5, will support this goal on a long-term basis to help the general public and developers better understand and support the need for water quality

improvements, and to monitor the water quality trends to evaluate the progress to achieving the goals of this Plan.

Table 9. Water Quality Implementation Plan

ID	Activity / Project	Resources	Measurement	Schedule
1	Continue Education program as part of the City's NPDES Permit program SWPPP	• NPDES SWPPP • Water Resources Coordinator • Watershed Organizations	• Education events	Ongoing
2	Coordinate BMP maintenance program with NPDES SWPPP and private system maintenance program.	• City staff inspectors • Maintenance staff • Private system maintenance program in Table 7, ID 4.	• Measurable goals from NPDES SWPPP • BMPs maintained • Materials removed	Ongoing
3	Explore opportunities for water quality improvement projects. Focus on Riley and Lotus Lakes to jump start anticipated TMDL results. Identify direct discharges (no treatment pond/system) to priority water resources.	• Review of proposed development projects • City-wide hydrologic model • GIS database of storm systems, ponds, wetlands • Street recon projects (see Appendix G) • Recommended pond data in Appendix I.	• BMPs installed • Improved water clarity trends • Increased treatment capacity	Ongoing (see pond summary in App. I of this Plan for possible ponds)
4	Participate in TMDL Studies for Riley and Lotus Lakes	• MPCA • Watershed Organizations	• Final Study Recommendations	Pending
5	Continue water quality monitoring programs on City lakes and key resources	• MPCA Citizen Monitoring • City staff • Lake Management Plans and Studies	• Annual assessment of data • Management approach adjustments	Annually
6	Complete Neighborhood studies and implement treatment BMPs	• Study memorandums in Appendix G. • Street reconstruction project plans • See Figure 8	• Completed projects • Treatment capacity established	Varies
7	Update storm water management ordinance	• 2006 Plan standards in Appendix D • Local watershed standards	• Completed ordinance update	2006-2007

More specific projects, as listed in the resources column for Activity/Project 3 in Table 9, are listed as recommended pond implementation projects in Appendix I. The table in Appendix I lists all recommended storm water ponds from Table III-D1 in the 1994 Plan. The table in Appendix I identifies whether or not a recommended pond from the 1994 Plan has been constructed. The table also includes all new storm water ponds that were inventoried as part of the most recent wetland inventory. Some of these new ponds were not listed in the 1994 Plan. Appendix I also contains a planning-level cost estimate for each pond that has not been constructed as of the date of this Plan. The intended process for implementing these

recommended ponds (or alternative treatment systems) is to use the classification (priority) system in selecting projects from the list. As stated previously in this Plan, if two project opportunities were available, City staff would use the classification system as part of the decision process to select which project(s) to implement.

Activity 6 in Table 9 addresses several areas in the City where the potential for establishing new treatment capacity was evaluated and implemented. The areas are illustrated in Figure 8, and at the time of this Plan update one project (i.e., the Yosemite Neighborhood) was being implemented. The remaining areas will follow a similar process to evaluate the potential parcels available in the areas, the feasibility of completing a range of water quality BMPs (ponds, sump manholes, mechanical separators, bio-retention areas, etc.), and the anticipated costs of the recommended BMPs.

C. Goal 3: Wetland Protection

The key to meeting the City's wetland goals is the implementation of a wetland management program. In Chanhassen, this program consists of the inventory information in Section V and the current wetland ordinance in effect. More background and wetland inventory information is discussed in Section V, and recommendations for an update to the City's ordinance are provided in Appendix K. This portion of the Plan provides only a summary of Section V and establishes the overall goals and policies for wetland management in the City.

The policies listed in Table 10 will be used as the basis to achieve the City's wetland goals. The policies and strategies will apply to new development and redevelopment projects proposed within the City. Any wetland habitat on property to be developed will be subject to these management policies, as well as the rules and requirements of the Wetland Conservation Act.

Table 10. Wetland Protection Policies

Goal Statement: Protect and rehabilitate wetlands to maintain or improve their function and value.	
Policy No.	**Goal 3. Wetland Protection – Policies**
1	Develop and maintain an official wetlands map that classifies wetlands by function and value.
2	Adopt and keep current ordinances and standards designed to protect wetlands.
3	Wetland alteration, where allowed, should be the basis of "no net loss". If wetland impacts are unavoidable, they should be mitigated through replacement, wetland conversion, and/or improvements to wetland function and value.
4	Adopt the storm water and water quality management practices designed to protect wetland functions and values. Introduction of storm water runoff should be allowed only when it is demonstrated that wetlands will not be adversely impacted.
5	Adopt an ordinance in compliance with the Minnesota Wetlands Conservation Act of 1991 for no net loss in quantity and quality of jurisdictional wetlands.

1. Wetland Management Program

The City of Chanhassen has developed a Wetland Management Plan as part of this plan update. If the City pursues approval of the plan as a Comprehensive WMP, the plan would formally

serve as an alternative to the rules adopted under Minnesota Statutes, section 103G.2242. However, before this occurs, the plan would need to be approved by BWSR, be adopted by the City and must require equal or greater standards and procedures as compared to the Wetland Conservation Act (WCA). The benefits of a CWMP include a current functions and values assessment for management and wetland ordinance development, greater flexibility in sequencing and replacement standards for wetlands, and development and management of higher quality wetlands within the City. The major disadvantage to finalizing the approval process at this time is that the plan would not address all the requirements under the Corps of Engineers regulations for wetlands. Essentially two separate sets of rules would still exist.

The Wetland Management Plan (Section V and Appendix G) includes an inventory, a functions and values assessment, sequencing standards, replacement standards, a description of the size and location of replacement wetlands, allowance of exemptions based on ordinance standards and definitions of high priority wetlands. A Minnesota Routine Assessment Method Version 3.0 (MnRAM 3.0) was completed for each wetland located in the City. MnRAM assessments identify wetland functions and values. These qualitative data provide a basis for management, decision-making, and permitting for the inventoried wetlands. MnRAMs will also provide a base reference for long-term monitoring and management of wetlands. The MCWD has also completed a wetland inventory and functions and values assessment for the portion of the City within the Minnehaha Creek watershed (Minnehaha Creek Routine Assessment Method for Evaluating Wetland Functions, or McRAM). The City has agreed to use the McRAM results for that portion of the city, although the more recent inventory will be used for evaluation and comparison as needed. The City also addresses wetland buffers as part of the wetland management planning process and has buffer requirements in their current wetland ordinance.

2. Implementation Plan

Table 11 outlines activity steps that are intended to guide the City in achieving the wetland goals of this Plan. Table 11 also shows a list of possible resources available, the measurement system and a project target date for each of the identified activities.

Table 11. Wetland Implementation Plan

ID	Activity / Project	Resources	Measurement	Schedule
1	Implement the wetland management program Section V of this Plan	• 2006 Inventory • MnRAM, GIS Database • Development reviews	• WMP project review • Implemented projects • New wetland created	Ongoing
2	Update Wetland Inventory. Digitize created wetlands and modify impacts per projects.	• Development projects • MnRAM, McRAM, GIS Database	• Maintained, updated database	Ongoing
3	Update wetland management ordinance	• 2006 Inventory • Ordinance in Appendix K	• Completed ordinance update	2007

D. Goal 4: Erosion and Sediment Control

The City addresses erosion and sediment control in its ordinances and its NPDES Phase II SWPPP. The City partners with the Carver County Soil and Water Conservation District to

implement its construction site erosion control inspection program. The policies listed in Table 12 are intended to help the City achieve the erosion control goal of this Plan.

Table 12. Erosion and Sediment Control Policies

Goal Statement: Minimize soil erosion and sedimentation.	
Policy No.	**Goal 4. Erosion and Sediment Control – Policies**
1	Erosion and sediment control practices are necessary on all construction sites and on sites experiencing erosion control problems.
2	Best Management Practices should be used at all construction sites per the Minnesota Pollution Control Agency's "Minnesota Urban Small Sites BMP Manual" (2001), the Minnesota Pollution Control Agency's "Protecting Water Quality in Urban Areas" (2000), and/or the Minnesota Pollution Control Agency 2005 Storm Water Manual.
3	Disturbances to existing vegetation (trees, turf grass, native vegetation, etc.) should be minimized.
4	The City will continue to work with the Carver County SWCD to inspect construction sites for erosion and sediment control issues once every 2 weeks and after every 0.5-inch rain event.
5	The City will maintain and educate the public on the Clean Water Hotline. This hotline is used to report erosion and sediment control issues on sites, and to report any water quality issues.
6	Graded areas should be protected using erosion and sediment control Best Management Practices to reduce erosion in a manner consistent with the standards of this Plan. Streets will be frequently swept where construction activities spill and or track sediments onto streets. In areas undergoing construction activities, the cost of sweeping sediment from the streets generated by development should be borne by the developer and/or home builder.
7	Stockpiled soil (and/or like-materials) should be protected to prevent erosion.
8	Effective energy dissipation devices should be provided at all conveyance system discharge points to prevent bank, channel, or shoreline erosion. Design of stream bank stabilization and streambed control measures should consider unique or special site conditions, energy dissipation potential, adverse effects, preservation of natural processes and aesthetics, in addition to standard engineering and economic criteria.
9	Update City Specifications annually to reflect current technology for erosion and sediment control.

As discussed previously in Goal 2, water quality problems are frequently linked to high phosphorus and total suspended solids concentrations. Phosphorus is often transported to surface water through soil erosion, but can also be transported to waters in a variety of other mechanisms**.** Nevertheless, erosion control is extremely important in the effort to improve water quality. Soil erosion and sediment deposition also can create pond and drainageway performance and maintenance problems.

Ponds, drainage facilities and water bodies can be impacted by erosion and sediment from a variety of sources, including construction sites and winter street sanding operations. The coarse sediment accumulates in water bodies where runoff or flow velocities are relatively low. Usually a sand delta appears at a storm sewer outfall that is a visible indication of the effectiveness of erosion and sediment control measures and the extent of road sanding activities of the past winter. As sediment builds up over time, it reduces the capacity of drainage systems and the pollutant removal capabilities of ponds by reducing dead storage volume (i.e., the volume below the outlet elevation). Sediment from erosion also reduces infiltration rates in basins or BMPs

designed for groundwater recharge. Extending the life of these facilities involves source control and elimination of material that causes the problem, and maintenance of the systems on a regular basis. Regulatory aspects will control a major portion of the sediment at the source, and an effective street sweeping program will also have a positive impact.

The Lower Minnesota River Watershed District (LMRWD) Plan identified a bank erosion problem adjacent to the LRT trail in the northeast quarter of Section 35 in Chanhassen. The City will continue to monitor erosion issues at this site and throughout the City and address these issues as necessary.

1. Implementation Plan

Table 13 outlines activity steps that are intended to guide the City in achieving the erosion and sediment goals of this Plan. Table 13 also shows a list of possible resources available, the measurement system and a project target date for each of the identified activities.

Table 13. Erosion and Sediment Control Implementation Plan

ID	Activity / Project	Resources	Measurement	Schedule
1	Continue to implement the erosion and sediment control inspection program.	• Development projects • Carver County • Watershed Organizations • Clean Water Hotline	• Implemented projects	Ongoing
2	Explore opportunities for erosion protection and bank stabilization at key storm system conveyances and outlets	• Review of proposed development projects • City-wide hydrologic model • Analysis of peak rates on downstream impacts	• BMPs installed • Reduction in bank erosion • Reductions in gullies, washouts	Ongoing
3	Evaluate the need for improving the efficiency and effectiveness of the inspection program.	• Implement new technologies for inspection tracking • Dedicated staff to supplement work of Carver County staff	• Improved compliance at construction sites • Reduced sediment delivered to water bodies	Assess need in 2006 Program Ongoing

E. Goal 5: Financing

Paying for water management projects has become more complex in recent years. In the past, special assessments against benefited properties financed most of the necessary improvements. However, the financial options have broadened considerably. The City currently uses a storm water utility program as a key component of their overall approach to fund storm water-related projects. Section I.B of the Plan includes a summary of the state and federal rules, statutes and agencies that drive the City to implement the recommendations set forth in this Plan, and in turn implement financing goals and policies to fund the program. Table 14 lists the policies that are intended to help the City achieve the financing goal of this Plan.

Table 14. Financing Policies

Goal Statement: Establish and maintain funding sources to finance surface water management activities.	
Policy No.	**Goal 5. Financing Policies**
1	Revise, implement, and maintain a financing strategy for surface water improvements utilizing a combination of storm water utility fees, special assessments, surface water management plan connection charges, and storm water program grant funds.
2	Require all new development to pay connection charges for water quality and water quantity to finance downstream improvements to accommodate new developments.
3	Continue to collect storm water utility fees from all parcels within Chanhassen (exempting public ROW and lakes), to reflect the service provided by the City for storm water management and associated operational costs.

1. Implementation Plan

Table 15 outlines activity steps that are intended to guide the City in achieving the finance goals of this Plan. Table 15 also shows a list of possible resources available, the measurement system and a project target date for each of the planned activities.

Table 15. Financing Implementation Plan

ID	Activity / Project	Resources	Measurement	Schedule
1	Complete an assessment of trunk storm water and utility system fees needed to support the overall City water resources program.	• Original Utility Study • City staff • NPDES SWPPP requirements • Clean Water Hotline	• Completed study • Implemented changes to assessments and or utility rates	2006
2	Explore opportunities for grant program funding to implement water resource improvement projects	• MPCA Programs • Watershed Organizations • Metropolitan Council	• BMPs installed • Water quality improvement, education and/or demonstration projects	Ongoing

F. Goal 6: Regulatory Responsibility

The City assumes the role of permitting all land alteration activities and enforcing the standards and policies set forth by the Plan. Riley Purgatory Bluff Creek Watershed District (RPBCWD) also reviews and permits on any proposed land alteration > 1 acre within the RPBCWD. Minnehaha Creek Watershed District (MCWD) permits for projects that include land alteration, floodplain alteration, dredging, shoreline and streambank improvement, and stream and lake crossings. Lower Minnesota River Watershed District reviews alterations to land within the Minnesota River valley. Carver County Water Management Organization reviews and permits land altering projects in the WMO. The City is the LGU for the Wetland Conservation Act, and assumes the role of permitting all wetland impacts.

The Minnesota Department of Natural Resources has authority over issues relating to water and wetlands designated as State Protected Wetlands and Waters. The U.S. Army Corps of Engineers has authority relating to all wetlands identified by the U.S. Fish and Wildlife Service's National Wetland Inventory.

Carver County and the Minnesota Department of Health have regulatory authority over groundwater issues within the City. Erosion control falls under several jurisdictions including the City, the watershed districts, and the MPCA. The MPCA also has regulatory authority over individual septic systems within the City limits.

The City has developed the policies in Table 16 to help ensure that the regulatory responsibility goals of this Plan are clearly understood, met and addressed on an ongoing basis. The City wishes to retain permitting authority for projects within the City in order to provide a consistent permitting process for developers and residents. The City feels this is especially important since there are four WMOs that have jurisdictional authority within the City limits, and each has their own set of standards and guidelines. This situation becomes more complex when there is a larger development that potentially straddles two different WMOs, with two different sets of rules to follow.

Table 16. Regulatory Responsibility Policies

Goal Statement: Maintain primary responsibility for managing water resources at the local level but continue coordination and cooperation with other agencies and organizations.	
Policy No.	**Goal 6. Regulatory Responsiblity – Policies**
1	Adopt policies consistent with local watershed authorities' management plans.
2	This plan and all subsequent amendments will be consistent with the plans of regulatory agencies.
3	This plan will be amended as necessary to remain current.
4	Coordinate projects and information with government agencies; i.e. MnDOT, Carver and Hennepin Counties, Department of Natural Resources, Watershed Districts, and Water Management Organizations.

1. NPDES Phase II SWPPP

The NPDES Phase II Permit Program (http://www.pca.state.mn.us/water/stormwater/index.html) is a federal regulatory program that requires owners of Municipally Separate Storm Sewer Systems (MS4s) to prepare and implement a Storm Water Pollution Prevention Program (SWPPP), and apply for the permit with the administrative agency. The Minnesota Pollution Control Agency administers the Phase II MS4 program in the state, and the City submitted their permit application prior to March 10, 2003 to comply with the initial submittal deadline. This SWMP incorporates some of the BMPs that were identified in the City's SWPPP along with several specific projects that were not specified as part of the Phase II program.

As discussed in the water quality and quantity goal sections, a relatively new issue has recently gained much more attention over the past two years for 30 selected municipalities due, in large part, to the revised NPDES MS4 Permit. The new non-degradation requirements of the revised NPDES permit may create the need for stricter controls in many communities, including

Chanhassen. The non-degradation portion of the permit will require Chanhassen to assess the change in loading of three pollutants (runoff volume, total suspended solids, total phosphorus) over two time periods (approximately 1988 to 2000 and 2000 to 2020). The intent of these requirements is for the cities to develop a plan to address any increased loading of one or more of the three pollutants. At this time, it is too early to tell what additional long-term implementation efforts this will require of the City.

2. Implementation Plan

Table 17 outlines activity steps that are intended to guide the City in achieving the regulatory responsibility goals of this Plan. Table 17 also shows a list of possible resources available, the measurement system and a project target date for each of the identified activities.

Table 17. Regulatory Responsibility Implementation Plan

ID	Activity / Project	Resources	Measurement	Schedule
1	Continue to implement the City's NPDES Permit program SWPPP.	• SWPPP and individual BMPs • Permit activity tracking system • Adjacent MS4s	• Annual Report and program assessment summary	Annually June 30
2	Maintain consistency with Watershed Management Organization Plan Goals and Policies	• Minnehaha Creek Plan • Riley Purgatory Bluff Creek Plan • Carver County WMO Plan • Lower Minnesota River Watershed District Plan	• Plan updates as needed	Ongoing
3	Establish electronic NPDES inspection and maintenance program tracking and reporting system	• Current GIS data for structures • Recommendations in Appendix J • Off-the-shelf software or in-house system	• Evaluate options • System established and fully functional	2006 2007

The City encourages the WMO's to take the lead in developing TMDL studies as they become necessary. The City will continue to coordinate and cooperate with the WMO's in this process.

G. Goal 7: Public Education and Participation

The public education and participation goal is a strategy that recognizes people want to be involved in decisions that affect any facet of their life. The process of involving the public seeks to create opportunities for the public to participate in the processes that lead to decision-making and result in more public ownership in the outcome. The City has developed the public education and participation policies listed in Table 18 to help achieve the goals of this Plan. Public education and participation activities are also requirements of the National Pollutant Discharge Elimination System (NPDES) Permit.

Table 18. Public Education and Participation Policies

Goal Statement: Provide educational resources to improve knowledge and promote an active public role in management of water resources.	
Policy No.	**Goal 7: Public Education and Participation - Policies**
1	The City will continue to provide opportunities for public involvement (e.g., neighborhood meetings, public hearings, mailed notices, etc.) for significant water resource decisions or projects.
2	The City will coordinate and consult with the City Council and appropriate City commissions and committees on surface water issues.
3	City will communicate with lake associations and other appropriate civic and citizen groups.
4	The City will actively implement the current educational programs and work to develop and implement new education programs and activities related to water resources. This program will use a variety of media including use of notices, mailings, local cable television, newsletters, articles, internet web sites, workshops and/or presentations to inform and educate the public.
5	The City will cooperate with other agencies and encourage establishment of model interpretative sites for public education like the storm water practices at the Landscape Arboretum.
6	Continue to remain in compliance with the NPDES Phase II MS4 permit with respect to public education and involvement.

1. Watershed District and County Programs

The watershed districts and Carver and Hennepin Counties currently have public education and information activities efforts in their overall surface water programs. These agencies make this information available to the City generally through their websites, but also on a case-by-case basis for special programs or events available to the City or City residents to participate in. The City will continue to seek out these education efforts to more effectively reach and inform residents, businesses and City staff on the wide range of surface water management issues. The City encourages the counties and watershed districts to devote more time and energy to producing educational tools, such as brochures, videos, training sessions, newsletter articles, etc., that can be used by municipalities throughout their jurisdictions.

2. City Programs

The City has numerous lake associations and committees who focus on the interests and the protection of the lakes and other water resources within the City limits. The City also has a website where information regarding the City's committees and commissions, their mission statements and past agendas and meeting minutes are available. As part of the NPDES Phase II MS4 Permit, the City has also posted their SWPPP on the website. As part of the NPDES program, the City is required to implement a public education and outreach program, along with a public participation and involvement program and to incorporate public information into each of the other four minimum control measures of the permit.

The City's website is an alternative medium to provide municipal information to both City residents and those people who live outside the City. An electronic version of the completed and approved surface water management plan will ultimately be accessible on the web. Because the Plan has such a wide audience, from engineers and planners to developers, citizens, scientists and educators, electronic access to the text and mapping creates a better understanding of the goals, policies and activities of this Plan.

The City will continue to distribute information on pertinent water and wetland management issues via the Chanhassen Connection, its quarterly community newsletter, and will promote opportunities for residents to participate in water resources management activities. The City will also make ongoing efforts on both a City-wide and watershed level toward educating the public by distributing information to its residents on responsible practices they should employ to protect water resources within the community. The program will educate residents on things such as the benefits of using phosphorus-free fertilizer and the proper use of a wide range of lawn chemicals.

3. Implementation Plan

Table 19 outlines activity steps intended to guide the City in achieving the public participation, information and education goals of this Plan. Table 19 also shows a list of possible resources available, the measurement system and a project target date for each of the planned activities.

Table 19. Public Participation, Information and Education Implementation Plan

ID	Activity / Project	Resources	Measurement	Schedule
1	City Storm Water Program and Annual NPDES Permit Public Meeting	• SWPPP - BMPs • Adjacent MS4s • Public Input	• Annual Report and program assessment • Public hearing held at City Council	Annually Prior to June 30
2	Remain involved in local educational campaigns	• Metro WaterShed Partners • Watershed Districts	• Resulting information distributed	Ongoing
3	Recruit volunteers to participate in the Citizen Assisted Monitoring Program (CAMP) for lakes	• Metropolitan Council • City staff	• Annual results in report from Metropolitan Council	Annually
4	Include water resources articles in Chanhassen Connection	• Metro WaterShed Partners • Watershed Districts • City staff	• Articles placed in newsletter quarterly	Quarterly; Ongoing
5	Provide water resources-related information on the City's website	• Metro WaterShed Partners • City staff	• Updated info on website - water quality, current issues	Ongoing
6	Continue to maintain Clean Water Hotline	• City staff	• Provide information on current projects	Ongoing

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