



ENGINEERING DESIGN STANDARDS
for
STORMWATER MANAGEMENT

City of White Bear Lake

May 12, 2015

Engineering Design Standards

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1. DESIGN OVERVIEW

The City of White Bear Lake's Stormwater Pollution Prevention Plan (SWPPP) identifies the goals and policies that define the City's stormwater management program, which are implemented via the City Municipal Code (Chapter 406), City Zoning Code (Chapter 1300), City Subdivision Code (Chapter 1400), and these Engineering Design Standards. The City of White Bear Lake's stormwater requirements were written to meet the City's goals to preserve, protect, and manage its water resources as well as to meet federal, state, and watershed stormwater regulations and to meet the following objectives:

- Minimize increases in stormwater runoff rates from any development in order to reduce flooding, siltation and erosion and in order to maintain the integrity of water resources,
- Minimize increases in nonpoint source pollution caused by stormwater runoff from development which would otherwise degrade local water quality,
- Minimize the total annual volume of surface water runoff that flows from any specific site during and following development so as not to exceed the predevelopment hydrologic regime to the maximum extent practicable,
- Ensure that these management controls are properly maintained and pose no threat to public safety, and
- Implement stormwater management controls to help meet current and future total maximum daily load (TMDL) goals, to address the need to improve water quality, and to meet objectives in the Local Surface Water Management Plan.

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2. DEFINITIONS

Unless specifically defined below, words or phrases used in these Design Standards shall be interpreted so as to give them the same meaning as they have in common usage and to give this manual its most reasonable application. For the purpose of this manual, the words “must” and “shall” are mandatory and not permissive. For the purpose of this Design Manual, the following definitions describe the meaning of the terms used in this Design Manual:

Applicant. A property owner or agent of a property owner who has filed an application for a Stormwater Management Permit.

Best Management Practices (BMPs). Erosion and sediment control and water quality management practices that are the most effective and practicable means of controlling, preventing, and minimizing degradation of surface water, including avoidance of impacts, construction-phasing, minimizing the length of time soil areas are exposed, prohibitions, and other management practices published by state or designated area-wide planning agencies.

Channel. A natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

Commissioner. The Commissioner of the Minnesota Pollution Control Agency or the Commissioner's designee.

Common Plan of Development or Sale. A contiguous area where multiple separate and distinct land disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. One plan is broadly defined to include design, permit application, advertisement or physical demarcation indicating that land-disturbing activities may occur.

Construction Activity. For this permit, **construction activity** includes **construction activity** as defined in 40 C.F.R. part 122.26(b)(14)(x) and **small construction activity** as defined in 40 C.F.R. part 122.26(b)(15). This includes a disturbance to the land that results in a change in the topography, existing soil cover (both vegetative and non-vegetative), or the existing soil topography that may result in accelerated **storm water** runoff, leading to soil erosion and movement of sediment into **surface waters** or drainage systems. Examples of construction activity may include clearing, grading, filling and excavating. **Construction activity** includes the disturbance of less than one acre of total land area that is a part of a larger **common plan of development or sale** if the larger common plan will ultimately disturb one (1) acre or more.

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Dewatering. The removal of water for construction activity. It can be a discharge of appropriated surface or groundwater to dry and/or solidify a construction site. It may require Minnesota Department of Natural Resources permits to be appropriated and if contaminated may require other MPCA permits to be discharged.

Energy Dissipation. Methods employed at pipe outlets to prevent erosion. Examples include, but are not limited to: concrete aprons, riprap, splash pads, and gabions that are designed to prevent erosion.

Erosion and Sediment Control Plan. Otherwise known as a stormwater pollution prevention plan (SWPPP) which is a set of plans prepared by or under the direction of a licensed professional engineer or certified contractor indicating the specific measures and sequencing to be used to control the sediment and erosion on a project site during and after construction.

Erosion Prevention. Measures employed to prevent erosion including but not limited to: soil stabilization practices, limited grading, mulch, temporary or **permanent cover**, and construction phasing.

Final Stabilization. The applicant must ensure Final Stabilization of the site after the completion of construction activities and prior to the termination of the permit. Final Stabilization is not complete until all requirements in accordance with Section 6.7 are complete.

Homeowner Factsheet. A fact sheet developed by the MPCA to be given to homeowners at the time of sale by a builder to inform the homeowner of the need for, and benefits of, **final stabilization**.

Impaired or Special Waters. Waters identified as impaired under section 303 (d) of the federal Clean Water Act for phosphorus (nutrient eutrophication biological indicators), turbidity, dissolved oxygen or aquatic biota (fish bioassessment, aquatic plant bioassessment and aquatic macroinvertebrate bioassessment), E. coli/fecal coliform, chloride, mercury, or other pollutants and stressors as identified by the Minnesota Pollution Control Agency

Impervious Area. Those surfaces that cannot effectively infiltrate rainfall (e.g., building rooftops, pavement, sidewalks, gravel, driveways, swimming pools, etc.).

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Land Disturbance Activity. Any activity that changes the volume or peak discharge rate of stormwater runoff from the land surface. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation, or any activity that bares soil or rock or involves the diversion or piping of any natural or fabricated watercourse.

Low Impact Development (LID). An approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible.

Stormwater Operation and Maintenance Agreement (SOMA). Document recorded against the property which provides for long-term maintenance of stormwater treatment practices.

Minimum Impact Design Standards (MIDS). Design requirements such that the rate and volume control and water quality standards of predevelopment stormwater reaching receiving waters is unchanged compared to the runoff from developed land.

National Pollutant Discharge Elimination System (NPDES). The program for issuing, modifying, revoking, reissuing, terminating, monitoring, and enforcing permits under the Clean Water Act (Sections 301, 318, 402, and 405) and United States Code of Federal Regulations Title 33, Sections 1317, 1328, 1342, and 1345.

Nonpoint Source Pollution. Pollution from any source other than from any discernible, confined, and discrete conveyances, and shall include but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

Notice of Termination (NOT). Notice to terminate coverage under the NPDES permit after construction is complete, the site has undergone **final stabilization**, and maintenance agreements for all permanent facilities have been established, in accordance with all applicable conditions of this permit.

Off-Site Facility. A stormwater management measure located outside the subject property boundary.

Permanent Cover. Shall mean **final stabilization**. Examples include grass, gravel, asphalt, and concrete.

Permittee. A person or persons, firm, or governmental agency or other institution that signs the application submitted to the MPCA and is responsible for compliance with the terms and conditions of this permit.

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Responsible Party. The entity which will be responsible for ownership and maintenance of Stormwater Treatment Practices.

Sediment Control. Methods employed to prevent sediment from leaving the site, including biologs, silt fences, sediment traps, earth dikes, drainage swales, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, and temporary or permanent sedimentation basins.

Stabilized. The exposed ground surface has been covered by appropriate materials such as mulch, staked sod, riprap, wood fiber blanket, or other material that prevents erosion from occurring. Grass seeding is not stabilization.

Stop Work Order. An order which requires that all construction activity on a site be stopped.

Storm water. Is defined under Minn. R. 7077.0105, subp. 41(b), and includes precipitation runoff, storm water runoff, snow melt runoff, and any other surface runoff and drainage.

Stormwater Management. The use of structural or non-structural practices that are designed to reduce stormwater runoff pollutant loads, discharge volumes, and/or peak discharge rates.

Stormwater Management Plan (SWMP). A set of drawings or other documents submitted by a person as a prerequisite to obtaining stormwater management approval, which contains all of the required information and specifications pertaining to Stormwater Management.

Stormwater Treatment Practices (STPs). Measures, either structural or nonstructural, that are determined to be the most effective and practical means of preventing or reducing point source or nonpoint-source pollution inputs to stormwater runoff and waterbodies.

Surface Water or Waters. All streams, lakes, ponds, marshes, **wetlands**, reservoirs, springs, rivers, drainage systems, waterways, watercourses, and irrigation systems whether natural or artificial, public or private.

Redevelopment. Projects with more than 15 percent impervious prior to construction.

Temporary Erosion Protection. Short term methods employed to prevent erosion. Examples of these methods include: straw, wood fiber blanket, wood chips and erosion netting.

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Water Quality Volume (WQ_v). The runoff storage volume needed to treat the specified phosphorus loading as determined by these Engineering Design Standards.

Watercourse. A permanent or intermittent stream or other body of water, either natural or fabricated, which gathers or carries surface water.

Waters of the State. (As defined in Minn. Stat. § 115.01, subd. 22). All streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof.

Watershed. The total drainage area contributing runoff to a single point.

Wetland or Wetlands. As defined in Minn. R. 7050.0130, subp. F and includes those 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. Constructed **wetlands** designed for wastewater treatment are not **waters of the state**. **Wetlands** must have the following attributes:

- A predominance of hydric soils;
- Inundated or saturated by **surface water** or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil condition; and
- Under normal circumstances support a prevalence of such vegetation.

Wetland Conservation Act (WCA). As defined by Minn. R. 8420, with the purpose of preserving and protecting the quality, quantity, and biological diversity of Minnesota's wetlands.

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3. APPLICABILITY

An Erosion and Sediment Control (ESC) Plan and/or Stormwater Management Plan (SWMP) may be required, based on the criteria outlined below. These plans shall be consistent with NPDES permit requirements, and the filing or approval requirements of other regulatory bodies. When required, these plans shall be approved prior to the issuance of any permits.

3.1 Erosion and Sediment Control

Unless otherwise exempted by these Standards, Applicants are required to follow the Erosion and Sediment Control requirements of Section 6 of these Standards and are encouraged to incorporate the Stormwater Management requirements of Section 7 and 8, for all proposed land disturbing activities within the City that meet any or all of the following:

- a) Disturbs a total land surface area of 6,000 square feet or more; or
- b) Involves excavation or filling, or a combination of excavation and filling, in excess of 100 cubic yards of material; or
- c) Involves the laying, repairing, replacing, or enlarging of an underground utility, pipe or other facility, or the disturbance of road ditch, grass swale or other open channel for a distance of 300 feet or more; or
- d) Is a land disturbing activity, regardless of size, that the City determines is likely to cause an adverse impact to an environmentally sensitive area or other property, or may violate any other erosion and sediment control standard set forth in this ordinance.

3.2 Stormwater Management

Unless otherwise exempted in these Standards, Applicants are required to develop a Stormwater Management Plan that meets the requirements of Sections 7 and 8 of these Standards, for all proposed land disturbing activities that meet any or all of the following:

- a) Any land disturbing activity that may ultimately result in the addition or full reconstruction of 10,000 square feet or greater of impervious surfaces, including smaller individual sites that are part of a common plan of development that may be constructed at different times; or
- b) All new single-family subdivisions greater than 3 lots that rely on common drainage facilities for stormwater management; or
- c) The construction of any new public or private road; or
- d) Any land disturbance activity, regardless of size, that the City determines is likely to cause an adverse impact to an environmentally sensitive area or other property.

4. PLAN REVIEW PROCEDURES

The general review process, from the submittal of the concept and final plans to the issuance of the Stormwater Management Plan approval, is summarized in the following seven steps:

1. Determine what stormwater management provisions apply (stormwater management, erosion control, buffers, floodplain management).
2. What permits, or approvals, are required for the project site, and what waivers and/or exemptions are applicable (COE, DNR, MPCA, Watershed, WCA, etc.)
3. Are the selected practices appropriate for this site?
4. Are the practices designed to meet the minimum performance criteria?
5. Does the Plan meet other resource protection requirements as specified in the City of White Bear Lake's Code?
6. Are provisions for long-term maintenance adequate, including access and methods for maintenance defined?

Any changes to the approved plan must be submitted to the City for review and approval before work can commence.

No development, utility or street construction will be allowed and no Building Permits will be issued unless the development is in full compliance with the requirements of these Standards.

If the City determines that the Stormwater Management Plans and/or Erosion and Sediment Control Plan meets the requirements of these standards, the City shall issue a permit valid for a specified period of time that authorizes the land disturbance activity contingent on the implementation and completion of this plan.

If the City determines that the Stormwater Management Plan and/or Erosion and Sediment Control Plan does not meet the requirements of these Standards, the City shall not issue a permit for the land disturbance activity. This plan must be resubmitted for approval before the land disturbance activity begins. All land use and building permits shall be suspended until the developer has an authorized permit.

Modification of Plan – The applicant must amend the ESC Plan or SWMP as necessary to correct problems identified or address situations whenever:

1. A change in design, construction, operation, maintenance, weather, or seasonal conditions that has a significant effect on the discharge or pollutants to surface waters or underground waters.

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2. Inspections or investigations indicate the plans are not effective in eliminating or significantly minimizing the discharge or pollutants to surface waters or underground waters or that the discharges are causing water quality degradation; or
3. The plan is not achieving the general objectives of minimizing pollutants in stormwater discharges associated with construction activity; or
4. The plan is not consistent with the terms and conditions of this ordinance.

5. GENERAL PROVISIONS

5.1 General Provisions

The applicant shall consider reducing the need for stormwater management performance standards by incorporating the use of natural topography and land cover such as natural swales and depressions as they exist before development to the degree that they can accommodate the additional flow of water without compromising the integrity or quality of the receiving waterbody. The development shall minimize impact to significant natural features. The Applicant shall review the site for steep slopes (greater than 12%), wetlands, wooded areas of significance, rare and endangered species habitat, areas designated by the County Biological Survey, metro greenways, parks and open space, groundwater recharge areas, wellhead or surface water protection areas, or regional stormwater pond locations.

These areas should not be developed.

The development shall limit impervious surface coverage to the maximum extent practicable. In designated shoreland areas the development shall meet the impervious surface requirements of the Shoreland Ordinance. At a minimum all volume control for water quality and quantity and pond design specifications shall conform to the requirements found in the current version of the NPDES Permit. In addition, stormwater practices shall be designed, engineered and implemented to achieve the results for volume control for water quality and quantity and pond design as discussed in this Manual.

The project shall maximize on-site retention and storage and then use existing natural drainage ways and vegetated soil surfaces to convey, store, filter, and retain stormwater runoff before discharge into public waters or a pre-existing stormwater conveyance system (permanent pool areas of wet ponds tend to lose infiltration capacity and will not be accepted as an infiltration practice). The applicant shall limit the impervious surface of the developed site or subdivision by incorporating the following design considerations, so long as consistent with zoning, and subdivision requirements:

- a. Narrowing street widths
- b. Reducing parking lot space
- c. Sidewalk locations
- d. Reducing setbacks and driveways
- e. Maximizing open space while incorporating smaller lot sizes to conserve natural areas and reduce the amount of stormwater runoff generated at the site
- f. Using landscaping and soils to treat and infiltrate stormwater runoff.
- g. Eliminate curb and gutter where practicable, and use vegetated swales or equivalent.
- h. Look for vegetated areas that can filter sheet flow, removing sediment and other pollutants, and increasing the time of concentration.

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- i. Disconnect impervious areas by allowing runoff from small impervious areas to be directed to pervious areas where it can be infiltrated or filtered.
- j. All runoff from downspouts, driveways and other impervious areas shall be directed to pervious surfaces, where feasible, or unless the applicant can demonstrate that the practice is likely to result in nuisance flooding and/or groundwater contamination.
- k. Increase buffers around streams, steep slopes, and wetlands to protect from flood damage and provide additional water quality treatment.
- l. Use shared parking facilities consistent with zoning requirements.
- m. Install semi-permeable/permeable or porous paving.

5.2 General Plan Requirements

The Plans shall include sufficient information to evaluate the environmental characteristics of the project site. This information should show the potential impacts of all proposed development of the site, both present and future, on the water resources, and show the effectiveness and acceptability of the measures proposed for managing erosion and sediment and/or permeant stormwater treatment at the project site.

Minimum requirements of the Erosion & Sediment Control Plan and Stormwater Management Plan:

- a. Name and address of the applicant and the location of the activity.
- b. Project description.
- c. Phasing of construction: timeframes and schedules for the project.
- d. A map of the existing site conditions including the following: topography, property information, steep slopes, existing drainage systems/patterns, waterways, wetlands, vegetative cover, floodplain boundaries, buffer strips.
- e. A site construction plan that includes the location of the proposed land disturbing activities, stockpile locations, erosion and sediment control plan, construction schedule, and the plan for the maintenance and inspections of the stormwater pollution control measures.
- f. Adjacent areas: streams, lakes, residential areas, roads, etc., which might be affected by the land disturbing activity. The Normal Water Level (NWL) and Ordinary High Water Level (OHWL) of on site and adjacent water bodies.
- g. Designate the site areas that have the potential for an erosion problem.
- h. Erosion and sediment control measures, both during and after construction.
- i. Permanent stabilization: How the site will be stabilized, timeframe, and schedules.
- j. Ensure the plan is prepared by an individual trained in the design of construction SWPPPs in accordance with the MPCA NPDES construction general permit training requirements (CGP Part III.A.3);
- k. Ensure at least one individual is present or available to the project site within 72 hours

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- is trained in the job duties for construction site management to inspect, oversee implementation of, revising and amending the SWPPP (CGP Part III.F.b);
- l. Ensure at least one individual is present or available to the project site within 72 hours is trained in the job duties for construction installation to perform or supervise the installation, maintenance and repair of Best Management Practices (BMPs) (CGP Part III.F.c);
 - m. Document the name(s) of the trained personnel to design the construction SWPPP, the construction site manager and the construction installer. Documentation shall include the date of training, name of instructor(s), name of entity providing the training, content covered and hours of training attended (CGP Part III.A.3).

6. EROSION AND SEDIMENT CONTROL DESIGN STANDARDS

6.1 Erosion Control

- a) The Permittee must plan for and implement appropriate construction phasing vegetative buffer strips, horizontal slope grading, and other construction practices to minimize erosion. All areas not to be disturbed shall be marked (e.g. with flags, stakes, signs, silt fence etc.) on the project site before any work begins.
- b) All exposed soil areas must be stabilized as soon as possible to limit soil erosion but in no case later than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased and no later than seven (7) days after construction activity in that portion of the site has temporarily or permanently ceased when discharge points on the project is within one mile of a special or impaired water and flows to that special or impaired water.
- c) Additional BMPs together with enhanced runoff controls are required for discharges to special waters and impaired waters. The BMPs identified for each special or impaired water are required for those areas of the project draining to a discharge point on the project that is within one mile of a special or impaired water and flows to that water. The additional BMPs are identified in Appendix A of the NPDES Construction General Permit.
- d) The permittee must stabilize the normal wetted perimeter of any temporary or permanent drainage ditch or swale that drains water from any portion of the construction site, or diverts water around the site, within 200 lineal feet from the property edge, or from the point of discharge into any surface water. Stabilization of the last 200 lineal feet must be completed within 24-hours after connecting to a surface water or property edge.
- e) Pipe outlets must have temporary or permanent energy dissipation before connecting to surface water.
- f) When possible, all slopes must be graded in such a fashion so that tracking marks made from heavy equipment are perpendicular to the slope.
- g) All areas disturbed during construction must be restored as detailed in these requirements. The type of permanent restoration shall be clearly shown on the plans including but not limited to sod, seed, impervious cover and structures. A minimum of 4 inches of topsoil must be installed prior to permanent restoration. Areas in which the top soil has been placed and finish graded or areas that have been disturbed and other grading or site building construction operations are not actively underway must be temporary or permanently restored as set forth in the following requirements.
 - 1) Areas with slopes that are less than 3:1 must be seeded and mulched within 14 days of the area not being actively worked.

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- 2) Areas with slopes that are greater or equal to 3:1 must be seeded and erosion control blanket placed within 14 days of the area not being actively worked.
- 3) All seeded area must be either mulched and disc anchored, hydro- mulched, or covered by erosion control blanket to reduce erosion and protect the seed. Temporary or permanent mulch must be disc anchored and applied at a uniform rate of 2 tons per acre and have 90% coverage.
- 4) If the disturbed area will be re-disturbed within a six month period, temporary vegetative cover shall be required consisting of an approved seed mixture and application rate.
- 5) If the disturbed area will not be re-disturbed within a six month period, permanent vegetative cover shall be required consisting of an approved seed mixture and application rate.
- 6) All areas that will not have maintenance done such as mowing as part of the final design shall be permanently restored using an approved seed mixture and application rate.
- 7) Restoration of disturbed wetland areas shall be accomplished using an approved seed mixture and application rate, depending on the wetland type.
- h) All erosion control measures must be maintained for the duration of the project until final stabilization has been achieved. If construction operations or natural events damage or interfere with any erosion control measures, they shall be restored to serve their intended function.
- i) Additional erosion control measures shall be added as necessary to effectively protect the natural resources of the City. The temporary and permanent erosion control plans shall be revised as needed based on current site conditions and to comply with all applicable requirements

6.2 Sediment Control Practices

- a) Sediment control practices must be established on all down gradient perimeters before any upgradient land disturbing activities begin. These practices must remain in place until final stabilization has been achieved.
- b) If down gradient treatment system is overloaded additional up gradient sediment control practices must be installed to eliminate overloading. The SWPPP must be amended to identify the additional practices.
- c) All storm drain inlets must be protected by approved BMPs during construction until all potential sources for discharge have been stabilized. These devices must be maintained until final stabilization is achieved. Inlet protection may be removed if a specific safety concern (street flooding/freezing) has been identified.
- d) Temporary stockpiles must have silt fence or other effective sediment controls on the down gradient side of the stockpile and shall not be placed at least 25 feet from

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- any road, wetland, protected water, drainage channel, or stormwater inlets. Stockpiles left for more than 14 days must be stabilized with mulch, vegetation, tarps or other approved means.
- e) Vehicle tracking of sediment from project shall be minimized by approved BMPs. These shall be installed and maintained at the City approved entrances. Individual lots shall each be required to install and maintain entrances throughout the construction site until a paved driveway is installed.
 - f) Sediment that has washed or tracked from site by motor vehicles or equipment shall be collected from paved surfaces daily throughout the duration of construction.
 - g) Silt fence or other approved sediment control devices must be installed in all areas as shown on the SWPPP.
 - h) Silt fence or other approved sediment control devices shall be required along the entire curb line, except for approved opening where construction entrance will be installed or drainage flows away from curb. This device must be maintained until final stabilization is achieved. Ditch checks shall be required in ditch bottoms per MnDOT specifications.
 - i) Dust control measures, such as application of water must be performed periodically due to weather, construction activity, and/or as directed by the City.
 - j) Flows from diversion channels or pipes (temporary or permanent) must be routed to sedimentation basins or appropriate energy dissipaters to prevent the transport of sediment to outflow or lateral conveyors and to prevent erosion and sediment buildup when runoff flows into the conveyors.
 - k) A concrete washout shall be installed on projects that require the use of concrete. All liquid and solid wastes generated by concrete washout operations must be contained in a leak-proof containment facility or impermeable liner. A sign must be installed adjacent to each washout facility to inform operators to utilize the proper facilities.
 - l) All sediment control measures shall be used and maintained for the duration of the project until final. If construction operations or natural events damage or interfere with any erosion control measures, they must be restored immediately to serve their intended function.
 - m) Additional sediment control measures shall be added as necessary to effectively protect the natural resources of the City. The temporary and permanent erosion control plans shall be revised as needed based on current site conditions and to comply with all applicable requirements.
 - n) Restrict clearing and grading adjacent to an existing wetland boundary to provide for a protective buffer strip of natural vegetation as per Section 8.7.

6.3 Temporary Sediment Basins

A temporary sediment basin (or permanent) shall be provided when ten (10) or more acres of disturbed soil drain to a common location prior to the runoff leaving the site or entering surface waters. The Permittee is also encouraged, but not required to install temporary sediment basins in areas with steep slope or highly erodible soils even if the area is less than ten (10) acres and it drains to one common area. The basins shall be designed and constructed according to the following requirements:

- a) The basins must provide storage below the outlet pipe for a calculated volume of runoff from a 2-year, 24-hour storm from each acre drained to the basin, except that in no case shall the basin provide less than 1,800 cubic feet of storage below the outlet pipe from each acre drained to the basin.
- b) Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage below the outlet pipe per acre drained to the basin shall be provided where attainable until final stabilization of the site.
- c) Temporary basin outlets will be designed to prevent short-circuiting and the discharge of floating debris. The basin must be designed with the ability to allow complete basin drawdown (e.g., perforated riser pipe wrapped with filter fabric and covered with crushed gravel, pumps or other means) for maintenance activities, and provide a stabilized emergency overflow to prevent failure of pond integrity. Energy dissipation must be provided for the basin outlet.
- d) Temporary (or permanent) basins must be constructed and made operational concurrent with the start of soil disturbance that is up gradient of the area and contributes runoff to the pond.
- e) Where the temporary sediment basin is not attainable due to site limitations, equivalent sediment controls such as smaller sediment basins, and/or sediment traps, silt fences, vegetative buffer strips or any appropriate combination of measures are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. In determining whether installing a sediment basin is attainable, the Permittee must consider public safety and may consider factors such as site soils, slope, and available area on site. This determination must be documented in the SWPPP.
- f) The Permittee shall maintain the sedimentation basins and ensure they remain functional until an acceptable vegetative cover is restored to the site,. The City will not issue Certificates of Occupancy or approve final inspections for lots containing sediment basins until they have been removed or relocated based on the projects restoration progress.

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- g) Basins designed to be used for permanent stormwater management shall be brought back to their original design contours.

6.4 Dewatering and Basin Draining

- a) If water cannot be discharged into a sedimentation basin before entering a surface water it must be treated with the appropriate BMPs, such that the discharge does not adversely affect the receiving water or downstream landowners. The Permittee must make sure discharge points are appropriately protected from erosion and scour. The discharge must be dispersed over riprap, sand bags, plastic sheeting or other acceptable energy dissipation measures. Adequate sediment control measures are required for discharging water that contains suspended soils.
- b) All water from dewatering or basin draining must discharge in a manner that does not cause nuisance conditions, erosion in receiving channels, on down slope properties, or inundation in wetlands causing significant adverse impact to wetlands.

6.5 Inspections and Maintenance

- a) The Permittee shall be responsible for inspection, record keeping, and maintenance of the BMPs in accordance with the NPDES Permit and these Standards.
- b) The Permittee must routinely inspect the construction project once every seven (7) days during active construction and within 24-hours of a rainfall event of 0.5 inches or greater in 24-hours. Furthermore, the Permittee shall inspect all BMPs prior to imminent storm events.
- c) All inspections and maintenance conducted during construction must be recorded in writing and must be retained with the SWPPP. Records of each inspection and maintenance activity shall include:
 - 1) Date and time of inspection.
 - 2) Name of person(s) conducting the inspections.
 - 3) Findings of inspections, including recommendations for corrective actions.
 - 4) Corrective actions taken (including dates, times, and the party completing the maintenance activities).
 - 5) Date and amount of all rainfall events 0.5 inches or greater in 24-hours.
 - 6) Documentation of changes made to SWPPP.
- d) Parts of the construction site that have achieved final stabilization, but work continues on other parts of the site, inspections of the stabilized areas can be reduced to once a month. If work has been suspended due to frozen ground

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conditions, the required inspections and maintenance must take place as soon as runoff occurs or prior to resuming construction, whichever happens first.

- e) All erosion and sediment BMPs shall be inspected to ensure integrity and effectiveness. All nonfunctional BMPs shall be repaired, replaced or supplemented with a functional BMP. The Permittee shall investigate and comply with the following inspection and maintenance requirements.
- f) All silt fences and biorolls must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches 1/2 of the height of the BMP. These repairs shall be made within 24-hours of discovery, or as soon as field conditions allow access.
- g) Temporary and permanent sedimentation basins must be drained and the sediment removed when the depth of sediment collected in the basin reaches 1/2 the storage volume. Drainage and removal must be completed within 72-hours of discovery, or as soon as field conditions allow access.
- h) Surface waters, including drainage ditches and conveyance systems, must be inspected for evidence of sediment being deposited by erosion. The Permittee shall remove all deltas and sediment deposited in surface waters, including drainage ways, catch basins, and other drainage systems, and restabilize the areas where sediment removal results in exposed soil. The removal and stabilization shall take place within seven (7) days of discovery unless precluded by legal, regulatory, or physical access constraints. The Permittee shall use all reasonable efforts to obtain access. If precluded, removal and stabilization shall take place within seven (7) calendar days of obtaining access. The Permittee is responsible for contacting all local, regional, state and federal authorities and receiving any applicable permits, prior to conducting any work.
- i) Construction site vehicle exit locations shall be inspected for evidence of off-site sediment tracking onto paved surfaces. Tracked sediment shall be collected and removed from all off-site paved surfaces, within 24-hours of discovery, or if applicable, within a shorter time, and before sites are left idle for weekends and holidays.
- j) The Permittee is responsible for the operation and maintenance of temporary and permanent water quality management BMPs, as well as all erosion prevention and sediment control BMPs, for the duration of the construction work at the site. The Permittee is responsible until another Permittee has assumed control over all areas of the site that have not been finally stabilized or the site has undergone final stabilization approved by the City, and a NOT has been submitted to the MPCA, if applicable.
- k) If stormwater and/or erosion and sediment control measures malfunction and breach the perimeter of the site, enter streets, other public areas, or waterbodies,

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the applicant shall **immediately** develop a cleanup and restoration plan, and implement the cleanup and restoration plan within 24 hours. If in the discretion of the City, the applicant has not repaired the damage to the extent necessary caused by the stormwater runoff the City can do the remedial work required and charge the cost to the applicant.

- 1) All infiltration areas shall be inspected to ensure that no sediment from ongoing construction activities is reaching the infiltration area and these areas are protected from compaction due to construction equipment driving across the infiltration area.

6.6 Pollution Management Measures/Construction Site Waste Control

- a) The Permittee must implement the following pollution prevention management measures on the site.
 - 1) Solid Waste – Collected sediment, asphalt and concrete millings, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes must be disposed of properly and must comply with MPCA disposal requirements.
 - 2) Hazardous Materials such as oil, gasoline, paint and any hazardous substances must be properly stored, including secondary containment, to prevent spills, leaks or other discharge. Restricted access to storage areas shall be provided to prevent vandalism. Storage and disposal of hazardous waste shall be in compliance with MPCA regulations.
 - 3) External washing of trucks and other construction vehicles must be limited to a defined area of the site. Runoff shall be contained and waste properly disposed of. No engine degreasing is allowed on site.
 - 4) Discharges of any material other than stormwater, and discharges from dewatering or basin draining activities is prohibited. Prohibited discharges include but are not limited to vehicle and equipment washing, maintenance spills, wash water, and discharges of oil and other hazardous substances.
 - 5) The Permittee must comply with all other pollution prevention/good housekeeping requirements of the MPCA NPDES Construction General Permit.

6.7 Final Stabilization

- a) The Permittee must ensure final stabilization of the project. Final stabilization can be achieved in one of the following ways.
 - 1) All soil disturbing activities at the site have been completed and all soils will be stabilized by a uniform perennial vegetative cover with a density of at least

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- 70 percent over the entire pervious surface area, or other equivalent means necessary to prevent soil failure under erosive conditions and;
- 2) All drainage ditches, constructed to drain water from the site after construction is complete, must be stabilized to preclude erosion; and
 - 3) All temporary synthetic, and structural erosion prevention and sediment control BMPs (such as silt fence) must be removed as part of the site final stabilization; and
 - 4) The Permittee must clean out all sediment from conveyances and from temporary sedimentation basins that are to be used as permanent water quality management basins. Sediment must be stabilized to prevent it from washing back into the basin, conveyances or drainage ways discharging off-site or to surface waters. The cleanout of permanent basins must be sufficient to return the basin to design capacity.
 - 5) For residential construction only, final stabilization has been achieved when temporary erosion protection and down gradient perimeter control for individual lots has been completed and the residence has been transferred to the homeowner. In addition, the Permittee must distribute the MPCA “homeowner factsheet” to the homeowner so the homeowner is informed for the need, and benefits, of final stabilization.

6.8 Training

- a) The SWPPP must provide a chain of command showing who prepared the SWPPP and who is responsible for the management of the construction site and inspections.
- b) The training shall consist of a course developed by a local, state or federal agency, professional organization, water management organization, or soil and water conservation district and must contain information that is related to erosion prevention, sediment control, or permanent stormwater management and must relate to the work that you are responsible for managing.

7. STORMWATER MANAGEMENT DESIGN STANDARDS

7.1 Stormwater Management Plan Requirements

A Stormwater Management Plan shall detail how runoff and associated water quality impacts resulting from the development will be controlled or managed. These plans must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices.

Stormwater Management Plans will be evaluated for stormwater quantity control and stormwater quality management. The City's policy on stormwater management is to reduce the impacts of development by maintaining pre-development hydrological conditions in the following ways:

- a. Decrease runoff volume
- b. Decrease erosion and sedimentation
- c. Decrease flow frequency, duration, and peak runoff rates
- d. Increase infiltration (groundwater recharge)
- e. Maintain existing flow patterns
- f. Reduce time to peak flows by increasing the time of concentration to and through storm sewers
- g. Increasing storage of stormwater runoff on-site
- h. Avoid channel erosion

The Stormwater Management Plan must be signed by a licensed professional civil engineer in the State of Minnesota, who will verify that the design of all stormwater management practices meet the submittal requirements outlined in the Submittal Checklist found in Appendix A. A satisfactory final Stormwater Management Plan, or a waiver thereof, shall have undergone a review and been approved by the City after determining that the plan or waiver is consistent with the requirements of this manual.

All plans shall be consistent with National Pollution Discharge Elimination Permit (NPDES) requirements, and the filing or approval requirements of relevant agencies such as Watershed Districts (Rice Creek, Ramsey-Washington, or Valley Branch), Vadnais Lake Area Watershed Management Organization, White Bear Lake Conservation District, Ramsey Conservation District, Ramsey County, or other regulatory bodies.

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The following information shall be included in the Stormwater Management Plan:

- a. A map (or maps) indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural stormwater management and sediment control facilities. The map(s) will also clearly show proposed land use with tabulation of the percentage of surface area to be adapted to various uses; drainage patterns; locations of utilities, roads and easements; the limits of clearing and grading; a written description of the site plan and justification of proposed changes in natural conditions may be required.
- b. Sufficient calculations to show that the proposed stormwater management measures are capable of controlling runoff from the site in compliance with these Engineering Design Standards.
- c. A written or graphic inventory of the natural resources at the site and surrounding area as it exists prior to the commencement of the project and a description of the watershed and its relation to the project site. This description should include a discussion of solid conditions, forest cover, topography, wetlands, and other native vegetative areas on the site. Particular attention should be paid to environmentally sensitive features that provide particular opportunities or constraints for development.
- d. A brief written description of the required maintenance burden for the proposed stormwater management facility, and the party responsible for this maintenance.
- e. The final plan shall provide detailed design information for the proposed STPs, and includes details of hydrologic conditions and site features, measures for controlling existing stormwater runoff discharges and water quality from the site in accordance with the standards of this Manual.

After review of the concept plan and modifications are made to that plan as deemed necessary by the City, a final Stormwater Management Plan may be submitted for approval.

Record drawings are required for all projects that impact wetlands and/or the floodplain, require water quality ponding, have significant grade changes, and/or have other unusual circumstances. Record drawings must be certified by a professional land surveyor or civil engineer. (Record drawings should not include temporary erosion control measures.)

7.2 Guidance on Stormwater Treatment Practices (STPs)

The Stormwater Management Plan shall meet the volume control, water quality, and water quantity requirements of these Standards and the *Minnesota Stormwater*

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Manual. Designers are also expected to follow the Minimal Impact Design Standards (MIDS) flowchart detailed in the Minnesota Stormwater Manual (Appendix D). Deviations from recommended guidance will require detailed written explanation with discretion given by the City.

Final site design and choice of permanent stormwater volume reduction practices shall be based on outcomes of the MIDS Calculator (or other model that shows the performance goal can be met) and shall meet the performance goals in Section 8 of these design standards. The MIDS calculator is available at <http://stormwater.pca.state.mn.us/index.php/Calculator>.

7.3 **List of Acceptable Stormwater Treatment Practices**

In the development of appropriate Stormwater Treatment Practices (STP) appropriate for the development and redevelopment, volume control systems are foremost in importance to apply in the design. Filtration is warranted when site conditions do not allow for an effective infiltration facility. For flooding or rate control, detention systems are typically the preferred practice. Low Impact Design (LID) practices are encouraged when they can be functionally incorporated into the design. Alternative practices may be approved at the discretion of the City Engineer. For projects where infiltration is not feasible the STPs proposed shall meet the performance identified in the MIDS Flexible Treatment Options (FTO) (Appendix C).

The Minnesota Stormwater manual identifies a number of potential STPs that can be used during design. The following is a list of potential options that can be considered during development and redevelopment:

Volume Control Systems:

- Infiltration trench
- Infiltration basin
- Raingarden
- Underground storage
- Reuse
- Green Roofs
- Trees/Tree Planters

Filtration Systems:

- Surface sand filter
- Underground sand filter
- Perimeter sand filter
- Organic filter
- Bioretention system
- Raingarden with underdain
- Pervious pavement with underdrain
- Underground storage with underdrain
- Tree trench

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Detention Systems:

- Wet pond
- Stormwater re-use systems
- Multiple pond systems
- Extended detention basin
- Micro-pool extended detention basin
- Dry detention ponds
- Underground storage
- Other, as approved by the City of White Bear Lake

Open Channel Systems:

- Dry swale
- Wet swale

8. STORMWATER TREATMENT PLAN DESIGN CRITERIA

Proposed Stormwater Management Plans must incorporate Volume Control, Water Quality Control, and Rate Control as the basis for stormwater management in the proposed development plan. The City of White Bear Lake, as a permitted MS4, requires for new development projects to have a no net increase from pre-project conditions of total volume, TSS, and TP; in addition, for redevelopment projects within the city, it is required to have a net reduction from pre-project conditions of total volume, TSS and TP.

8.1 Volume Control Requirements

Volume control measures are required on projects to meet the water quality criteria of the White Bear Lake City Code, the MS4 Permit, and NPDES Construction General Permit. Volume control shall be required for proposed new impervious areas greater than 10,000 square feet or redevelopment of impervious areas greater than 10,000 square feet. If an applicant can demonstrate that the volume control standard has been met, then the water quality sizing criteria shall be considered satisfied.

Volume control may be waived by the City for sites with impermeable soil, where the seasonally high groundwater table is less than three feet, bedrock depth is less than three feet, in a stormwater hot spot, or is in an area where groundwater has a high vulnerability for contamination. If the applicant claims that infiltration is not feasible on site, the applicant must provide supporting documentation to the City. If the City agrees that infiltration is not feasible, the applicant shall design alternative stormwater runoff treatment methods meeting the requirements as established in Section 8.3.

8.2 Volume Control Calculations

Any applicant for a permit resulting in site disturbance that will require volume control must meet all of the following stormwater performance goals:

- a) *New Development/Redevelopment Volume Control.* For nonlinear developments that create and/or fully reconstruct more than 10,000 square feet of impervious surface on sites, stormwater runoff volumes will be controlled and the post-construction runoff volume shall be retained on site for 1.1 inches of runoff from all impervious surfaces on the site.
- b) *Linear Development Volume Control.* Linear projects on sites that create 10,000 square feet or greater of new and/or fully reconstructed impervious surfaces, shall capture and retain 0.75 inches of runoff from the new and fully reconstructed impervious surfaces on the site.

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Mill and overlay and other resurfacing activities are not considered fully reconstructed, and are exempt from the volume control requirements.

The use of infiltration techniques shall be restricted and subject to additional City review where the infiltration BMP will be constructed in any of the following areas:

- Where industrial facilities are not authorized to infiltrate industrial stormwater under and NPDES/SDS Industrial Stormwater Permit issued by the MPCA.
- Where vehicle fueling and maintenance occur.
- With less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of the bedrock.
- Where high levels of contaminant in soil or groundwater will be mobilized by the infiltrating stormwater.
- Soils are predominately Hydrologic Soil Group D (clay) soils.
- Drinking Water Supply Management Areas are present, as defined by Minn. R. 4720.51000, subp. 13, unless precluded by a local unit of government with an MS4 permit.
- Soil infiltration rates are more than 8.3 inches per hour unless soils are amended to flow the infiltration rate below 8.3 inches per hour.

Where the site factors listed above limit the construction of infiltration systems, the project proposer shall provide appropriate documentation to the City regarding the limitations. If the City determines that infiltration is restricted or prohibited onsite, the applicant will follow the flexible treatment options outlined in the Minimal Impact Design Standards (MIDS) sequencing guidance.

For linear projects with lack of right-of-way, easements or other permissions from property owners to install treatments systems that are capable of treating the total water quality volume on site, the project must maximize treatment through other methods or combination of methods before runoff is released to nearby surface waters. Alternative treatment options include: grassed swales, filtration systems, smaller ponds, or grit chambers. In all circumstances, a reasonable attempt must be made to obtain right-of-way during the project planning and all attempts of infeasibility must be recorded.

8.3 Water Quality Control

The water quality control standard shall be considered satisfied if the volume control standard has been satisfied. In the event that it is infeasible to meet the volume control standard due to contaminated soils, site constraints, etc., the proposed STP will need to maintain the TSS and TP loading to satisfy the water quality standards using the MIDS

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flexible treatment options as outlined below in addition to the MIDS Design Sequence Flowchart (Appendix C).

MIDS Flexible Treatment Options:

Option 1:

- Applicant attempts to comply with the following conditions:
 - Achieve at least 0.55 inch volume reduction goal, and
 - Remove 75 percent of the annual total phosphorus load, and
 - Options considered and presented shall examine the merits of relocating project elements to address varying soil conditions and other constraints across the site

Option 2:

- Applicant attempts to comply with the following conditions:
 - Achieve volume reduction to the maximum extent practicable (as determined by the Local Authority), and
 - Remove 60 percent of the annual total phosphorus load, and
 - Options considered and presented shall examine the merits of relocating project elements to address varying soil conditions and other constraints across the site.

Option 3:

- Off-site mitigation (including banking or cash or treatment on another project, as determined by the local authority) equivalent to the volume reduction performance goal can be used in areas selected in the following order of preference:
 - Locations that yield benefits to the same receiving water that receives runoff from the original construction activity.
 - Locations within the same Department of Natural Resources (DNR) catchment area, or local watershed district Resource of Concern as the original construction activity.
 - Locations in the next adjacent DNR catchment area up-stream.
 - Locations anywhere within the local authority's jurisdiction.

Methods for meeting these water quality requirements in the decreasing order of preference:

- a) Credits and site design practices to minimize the creation of connected impervious surfaces are used to the extent practical.
- b) Underdrains to promote filtration instead of infiltration.
- c) Off-site infiltration.
- d) On-site wet detention with permanent pool volume below the normal outlet that is greater than or equal to the runoff from a 2.5 inch, 24-hour storm over the entire contributing drainage area, assuming full development.

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8.4 Infiltration/Filtration Practices

- a) Sizing of filtration/infiltration practices shall be in conformance with the volume control requirements of this manual and the *Minnesota Stormwater Manual*.
- b) When designing an infiltration practice for volume control and water quality management, on-site testing and detailed analysis are strongly encouraged in order to determine the infiltration rates of the proposed infiltration facility. Documented site-specific infiltration or hydraulic conductivity measurements (double-ring infiltrometer) completed by a licensed soil scientist or engineer is required. In the absence of a detailed analysis, the saturated infiltration rates listed in the Infiltration Rates for Infiltration BMPs table found on the *Minnesota Stormwater Manual* shall be used. A piezometer shall be installed in order to ascertain the level of the local groundwater table and demonstrate at least three feet of separation between the bottom of the proposed facility and the groundwater. The soil boring is required to go to a depth of at least five feet below the proposed bottom of the BMP. The soils shall be classified using the Unified Soil Classification system. The least permeable soil horizon will dictate the infiltration rate. Infiltration practices shall be designed to infiltrate the required runoff volume within 48 hours.
- c) Pretreatment, in the form of ponds, forebays, filter strips, or other approved methods, shall be provided for all infiltration areas. Pretreatment upstream of volume management practices is a key element in the long-term viability of infiltration areas. The level of pretreatment varies largely depending on the BMP and drainage area of the watershed, City staff, and *Minnesota Stormwater Manual* recommendations shall be utilized for determining the appropriate level of pretreatment on a case-by-case basis.
- d) The infiltration practice shall not be used within fifty feet of a municipal, community or private well, unless specifically allowed by an approved wellhead protection plan.
- e) Vegetation of infiltration/filtration practices shall be as shown in the City of White Bear Lake's Standard Details. A plan for management for vegetation shall be included in the Stormwater Pollution Prevention Plan.
- f) If soils are unsuitable for infiltration, then filtration may be used with drain tile, provided in accordance with the City of White Bear Lake's Standard Details.
- g) Subgrade soils for infiltration/filtration practices shall be as presented in the City of White Bear Lake's Standard Details. Assume a 40% void ratio for clean washed rock and 20% for construction sand for the purposes of volume calculations.

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- h) Rock storage beds shall be constructed using crushed angular granite that has been thoroughly washed to remove all fine particles that could result in clogging of the system.
- i) For infiltration benches adjacent to ponds, benches shall have slopes no steeper than 5:1 over the proposed infiltration zone. A slope of 10:1 is preferred. The *Minnesota Stormwater Manual* cites concerns with locating infiltration features immediately adjacent to ponds. To address this, benches shall be located to maintain hydraulic separation from the saturated zone of the pond in order to minimize the loss of infiltration potential over time.

8.5 Rate Control

A hydrograph method based on sound hydrologic theory as approved by the City Engineer will be used to analyze runoff for the development design or analysis of flows and water levels.

- a) Runoff Curve Numbers shall match those as outlined in the current version of the *Minnesota Stormwater Manual*.
- b) At a minimum, detention basins should maintain existing flow rates for the 2, 10, and 100-year 24-hour rainfalls in accordance to the Atlas 14 data, and 100 year-10 day snowmelt event in accordance with Technical Release #60 (TR-60) and as shown in the table below:

Event	Rainfall/Snowmelt Depth (inches)
2-year, 24 hour	2.79
10-year, 24 hour	4.16
100-year, 24 hour	7.24
100-year, 10 day snowmelt	7.00

- c) Detention basins shall be designed with capacity for the critical 100-year event, which is defined as the 100-year event that produces the highest water level among a 24-hour rainfall event or the 10-day, snowmelt runoff event.
- d) The maximum duration for rainfall critical event analysis shall be 24-hours except in cases where basins are landlocked, where back to back 24-hour events and the 10-day snowmelt runoff event shall also be used. In all cases a hydrograph method of analysis should be used. For the 24-hour rainfall event, or back to back 24-hour rainfall events, an either a nested rainfall distribution or NRCS rainfall distribution should be used. For shorter duration critical events other distributions may be used with the approval of the City Engineer.

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- e) All drainage system analyses and designs shall be based on proposed full development land use patterns. A nested rainfall distribution or NRCS rainfall distribution with average antecedent moisture conditions should be utilized for runoff calculations.
- f) City standard detail plates should be utilized for pond outlet structures.
- g) Outlet structures should be designed in three phases with primary outlet structure and secondary overflow structure routed to the storm sewer and a defined emergency overflow as the tertiary outlet structure.

8.6 Floodplain Management

Filling construction activities within the 100-year floodplain are subject to the requirements of Chapter 1303.235 of the City Zoning Code. Applications proposing to alter the floodplain shall submit the following, along with any submittal requirements of Chapter 1303.235 of the City Zoning Code:

- a) Cut/fill diagrams along with calculations demonstrating that the filling or alteration of the floodplain is not resulting in a reduction in the flood stage/storage;
- b) Compensatory floodplain storage within +/- 1 foot of the floodplain impacts in the same water body or drainage district of the proposed work; and
- c) Proper stabilization of excavated areas.

8.7 Buffers

Buffers are required adjacent to rivers, streams, lakes, and wetlands for projects requiring a stormwater management permit as defined in the City Zoning Code, Chapter 1303.240.

- a) Buffers are areas of native vegetation located adjacent to receiving waters to protect water quality. Buffers can intercept overland flow of runoff and reduce sediment, debris, nutrients and pesticides inputs to receiving waters by providing an area of undisturbed vegetation in order to trap sediment and debris from adjacent land areas.
- b) The City recognizes the potential for sedimentation and nutrient loading from poorly maintained construction practices and nonpoint source loading from urban landscapes. Therefore, the City finds it necessary to require extraordinary measures to prevent such construction related and nonpoint sources degradation.
- c) The City lies within the boundaries of three watershed districts and one water management organization. Some of these agencies have adopted rules that specify the minimum buffer widths for wetlands and other water bodies. This manual incorporates by reference the wetland buffer widths and the wetland management standards contained in the rules of these agencies.

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- d) Buffer width measurements will follow the requirements of the appropriate watershed district. For agencies without an adopted standard, a minimum 15-foot and average 30-foot buffer strip at all points around wetlands shall be maintained at all times using native vegetation. If, in the opinion of the City, the perimeter of the wetland contains significant natural vegetation in good condition, the City reserves the right to require up to a 50-foot buffer of this natural vegetation where it exists area around the wetland, where no grading or disturbance of any kind shall be allowed.
- e) For roads and sites with existing homes, the buffer widths listed above are strongly encouraged, but may not be feasible and practical. The City will review these situations on a case-by-case basis.
- f) Buffer areas must be established in appropriate vegetation such as native grasses, forbs, shrubs, and trees. The buffer area cannot consist of more than 20% common or noxious weeds. After becoming established, the vegetation in the wetland buffer area must be maintained according to natural area standards for the cover type (grassland, woodland).
- g) Impervious surfaces shall not be allowed in the buffer area.
- h) Stormwater management BMPs are encouraged to be located adjacent to buffers in new and redevelopment areas.
- i) The minimum wetland buffer width shall be in addition to non-vegetative material, such as rock riprap, may be employed along the banks of waterbodies as necessary to prevent erosion, such as on steep slopes or where high velocity flows occur.
- j) The use of a meandering buffer strip to maintain a natural appearance is encouraged in areas of flat topography.
- k) A monument shall be required at each parcel line where it crosses a buffer strip and shall have a maximum spacing of 200 feet along the edge of the buffer strip. Additional monuments shall be placed as necessary to accurately delineate the edge of the buffer. The signs shall be 11 inch x 17 inch vertical, have a brown field with white lettering, and shall be securely mounted on a post to a minimum height of 4 feet above grade. The signs shall include warnings about disturbing or developing the buffer strip. The signs shall be installed prior to the issuance of a building permit.
- l) Buffer strip vegetation shall be appropriate to the goals for the water body. Where acceptable natural vegetation exists in buffer strip areas, the retention of such vegetation in an undisturbed state is preferred.

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8.8 Shoreland Management

The City of White Bear Lake has an established adopted Shoreland Overlay District Code, Section 1303.230 of the Zoning Code. The City Code has established setbacks for placement of structures and impervious and also requirements for shoreland alterations. The City also encourages the following for work occurring within the shoreland zone:

- a) Encourage the use of natural vegetation or bioengineering techniques for the stabilization of shorelines.
- b) Use materials such as granite or fieldstone for shoreline stabilization project where hard armoring is necessary.
- c) Encourage the use of techniques that will minimize runoff and improve water quality associated with new development and redevelopment. When possible use existing natural drainage ways, wetlands, and vegetated soil surfaces to convey, store, filter, and retain stormwater runoff before discharge to public waters. When development density, topographic features, and soil and vegetation conditions are not sufficient to adequately handle stormwater runoff using natural features and vegetation, various types of constructed facilities such as diversions, settling basins, skimming devices, dikes, waterways, and ponds may be used. Preference shall be given to designs using surface drainage, vegetated filter strips, bioretention areas, rainwater gardens, enhanced swales, off-line retention areas, and natural depressions for infiltration rather than buried pipes and human-made materials and facilities (*MnDNR Alternative Shoreland Standards, 2005*).

8.9 Alternative Compliance Options

Under certain circumstances, some construction projects cannot meet the TSS and/or TP reduction requirements for new or redevelopment projects on the site of the original construction. All methods must be exhausted prior to considering alternative locations where TSS and TP treatment standards can be achieved. If the City has determined that all methods have been exhausted, the permittee will be required to identify alternative locations where TSS and TP treatment standards can be achieved.

- Mitigation projects will be chosen in the following order of preference:
 - a) Locations that yield benefits to the same receiving water that receives runoff from the original construction activity.
 - b) Locations within the same Department of Natural Resource (DNR) catchment area, or local watershed district Resource of Concern, as the original construction activity.
 - c) Locations in the next adjacent DNR catchment area up-stream.
 - d) Locations anywhere within the City of White Bear Lake.

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- Mitigation projects shall involve the establishment new structural stormwater BMPs or the retrofit of existing structural stormwater BMPs, or the use of a properly designed regional structural stormwater BMP.
- Previously required routine maintenance of structural stormwater BMPs cannot be considered mitigation.
- Mitigation projects must be finished within 24 months after the original construction activity begins.

9. STORMWATER SEWER DESIGN STANDARDS

9.1 Storm Sewers

- a) Manhole spacing shall not exceed 400 feet.
- b) Where more than one pipe enters a structure, a catch basin/manhole shall be used.
- c) Storm sewer pipe should match top of pipe on top of pipe unless grade constraints prevent this. In that case, hydraulic calculations will be necessary to verify that excessive surcharging will not occur.
- d) Stormwater pipes shall be designed utilizing the Rational Method. Channel design shall be hydrograph method only. All methods are subject to the City Engineer’s approval.
- e) Lateral systems shall be designed for the 10-year rainfall using the Rational Method. State Aid roadway storm sewer shall be designed per the State Aid requirements.
- f) The minimum full flow velocity within the storm sewer should be 3 feet per second (fps). The maximum velocity shall be 10 fps, except when entering a pond, where the maximum velocity shall be limited to 6 fps.
- g) Trunk storm sewer should be designed at a minimum to carry 100-year pond discharge in addition to the 5-year design flow for directly tributary areas. The following table shall be used for the calculation of peak rates using the Rational Method:

Cover Type	10-Year Runoff Coefficient
Single-family Residential	0.4
Multi-family Residential	0.5
Commercial	0.7
Industrial	0.7
Parks, Open Space	0.2
Ponds, Wetlands	1.0

- h) For storms greater than the 5-year event, and in the case of plugged inlets, transient street ponding will occur. For safety reasons, the maximum depth in streets should not exceed 1.5 feet at the deepest point.
- i) To promote efficient hydraulics within manholes, manhole benching shall be provided to 1/2 diameter of the largest pipe entering or leaving the manhole.
- j) Vaned grate (Neenah 3067V) catch basin castings, or other approved castings, shall be used on all streets.
- k) The maximum design flow at a catch basin for the 5-year storm event shall be three (3) cubic feet per second (cfs), unless high capacity grates are provided.

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Catch basins at low points will be evaluated for higher flow with the approval of the City Engineer.

- l) All structures located in the street are to be a minimum of four feet deep (rim to invert) and a minimum of three feet deep elsewhere. Two-by-three catch basins are to be four (4) feet deep.

9.2 Outlet and Inlet Pipes

- a) Inlet pipes of stormwater ponds shall be extended to the pond normal water level whenever possible.
- b) Outfalls with velocities greater than 4 fps into channels, where the angle of the outfall to the channel flow direction is greater than 30 degrees, requires energy dissipation or stilling basins.
- c) Outfalls with velocities of less than 4 fps, that project flows downstream into a channel in a direction 30 degrees or less from the channel flow direction, generally do not require energy dissipaters or stilling basins, but will require riprap protection.
- d) In the case of discharge to channels, riprap shall be provided on all outlets to an adequate depth below the channel grade and to a height above the outfall or channel bottom. Riprap shall be placed over a suitably graded filter material and filter fabric to ensure that soil particles do not migrate through the riprap and reduce its stability. Riprap shall be placed to a thickness at least 2.5 times the mean rock diameter to ensure that it will not be undermined or rendered ineffective by displacement. If riprap is used as protection for overland drainage routes, grouting may be recommended.
- e) Discharge velocity into a pond at the outlet elevation shall be 6 fps or less. Riprap protection is required at all inlet pipes into ponds from the NWL to the pond bottom.
- f) Where outlet velocities to ponds exceed 6 fps, the design should be based on the unique site conditions present. Submergence of the outlet or installation of a stilling basin approved by the City is required when excessive outlet velocities are experienced.
- g) Submerged outlet pipes from ponds are not allowed.

9.3 Channels and Overland Drainage

- a) Overland drainage routes where velocities exceed 4 fps should be reviewed by the City Engineer and approved only when suitable stabilization measures are proposed.
- b) Open channels and swales are recommended where flows and small grade differences prohibit the economical construction of an underground conduit.

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Open channels and swales can provide infiltration and filtration benefits not provided by pipes.

- c) The minimum grade in all unpaved areas shall be 2%.
- d) Maximum length for drainage swales shall be 400 feet.
- e) Channel side slopes should be a maximum of 4:1 (horizontal to vertical) with gentler slopes being desirable.
- f) Riprap shall be provided at all points of juncture, particularly between two open channels and where storm sewer pipes discharge into a channel.
- g) Open channels should be designed to handle the expected velocity from a 10-year design storm without erosion. Riprap may need to be provided.
- h) Periodic cleaning of an open channel is required to ensure that the design capacity is maintained. Therefore, all channels shall be designed to allow easy access for equipment.

9.4 **Ponds**

- a) Where on site water quality detention basins are required, copies of the calculations determining the design of the basins. The size and design considerations will be dependent on the receiving water body's water quality category, the imperviousness of the development and the degree to which on site infiltration of runoff is encouraged. Design of on-site detention basins, as described in the site's runoff water management plan, shall incorporate recommendations from the Nationwide Urban Runoff Program (NURP) and "Protecting Water Quality In Urban Areas", published by the Minnesota Pollution Control Agency, as adopted by the City, or the applicable publications, as adopted by the City. The following design considerations are required for on-site water quality detention basins based on the receiving water's water quality category. These designs include permanent detention for water quality treatment; extended detention designs may be substituted provided that they provide treatment equivalent to the requirements below:
 - 1) All stormwater ponds shall be designed with an acceptable pre-treatment method to provide potential for settlement of fine particles.
 - 2) A permanent pool (dead storage) volume below the normal outlet shall be greater than or equal to the runoff from a two and one-half inch (2.5") 24-hour storm over the entire contributing drainage area assuming full development.
 - 3) Maximum allowable pond slopes above the outlet elevation are 4:1.
 - 4) All constructed ponds and wetland mitigation areas shall have an aquatic or safety bench around their entire perimeter. The aquatic bench is defined as follows:
 - i. Cross-slope no steeper than 10:1.

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- ii. Minimum width 10 feet.
 - iii. Located from pond outlet elevation to one foot above pond outlet elevation.
- 5) All constructed ponds shall be provided a maintenance access from an adjacent roadway. The maintenance access shall be provided in the form of an easement no narrower than 20 feet. The maintenance access shall have a longitudinal slope no steeper than 6:1 and minimal cross slope. Maintenance access routes, due to their extra width, also serve well as emergency overflow (EOF) routes.
 - 6) All constructed ponds and wetland mitigation areas shall have a maintenance access bench around sufficient perimeter to provide access to all inlets and outlets. The maintenance bench shall be located within a designated outlot or within a permanent easement. The maintenance bench shall extend from the outlet elevation to one foot above the outlet elevation and its cross slope shall be no steeper than 10:1. The maintenance bench shall connect to the maintenance access.
 - 7) Maximum pond wet volume depth is 8 feet.
 - 8) Mean depth for wet ponds shall be a minimum of 4 feet. If the pond is smaller than 3 acre-feet in volume, mean depths of 3 to 4 feet may be used. Mean depth is defined as the area at outlet elevation divided by the wet volume.
 - 9) All ponds shall be graded to one foot below design bottom elevation. This “hold down” allows sediment storage until site restoration is complete.
 - 10) The top berm elevation of ponds shall be a minimum of one foot above the 100-year pond HWL.
 - 11) Grading shall not block or raise emergency overflows from adjoining properties unless some provision has been made for the runoff that may be blocked behind such an embankment.
 - 12) All ponds shall have a protected Emergency Overflow that is a minimum of 2 feet below the lowest building opening.

9.5 Freeboard

Elevation separations of buildings with respect to ponds, lakes, streams, and stormwater features shall be designed as follows:

- a) The basement floor elevation of any new building shall be placed at least two (2) feet above the elevation of any known historic high groundwater elevations for the area and at least three (3) feet above the 100-year high surface water elevation in the area.

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- b) The low building opening elevation of any new building shall be at least three (3) feet above the projected 100-year high water elevation for the area. If this standard is considered a hardship, the standard may be lowered to placing the low building opening elevation at least two (2) feet above the projected 100-year high water elevation if the following can be demonstrated:
 - 1) That within the two-foot freeboard area above the 100-year high water elevation, stormwater storage is at least 50 percent of the stormwater storage capacity below the 100-year high water elevation; and
 - 2) That a 25 percent obstruction of the basin outlet for a 100-year critical-duration rainfall event would not result in a high water elevation greater than one foot above the 100-year high water elevation; and
 - 3) An adequate overflow route from the basin will assure that water levels, even for 100-year rainfall events, will be greater than one foot below the low building opening elevation.
- c) An emergency spillway from ponding areas shall be installed a minimum of one (1) foot below the lowest building opening and shall be designed to have a capacity to overflow water at an elevation below the lowest building opening at a rate not less than three times the 100-year peak discharge rate from the basin or the 100-year inflow rate to the basin, whichever is higher.

9.6 Emergency Overflow Paths

- a) Emergency Overflows (EOFs) shall be sized with a minimum bottom width of five feet and 4:1 side slopes.
- b) The maximum flow depth in EOFs shall be less than equal to one foot as calculated for a 100-year back-to-back storm event.

10. DESIGN EXAMPLES

The design process for each of the acceptable Stormwater Treatment Practices is detailed in the *Minnesota Stormwater Manual*, http://stormwater.pca.state.mn.us/index.php/Main_Page.

11. STORMWATER TREATMENT PRACTICE DETAIL DRAWINGS

Please refer to the City of White Bear Lake's Engineering Details for the following:

- Bioretention
- Media Filter System
- Vegetative Filter System
- Infiltration Trench
- Infiltration Basin
- Stormwater Pond/Wetland

12. CONSTRUCTION SPECIFICATIONS

Construction specifications and details are found in the *Minnesota Stormwater Manual* for each of the acceptable STPs, unless otherwise restricted by this manual.

13. NOTIFICATION AND REPORTING PROCEDURES

13.1 Notification

The City shall make inspections as hereinafter required and either shall approve that portion of the work completed or shall notify the Applicant wherein the work fails to comply with the Erosion and Sediment Control Plan and/or Stormwater Management Plan as approved.

13.2 Procedure

The Applicant is responsible for regular inspections and record keeping needed to document compliance with the Permit Requirements in accordance with the NPDES Permit and Section 6 of these Engineering Design Standards. The City may conduct inspections as needed to ensure that both Erosion and Sediment Control and Stormwater measures are properly installed and maintained prior to construction, during construction, and at the completion of the project. In all cases the inspectors will attempt to work with the applicant or developer to maintain proper stormwater management.

13.3 Reporting

The Applicant shall submit reports to the City under the following circumstances and shall submit recommendations for corrective measures, if appropriate, with such reports:

- a) There are delays of more than seven (7) days in obtaining materials, machinery, services or manpower necessary to the implementation of the Stormwater Management Plan as scheduled.
- b) There are delays of seven (7) days in land disturbing or filling activities or Soil storage.
- c) The work is not being done in conformance with the approved plans and Permit.

13.4 Enforcement

Enforcement of these Engineering Design Standards shall be in accordance with the provisions of Chapter 1301.090 and 1302.070 of the City's Zoning Code.

14. STORMWATER OPERATION AND MAINTENANCE AGREEMENTS

All new and existing stormwater facilities shall be designed to minimize the need for maintenance, to provide easy vehicle and personnel access for maintenance purposes, and be structurally sound.

14.1 Applicability

- a) All new single-family subdivisions greater than 3 lots that rely on common drainage facilities for stormwater management, multiple family residential, commercial, mixed-use and industrial developments shall have stormwater facilities designed and constructed in accordance with the City's Engineering Design Standards. These stormwater facilities will require future maintenance, and as such, these subdivisions shall enter into a Stormwater Operation and Maintenance Agreement (SOMA) with the City in order to insure that the stormwater facilities provided are appropriately maintained. Said agreement shall meet the requirements below and be recorded at the County Recorder's Office for all properties associated with the referenced drainage facilities.
- b) No private stormwater facilities shall be approved unless a maintenance plan is provided that meets the requirements set forth below.
- c) Before work under the permit is deemed complete, the permittee must submit as-builts and a maintenance plan demonstrating at the time of final stabilization that the stormwater facilities conform to design specifications. A final inspection shall be required before the City accepts ownership of the stormwater facilities.

14.2 Stormwater Operation and Maintenance Agreement

The Responsible Party shall enter into a Stormwater Operation and Maintenance Agreement (SOMA) with the City that documents all responsibilities for operation and maintenance of all Stormwater Treatment Practices. Such responsibility shall be documented in a maintenance plan and executed through a Maintenance Agreement. The Maintenance Agreement shall be executed and recorded against the parcel. The stormwater Maintenance Agreement shall be in a form approved by the City. If in a format acceptable to the City, a SOMA with the applicable watershed district could be deemed sufficient to meet this requirement. The SOMA shall describe the inspection and maintenance obligations of this section and shall, at a minimum:

- a) Designate the Designate the Responsible Party, which shall be permanently responsible for maintenance of the structural or nonstructural measures.
- b) Pass responsibility for such maintenance to successors in title.

Engineering Design Standards

- c) Grant the City and its representatives the right of entry for the purposes of inspecting all Stormwater Treatment Practices. All private stormwater facilities will be inspected by the City and/or applicable watershed district during construction, during the first year of operation, and at least once every five years thereafter. Access to all stormwater facilities must be inspected annually and maintained as necessary. The applicant shall obtain all necessary easements or other property interests to allow access to the facilities for inspection or maintenance for both the responsible party and the City of White Bear Lake.
- d) Allow the City the right to repair and maintain the facility, if necessary maintenance is not performed after proper and reasonable notice to the Responsible Party.
- e) Include a maintenance plan that contains, but is not limited to the following:
 - 1) Identification of all Stormwater Treatment Practices.
 - 2) A schedule for regular inspection, monitoring, and maintenance for each practice. Monitoring shall verify whether the practice is functioning as designed and may include, but is not limited to quality, temperature, and quantity of runoff. At a minimum, all private stormwater facilities shall be inspected annually and maintained in proper condition consistent with the performance goals for which they were originally designed.
 - 3) Identification of the Responsible Party for conducting the inspection, monitoring, and maintenance for each practice.
 - 4) All settled materials including settled solids, shall be removed from ponds, sumps, grit chambers, and other devices on a sufficient frequency to maintain design capacity, and disposed of properly
- f) Identify a schedule and format for reporting compliance with the Maintenance Plan to the City.

14.3 Records of Installation and Maintenance Activities

The Responsible Party shall make records of the installation and of all maintenance and repairs of the stormwater treatment practices, and shall retain the records for at least three (3) years. These records shall be made available to the City during inspection of the Stormwater Treatment Practice and at other reasonable times upon request.

14.4 Failure to Maintain Practices

If a Responsible Party fails or refuses to meet the requirements of the Maintenance Agreement, the City, after reasonable notice, may correct a violation of the design standards or maintenance needs by performing all necessary work to place the Stormwater Treatment Practice in proper working condition. In the event that the

Engineering Design Standards

Stormwater Treatment Practice becomes a danger to public safety or public health, the City shall notify the Responsible Party in writing. Upon receipt of that notice, the Responsible Party shall have thirty days to perform maintenance and repair of the facility in an approved manner. After proper notice, the City may specially assess the owner(s) of the Stormwater Treatment Practice for the cost of repair work and any penalties; and the cost of the work shall be assessed against the property and collected along with ordinary taxes by the City.

15. CHECKLISTS

Refer to Appendix A & B

- Checklists for Construction Inspection and Operation & Maintenance
- Construction Inspection and Operation & Maintenance Checklists for each of the approved Stormwater Treatment Practices are available in the *Minnesota Stormwater Manual*.

APPENDIX A

**STORMWATER SITE PLAN
REVIEW CHECKLIST**



City of White Bear Lake – Stormwater Site Plan Review

Address:		Permit No:	
PID:		Date Approved:	
Date Received:		Signature:	
Site Size (acres):		Area of Disturbance(acres):	
Existing Impervious (acres):		Proposed Impervious (acres):	

Submittals Received

Date	Document	Author

Status of Other Permits		
	Yes ✓	No ✓
Watershed District Permit		
MPCA – NPDES Construction Stormwater Permit		

General Site Plan		
	Yes ✓	No ✓
Scale of Survey. Minimum scale 1" = 50'. Maximum size plan sheet 24" x 36"		
Survey signed by a registered survey with elevations in NGVD-1929 datum for the following locations:		
<ul style="list-style-type: none"> • Each lot corner 		
<ul style="list-style-type: none"> • Grade elevation at the foundation and elevation of top of foundation of structures on adjacent lots 		
<ul style="list-style-type: none"> • Grade elevation at the foundation, elevation of top of foundation and garage floor of proposed new construction 		
<ul style="list-style-type: none"> • Lowest point of entry (i.e. door sill or top of window well) of proposed and existing construction 		
<ul style="list-style-type: none"> • Lowest floor of proposed and existing construction 		
Any proposed retaining wall must have a top and bottom elevation and bottom elevation would be finish grade. Also, no retaining wall is allowed to be built on private property		
Retaining walls greater than 4.0 feet in height have been designed and certified by a licensed professional engineer and a building permit has been acquired		

Easements are clear of any encroachments?		
New curb cuts proposed? If new curb cut is proposed, stamp all survey maps with the curb cut stamp. Also, write a note on the Residential Plan & Routing Approval form reminding the builder that a curb cut permit is required if the driveway is moved or a new driveway is added		
Low floor a minimum of 4.25' (feet) above the sanitary sewer invert elevation		

Comments:

Erosion Control Plan		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
SWPPP notes provided on the plan		
Temporary stabilization measures provided		
Erosion control blankets provided on all slopes greater than 3:1		
Perimeter Control i.e., Silt Fence, Filter Log, etc.		
Phasing for sites that are ≥ 1 acre		
CB Inlet Protection		
Dewatering		
Sediment control		
Waste control		
Concrete washout		
Rock entrance		
Street sweeping schedule		
Permanent restoration plan		
SWPPP includes an erosion and sediment control inspection schedule and person responsible for maintenance		

Comments:

Stormwater Management Plan		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Delineation map		
Modeling calculations for existing and proposed conditions		
<ul style="list-style-type: none"> • 2, 10, 100, Snowmelt • Modeled direct connected impervious separate 		
Off-site drainage included		
Wetlands shown on plans and wetland permitting completed		
Pretreatment		
Skimmer structures provided on the outlets of all ponds.		
Soil borings		
Design Infiltration Rate Determination		
Seasonal High Water Elevation		

Comments:

Water Quality		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Volume control provided as per the City's Engineering Design Standards		
Sequencing provided for alternatives where infiltration is infeasible		
Required Water Quality Volume:		
Provided Water Quality Volume:		

Comments:

Rate Control		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Peak Discharge Rates < Existing		

Comments:

Freeboard		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Building Opening:		
<ul style="list-style-type: none"> • 2' above the critical 100-yr HWL of local basins, wetlands, & infiltration basins • 2' above EOF of local basins, wetlands, & infiltration basins • 2' above the 100-yr flow elevation of a swale or channel at the point where the swale channel is closest to the building 		
Low Floor Elevation:		
<ul style="list-style-type: none"> • 2' above the critical 100-yr HWL of major basins • 2' above EOF of major basins • For landlocked basins: 2' above the HWL from back to back 100-yr rainfalls or 2' above the HWL from the 100-yr 10-day snowmelt, whichever is higher. Starting elevation of the basin/waterbody prior to runoff is one of the following: <ul style="list-style-type: none"> ○ Existing Ordinary High Water level established by the Minnesota Department of Natural Resources ○ Annual water balance calculation approved by the City ○ Local observation well records, as approved by the City ○ Mottled soil 		

Comments:

APPENDIX B

**CONSTRUCTION SITE
EROSION & SEDIMENT CONTROL
INSPECTION FORM**



City of White Bear Lake – Construction Site Erosion & Sediment Control Inspection Form

General Information:				PERMIT NO. _____
Site Name:	Owner:	Contractor:		
Address/Nearby Landmark:	Weather:	Photos taken? Yes <input type="checkbox"/> No		
Inspection Date: ____ / ____ / ____ Time:	Inspected by:	Date of Last Inspection: ____ / ____ / ____		
Priority Area: Yes <input type="checkbox"/> No	Last Rain Date: _____ Amount: _____ (inches)			
	Today's Rainfall Amount: _____ (inches)			
	Rainfall Data Source: on-site gauge weather station w/in 1 mi			
Inspection Reason: Annual Complaint Spot-check (circle one)	Follow-up Contact Name _____			
Site Management:	Acceptable	Repairs Required	N/A	
SWPPP on-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Name of trained construction site manager & construction installer present on-site? _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Street and curb/gutter free of sediment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Appropriate site phasing/construction sequencing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Inlets/pipes, adjacent property, or receiving waters free of sediment from construction site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Corrective Actions:				
Erosion Prevention Practices:	Acceptable	Repairs Required	N/A	
Idle Lots, areas stabilized, undisturbed? Exposed soil areas acceptable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Exposed soil areas (including stockpiles) provided with temporary/permanent protection (i.e. mulch, sod) within 14 days or w/in 24 hours if w/in 200 feet of fish spawning for specific Public Waters?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Mulch evenly spread to 90% coverage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ditches stabilized properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Blanket installed properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Temporary or permanent vegetation adequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Normal wetted perimeter of temp. or perm. (connected) drainage system 200' from surface water stabilized w/in 24 hour?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Energy dissipation (temp. or perm.) w/in 24 hours at outlets?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Corrective Actions:				

<u>Sediment Control Practices</u>	Acceptable	Repairs Required	N/A
Site entrances/exits in-place? Properly installed and maintained?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installed where specified or indicated on plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installed correctly? (compacted, trenched)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle tracking or street sweeping completed to avoid off-site issues?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No blow-outs, pushed-over, or destroyed sections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No sediment removal needed? (1/2 capacity needs maintenance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perimeter controls installed down gradient before construction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temporary soil stockpiles protected?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temporary sediment basins installed? (Common drainage \geq 10 acres or \geq 5 acres in impaired watershed)? Energy dissipation installed at outlet? Emergency overflow stabilized?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corrective Actions:			
<u>Surface Waters:</u>	Acceptable	Repairs Required	N/A
Free of sediment plumes or highly turbid waters?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stormwater pond slopes in good shape?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Last 200 ft of drainage ditch/swale stabilized within 24hrs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discharge to impaired water within one mile of the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corrective Actions:			
<u>Inlet Protection:</u>	Acceptable	Repairs Required	N/A
Curb and gutter inlet protection in-place? Maintained? Appropriate for phase?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drop structure inlet protection in-place? Maintained? Appropriate for phase?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Culvert inlet protection in-place? Maintained? Appropriate for phase?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inlet protection removed after stabilization of catchment area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corrective Actions:			
<u>Pollution Prevention:</u>	Acceptable	Repairs Required	N/A
Construction site wastes (debris, trash, brush, etc), building products, hazardous materials, toxic waste (oil, diesel fuel, gasoline, etc.), & chemicals (pesticides, etc.) stored / recycled / covered appropriately?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concrete washout in-place & maintained in designated areas w/ signs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Vehicle & equipment washing, maintenance and fueling in-place, properly contained & maintained appropriately?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dust controlled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Corrective Actions:

<u>Dewatering and Basin Draining</u>	Acceptable	Repairs Required	N/A
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Proper dewater activities to avoid score and erosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Corrective Actions:

<u>Inspections:</u>	Acceptable	Repairs Required	N/A
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Inspections documented at least 1 per 7 days and within 24 hours after 0.5" rainfall?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Corrective Actions:

<u>Maintenance Completed from Prior Inspections:</u>
