

SECTION X.X – STORMWATER MANAGEMENT

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ARTICLE 1 - GENERAL

1.1 Statement of Authority

This ordinance is adopted in accordance with the Home Rule City Act, as amended, being MCL 117.1, et seq.; the Drain Code of 1956, as amended, being MCL 280.1, et seq.; the Land Division Act, as amended, being MCL 560.1, et seq.; the Revenue Bond Act, as amended, being MCL 141.101, et seq.; and the Natural Resources and Environmental Protection Act, as amended, being MCL 324.101, et seq.; Section 401(p) of the Federal Water Pollution Control Act (also known as the Clean Water Act), as amended, being 33 USC 1342(p) and 40 CFR Parts 9, 122, 123 and 124; and other applicable state and federal laws.

This ordinance shall be known and may be cited as the City of Houghton Stormwater Ordinance.

1.2 Findings

The City of Houghton finds that:

- 1) Water bodies, roadways, structures, and other property within the City of Houghton are at times subjected to flooding;
- 2) Flooding is a danger to the lives and property of the public and is also a danger to the natural resources of the City of Houghton and the region;
- 3) Land development alters the hydrologic response of watersheds, resulting in increased stormwater runoff rates and volumes, increased flooding, increased stream channel erosion, and increased sediment transport and deposition;
- 4) Stormwater runoff produced by land development contributes to increased quantities of water-borne pollutants;
- 5) Increases of stormwater runoff, soil erosion, and non-point source pollution have occurred as a result of land development, and cause deterioration of the water resources of the City of Houghton.
- 6) Increased stormwater runoff rates and volumes, and the sediments and pollutants associated with stormwater runoff from future development projects within the City of Houghton will, absent reasonable regulation and control, adversely affect the City of Houghton's water bodies and water resources.
- 7) Stormwater runoff, soil erosion, and non-point source pollution can be controlled and minimized by the regulation of stormwater runoff from development;
- 8) Adopting the standards, criteria and procedures contained in this ordinance and implementing the same will address many of the deleterious effects of stormwater runoff;
- 9) Adopting these standards is necessary for the preservation of the public health, safety and welfare.

1.3 Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls to accomplish, among others, the following objectives:

- 1) To reduce artificially induced flood damage;
- 2) To minimize increased stormwater runoff rates and volumes from identified new land development;

- 3) To minimize the deterioration of existing watercourses, culverts and bridges, and other structures;
- 4) To encourage water recharge into the ground where geologically favorable conditions exist;
- 5) To prevent an increase in non-point source pollution;
- 6) To maintain the integrity of stream channels for their biological functions, as well as for drainage and other purposes;
- 7) To minimize the impact of development upon streambank and streambed stability;
- 8) To reduce the adverse impact of changing land use on water bodies and, to that end, this ordinance establishes minimum standards to protect water bodies from degradation resulting from changing land use where there are insufficient stormwater management controls.

1.4 Applicability, Exemptions and General Provisions

- 1) This ordinance shall apply to any development site which requires approval of a plat or site development plan, or any other permit for work which will alter stormwater drainage characteristics of the development site, provided, however, that this ordinance shall not apply to the following:
 - a. Agricultural activity that is consistent with an approved soil conservation plan.
 - b. Additions or modifications to any single family or duplex structure.
 - c. Landscaping or gardening involving less than 1 acre of land.
 - d. Construction of a dwelling on a legal lot within a development that itself previously received approval under this Article provided that less than 1 acre of land is cleared or graded for such construction.

1.5 Definitions

For the purpose of this Article, the following words and phrases shall have the meanings respectively ascribed to them by this section unless the context in which they are used specifically indicates otherwise:

- 1) Best Management Practices (BMPs) A practice, or combination of practices and design criteria that comply with the Michigan Department of Environmental Quality's Guidebook of BMPs for Michigan Watersheds, or equivalent practices and design criteria that accomplish the purposes of this Article (including, but not limited to minimizing stormwater runoff and preventing the discharge of pollutants into stormwater).
- 2) Changes in land use - Any land use change, including, but not limited to, construction, earth change, and redevelopment.
- 3) Construction site stormwater runoff - Stormwater runoff from a development site following an earth change.
- 4) Cut - An earth change, which lowers topography or removes soil.
- 5) Design storm - A precipitation event of a designated amount and/or frequency. Typically used in a regulatory setting to designate required design criteria for stormwater facilities.
- 6) Detention - A system, which is designed to capture stormwater and release it over a given period of time through an outlet structure at a controlled rate.
- 7) Detention basin - A designed facility which stores and detains runoff and releases water at a controlled rate. Size will depend on the design storm event (10-, 25-, 100-year storm). These basins may be dry between runoff events or may be "wet bottom", where a base water level occurs below the elevation of the outlet structure.
- 8) Developed or development - The installation or construction of impervious surfaces on a development site that require, pursuant to state law or local Article, the City approval of a site plan, plat, site condominium, special land use, planned unit development, land division approval, private

road approval or other approvals required for the development of land or the erection of buildings or structures; provided, however, that for purposes of this Article only, developed or development shall not include the actual construction of, or an addition, extension or modification to, an individual single-family or a two-family dwelling.

- 9) Discharge - The rate of flow passing a given point. Expressed as cubic feet per second.
- 10) Disturbed area - The surface of land from which vegetation has been removed and/or subjected to earth moving activities.
- 11) Drainage - The collection, conveyance, or discharge of ground water and/or surface water.
- 12) Drainage area - The contributing watershed, which is expressed in acres or square miles.
- 13) Earth change - Any human activity which removes ground cover, changes the slope or contours of the land, or exposes the soil surface to the actions of wind and rain. Earth change includes, but is not limited to, any excavating, surface grading, filling, landscaping, removal of vegetative roots, or logging.
- 14) Erosion - The process by which the ground surface is worn away by action of wind, water, gravity or a combination thereof.
- 15) Fill - Earth or other materials added to existing topography.
- 16) First flush - The term given to the initial runoff quantity, typically highest in pollutant concentration, which is generally believed to be in the first 1/2 inch of precipitation which washes pollutants off impermeable surfaces.
- 17) Grading - Any stripping, excavating, filling, and stockpiling of soil or any combination thereof and the land in its excavated or filled condition.
- 18) Impervious - The ground condition (e.g. roads, parking lots, sidewalks, and rooftops) which does not allow percolation or infiltration of precipitation. The condition causes water to accumulate on the surface resulting in runoff consisting of essentially 100% of precipitation.
- 19) Infiltration - The percolation and movement of water downward into and through the soil column. The rate of this movement is expressed in inches per hour.
- 20) Non-point source - ". . . sources of pollution which enter surface or groundwaters through widely diffused small increments," (from Federal Clean Water Act, 33 U.S. CFR Part 1344). This type of pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands and underground sources of drinking water.
- 21) Offsite facility - Any portion of a stormwater management system which is located off the development site which it serves.
- 22) 100-year flood - That water occupation adjacent to a waterbody which results from a storm event having a 1percent probability of occurrence in any given year. Thus, a 50-year storm has a two percent probability, a ten-year storm a ten percent probability, etc.
- 23) Ordinary High Water Mark - The point on a streambank, lakeshore, or other waterbody shoreline to which the presence and action of surface water is so continuous as to leave a distinct mark of erosion; destruction or prevention of woody terrestrial vegetation; predominance of aquatic vegetation; or other easily recognized characteristic.
- 24) Peak discharge rate - The maximum rate of stormwater flow from within a drainage area expressed as cubic feet per second.
- 25) Point source - A discharge that is released to the surface waters of the State by a discernible, confined and discrete conveyance, including, but not limited to, a pipe, ditch, channel, tunnel, conduit, well, boat, and concentrated animal feeding facility.
- 26) Practicable - Available and capable of being done after taking into consideration cost, existing technology and logistics.

- 27) Property owner - Any person, firm or corporation having legal or equitable title to property or any person having or exercising care, custody, or control over any property.
- 28) Retention - A system, which is designed to capture stormwater and contain it until it infiltrates the soil or evaporates.
- 29) Retention basin - A stormwater management facility, either natural or manmade, which does not have an outlet, which captures and holds runoff directed into it.
- 30) Runoff - The portion of precipitation which does not infiltrate or percolate into the ground, but rather moves over the land, eventually reaching a waterbody, wetland, or low area.
- 31) Sediment - Any solid particulate matter which has been moved from the site of origin by erosion, is being transported by water, is in suspension in water, or has been deposited in a water body, wetland or floodplain.
- 32) Sheetflow - Overland runoff which moves relatively uniformly over the ground surface rather than being concentrated in a conveyance channel.
- 33) Site - Any tract, lot, or parcel of land or combination of tracts, lots, or parcels, which compose an area proposed for development and/or earth change.
- 34) Soil erosion control - Structures, facilities, barriers, berms, vegetative cover, basins, and/or any other installation, temporary or permanent, which are designed to minimize and prevent erosion.
- 35) Storm drain - A system of open or enclosed conduits and appurtenant structures intended to convey or manage stormwater runoff, ground water and drainage.
- 36) Stormwater facility - Structures, BMP's, areas, or related items, which are used to control, store, receive, infiltrate, or convey runoff.
- 37) Stormwater runoff - The runoff and drainage of precipitation resulting from rainfall, snowmelt or other natural event or process.
- 38) Time of concentration - The time it takes runoff to travel from the furthest portion of the watershed or drainage area to the outlet of the watershed.
- 39) Watershed - The total land area which contributes runoff, or is within such an area, to a common outlet, such as a lake or stream. Also known as the drainage area or catchment.
- 40) Wetland - Land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation and/or aquatic life. Also known as a bog, swamp, marsh, etc. (from § 324.30301 of Michigan Compiled Laws, Part 303 of NREPA, Wetlands Protection). The Michigan Department of Environmental Quality is the authority on the presence and regulatory status of wetlands.

ARTICLE 2 – STORMWATER PERMITS

2.1 Permit Required

- 1) A developer shall not engage in any development without first receiving a stormwater permit from the City of Houghton pursuant to Article 2.3.
- 2) The granting of a stormwater permit shall authorize only such development for which the permit is required, subject to the terms of the permit, and it shall not be deemed to approve other development or other land use activities.

2.2 Planning Commission Review

- 1) If the City of Houghton Planning Commission determines that all required information has not been received, the applicant may request that the matter be tabled, and the City of Houghton Planning Commission may, at its discretion, with or without such a request, table the matter to allow for the submittal of the required information.

- 2) The City of Houghton Planning Commission shall review the stormwater management plan to determine compliance with the conditions contained in Article 2.3.
- 3) The City of Houghton Planning Commission may add conditions for approval of the plan.
- 4) The authority to grant final approval for a stormwater management plan shall be vested with the Houghton City Council for all types of projects except for.

2.3 Conditions of Approval

The Houghton City Council shall grant a stormwater permit, which may impose terms and conditions in accordance with Article 2.10, and which shall be granted only upon compliance with each of the following requirements:

- 1) The developer has submitted a stormwater management plan complying with Article 2.4.
- 2) The drainage plan contains a description of adequate erosion and runoff control methods, satisfying the requirements of Article 2.7, and the developer has obtained a soil erosion permit, if necessary.
- 3) The stormwater management plan conforms with all applicable design and performance standards for stormwater management systems, as set forth in Article 3.
- 4) All stormwater facilities are designed in accordance with the most current BMPs.
- 5) The developer has paid or deposited the stormwater permit review fee(s) pursuant to Article 2.6.
- 6) The developer has paid or posted the applicable financial guarantee pursuant to Article 2.8.
- 7) The developer provides all easements necessary to implement the approved drainage plan and to otherwise comply with this Ordinance including, but not limited to, Article 7.2. All easements shall be acceptable to the City of Houghton in form and substance and shall be recorded with the Houghton County Register of Deeds.
- 8) For commercial and industrial developments, the developer provides the required maintenance agreement for routine, emergency, and long-term maintenance of all stormwater runoff facilities and in compliance with the approved drainage plan and this Ordinance including, but not limited to, Article 7.3. The maintenance agreement shall be acceptable to the City of Houghton in form and substance and shall be recorded with the Houghton County Register of Deeds.

2.4 Stormwater Management Plan Requirements

- 1) General Plan Requirements:
 - a. Through maps, illustrations, reports, and calculations, the stormwater management plan shall display the required information in a clear and logical sequence. The stormwater management plan shall be sufficiently detailed to specify the type, location, and size of all erosion control and stormwater facilities, including calculations.
 - b. The stormwater management plan shall be drawn to a scale of at least one inch equal to 40 feet (1 inch = 40 feet) for property less than three acres and one inch equal to one hundred feet (1 inch = 100 feet) for property three acres or more in size.
- 2) Plan submittal requirements:
 - a. The following plan requirements are in addition to other requirements specified in Articles 3.1 and 3.2. The applicant shall provide a stormwater management plan to the City for review and approval. Upon request by the applicant, or at its own initiative, the Houghton City Council may determine that one or more requirements may not be applicable and may be waived. Applicant shall submit 3 copies of the stormwater management plan, which shall identify and contain all of the following information:

- i. Contact information - The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected. Include information on the zoning classification of the applicant's parcel and all adjacent parcels.
- ii. Location map - A map depicting the location of the development site and all water bodies or municipal stormwater sewer system that will ultimately receive stormwater runoff.
- iii. Topographic base map - The existing and proposed topography of the development site, including the alignment and boundary of the natural drainage courses, with contours having a maximum interval of not greater than two feet. The map shall also show existing surface water drainage (permanent and intermittent) and flow direction, including streams, ponds, culverts, ditches, and wetlands; location of 100-year floodplain, if applicable to the site; current land use including all existing structures; locations of utilities, roads, and easements; Designated natural areas; Any proposed environmental mitigation features.
- iv. Soils information - The site soil information from the Houghton County Soil Survey Map.
- v. Watershed - A map showing the drainage boundary of the proposed development and/or earth change, and each point of discharge from the development and/or earth change.
- vi. Calculations - Stormwater calculations shall be provided in accordance with the design standards referenced in Article 3.
- vii. Site plan drawing - A drawing showing all proposed stormwater facilities with existing and final grades. This map shall also show existing and proposed lot lines, property lines, and structures, parking areas, etc. on the parcel and within 100 feet of the site.
- viii. Outlet and culvert information - The sizes and locations of upstream and downstream culverts serving the major drainage routes flowing into and out of the development site, with arrows indicating the direction of flow to the ultimate receiving water body. Any significant offsite and onsite drainage outlet restrictions other than culverts should be noted on the drainage map. Storm sewer calculations indicating the number of acres, calculated to the nearest tenth of an acre, contributing to each specific inlet/outlet and maximum flow in cubic feet per second shall be stated on the plan. The applicant shall demonstrate that suitable conveyance exists downstream of the development site to receive the stormwater, including easements, if necessary, for such conveyance. If easements do not exist, and cannot be acquired, the applicant shall demonstrate the means of volume controls. Any areas of offsite sheet flow shall be identified.
- ix. Construction plan - An implementation and sequencing plan for construction and inspection of all stormwater facilities, including a schedule of the estimated dates of completing construction of the stormwater facilities shown on the plan.
- x. Sedimentation and erosion control plan - A soil erosion and sedimentation plan for all construction activities. This plan shall provide the effective control of construction site stormwater runoff and sediment track-out onto roadways.
- xi. Construction specifications - All construction specifications for the stormwater facilities and a general summary on a single sheet showing all proposed stormwater facilities, including vegetative BMP's, with drainage easements overlaid onto the overall road and utility plan and drawn to the same scale.
- xii. Maintenance plan - A document in form and substance acceptable to the City for ensuring maintenance of any privately or publicly owned stormwater facilities. The maintenance plan shall include a mandatory association or other enforceable

commitment to provide routine, emergency, and long-term maintenance of the facilities and, in the event that the facilities are not maintained in accordance with the approved stormwater management plan, the maintenance plan shall authorize the City to maintain any onsite stormwater facility as reasonably necessary, at the owner's expense.

- xiii. Firm contact information - Name and signature of the licensed professional engineer who has assisted in the preparation of the stormwater management plan, designed the stormwater facilities, and will inspect the final construction of the stormwater facilities. The submitted plan shall be stamped and signed by the licensed design engineer.
- xiv. Vegetation plan - A drawing, which details the existing vegetation to remain and protective measures to be undertaken during construction.
- xv. Other environmental permits - All other applicable environmental permits shall be acquired for the site prior to construction.
- xvi. Additional Fees - Payment of applicable review fees is required before any review will commence.
- xvii. Phased development plans - Should the applicant plan to subdivide or develop a given area but wishes to begin with only a portion of the total area, the original preliminary plan will include the proposed general layout for the entire area. The first phase of the subdivision will be clearly superimposed upon the overall plan in order to illustrate clearly the method of development and/or earth change that the applicant intends to follow. However, the stormwater management plan shall be submitted for the entire development, with calculations and devices designed for buildout sufficient to demonstrate to the Houghton City Council the feasibility of future phases complying with the standards of this Article.
- xviii. Previously developed sites - For earth changes, development or redevelopment occurring on a previously developed site, an applicant shall be required to include within the stormwater management plan measures for controlling existing stormwater runoff discharges from the site in accordance with the standards of Article 3, or to match existing discharge rates, whichever is less.
- xix. The City has the right to do periodic inspections throughout the construction process.
- xx. Acceptance by the City: Upon satisfactory final inspection the City will accept the facility, and provide a letter of acceptance.

2.5 Approved Plans and Amendments

- 1) Approved plans - Approval of final development plans, site plans, and final preliminary subdivision plats shall not be granted prior to approval of the stormwater management plan. Upon approval of the stormwater management plan, the Mayor, or the Mayor's designee, shall sign two copies thereof. One signed copy shall be made a part of the City's files; and one copy shall be returned to the applicant.
 - a. City Council approval shall expire one year from the date of such approval, unless construction has commenced and proceeds satisfactorily.
- 2) Amendments - Amendments to an approved stormwater management plan may occur only under the following circumstances:
 - a. The holder of an approved plan shall notify the development official of any proposed amendment to such approved plan.
 - b. Minor changes may be approved by the development official upon certification in writing to the Houghton City Council that the proposed revision does not alter the basic

design nor any specified conditions of the plan as agreed upon by the Houghton City Council. The development official shall consider the following to be a minor change:

- i. Any change that does not decrease the effectiveness of approved stormwater facilities.
 - ii. Any change that does not cause an increase in runoff rate and/or volume.
 - iii. Any change deemed to be minor as determined by the Houghton City Council from time to time.
- c. Should the development official determine that the requested modification to the approved plan is not minor, then the applicant shall submit a new plan for review as required by this Article.

2.6 Stormwater Permit Review Fees

- 1) All expenses and costs incurred by the City of Houghton directly associated with processing, reviewing and approving or denying a stormwater permit application shall be paid (or reimbursed) to the City of Houghton from the funds in a separate escrow account established by the developer, as provided in Subsection 2). The City of Houghton may draw funds from a developer's escrow account to reimburse the City of Houghton for out-of-pocket expenses incurred by the City of Houghton relating to the application. Permit fee structure to be developed by City staff .

2.7 Construction Site Runoff Controls

Prior to making any earth change on a development site regulated by this ordinance, the developer shall first obtain a soil erosion permit issued in accordance with Part 91 of Act No. 451 of the Public Acts of 1994, as amended, if one is required. The developer shall install stormwater runoff facilities and shall phase the development activities so as to prevent construction site stormwater runoff and off-site sedimentation.

2.8 Financial Guarantee of Construction of Stormwater Facilities

- 1) The City of Houghton shall not approve a stormwater permit until the developer submits to the City of Houghton, in a form and amount satisfactory to the City of Houghton, a letter of credit or other financial guarantee for the timely and satisfactory construction of all stormwater runoff facilities and site grading in accordance with the approved drainage plan. Upon certification by a registered professional engineer that the stormwater runoff facilities have been completed in accordance with the approved stormwater management plan, the City of Houghton may release the letter of credit, or other financial guarantee subject to final City of Houghton acceptance and approval.
- 2) Except as provided in subsection 3, the amount of the financial guarantee shall be \$_____, unless the City of Houghton determines that a greater amount is appropriate, in which case the basis for such determination shall be provided to the developer in writing. In determining whether an amount greater than \$_____ is appropriate, the City of Houghton shall consider the size and type of the development, the size and type of the on-site stormwater system, and the nature of the off-site stormwater runoff facilities the development will utilize.
- 3) This ordinance shall not be construed or interpreted as relieving a developer of its obligation to pay all costs associated with on-site private stormwater runoff facilities as well as those costs arising from the need to make other drainage improvements in order to reduce a development's impact on a drain consistent with adopted design standards.

2.9 No Change in Approved Facilities

Stormwater runoff facilities, after construction and approval, shall be maintained in good condition, in accordance with the approved drainage plan, and shall not be subsequently altered, revised or replaced except in accordance with the approved drainage plan, or in accordance with approved amendments or revisions in the plan.

2.10 Terms and Conditions of Permits

In granting a stormwater permit, the City of Houghton may impose such terms and conditions as are reasonably necessary to effectuate the purposes of this ordinance. A developer shall comply with such terms and conditions.

ARTICLE 3 – DESIGN AND CONSTRUCTION STANDARDS

3.1 Performance and General Standards

- 1) Responsibility - The City is not responsible for providing drainage facilities on private property for the management of stormwater on the private property. It shall be the responsibility of the property owner to maintain private stormwater facilities serving the property and to prevent or correct the accumulation of debris, which interferes with the drainage or stormwater management function of the system.

All developments and earth changes subject to review under the requirements of this Article shall be designed, constructed, and maintained to control runoff, prevent flooding and protect water quality. The particular facilities and measures required onsite shall reflect the natural features, wetland, and watercourses on the site; the potential for onsite and offsite flooding, water pollution, and erosion; and the size of the site.

- 2) General standards for onsite and offsite stormwater management.
 - a. Stormwater facilities shall be designed to prevent flood hazards and water pollution related to stormwater runoff, soil erosion and channel erosion from the proposed earth change.
 - b. Existing stormwater from upstream and offsite locations shall be conveyed around or through the site, or stored onsite.
 - c. Every stormwater facility shall control the release of stormwater in accordance with the design standards -listed in this Article.
 - d. Unless otherwise approved, stormwater runoff shall be conveyed through swales and vegetated buffer strips so as to decrease runoff velocity, allow for natural infiltration and passive storage, allow suspended sediment particles to settle, and to remove pollutants.
 - e. Alterations to natural drainage patterns shall not increase the rate of runoff, create flooding or water pollution for adjacent or downstream property owners.
 - f. Cutting, filling, and grading shall be minimized and the natural topography of the site shall be preserved to the maximum extent practicable, except where specific findings demonstrate that major alterations will still meet the purposes and requirements of this Article.
 - g. Grading of lands at locations that are adjacent to or near public or private property shall be done in a manner to protect the property from settling, cracking or sustaining other damage.

- h. All development and other earth changes shall be designed, constructed, and completed so that the exposed area of any disturbed land is limited to the shortest possible period of time.
- 3) Stormwater facilities - The types of stormwater facilities are listed in order of preference, with the most desirable listed first. Stormwater storage and/or infiltration facilities, which protect water quality and minimize flooding, shall be designed to meet the standards of this Article. Storage facilities may include, but are not limited to, detention basins, retention basins, infiltration trenches, swales with check dams, bioretention structures and other facilities and/or BMP's proposed by the applicant. It shall be the responsibility of the applicant to demonstrate that all proposed facilities meet the intent, goals, and standards of this Article.
- a. Infiltration facilities - This Article encourages the use of infiltration systems as a part of stormwater management plan design. The following areas and conditions are considered inappropriate for use of stormwater infiltration:
 - i. Fueling and vehicle maintenance areas.
 - ii. Areas with less than 3 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock.
 - iii. Areas with runoff from industrial, commercial and institutional parking lots and roads with less than 5 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock.
 - iv. Areas within 400 feet of a community water system well or within 100 feet of a private well.
 - v. Any area where the soil between the bottom of the infiltration system and seasonal high groundwater or the top of bedrock is a clean sand (consisting of less than 10% fines).

Stormwater management plan designers shall consider the above criteria including soil permeability when designing stormwater infiltration components of a management system. The site developer shall attempt to minimize compaction of soil, which decreases infiltration and groundwater recharge and contributes to increased stormwater runoff.

- b. Stormwater storage facilities - All detention and/or retention basins shall be designed to meet the standards of this Article. The types of basins are listed in order of preference, with the most desirable listed first:
 - i. Wet basins or detention basins with a fixed minimum water elevation between runoff events. Wet basins, which serve to trap soil particles onsite, are preferable to dry basins.
 - ii. Detention basins, which detain the "first flush" (first ½-inch of precipitation) of an event and attenuate its release over an extended period.
 - iii. Extended detention basins, which hold stormwater from a less frequent storm event over an extended period before completely draining to become a dry basin. Dry basins without extended detention shall not be permitted.

3.2 Design and Performance Standards

- 1) Rate of Peak Discharge – By design, stormwater facilities shall be employed to maintain or reduce the peak runoff discharge rate following the same rainfall, to the maximum extent

practicable, as compared to pre-development conditions applicable to the post-construction site.

- 2) Volume of Total Discharge – Where infiltration facilities are appropriate for use according to Article 3.1(3)a, the post-development total runoff volume shall approximate the pre-development total runoff volume following the same rainfall, to the maximum extent practicable, as compared to pre-development conditions applicable to the post-construction site. Where infiltration facilities are not appropriate for use according to this Article, the increased volume of water discharged due to earth changes and/or development of the site shall not create adverse impacts to property owners and watercourses. These adverse impacts may include, but are not limited to flooding, excessive soil saturation, crop damage, erosion, and/or degradation in water quality or habitat.
- 3) Detention and Retention Basin Design - Detention and/or retention basins shall be designed to hold runoff from the largest-sized 24-hour storm event practicable. Basins shall be permanently stabilized to minimize erosion. Detention and/or retention basins shall have an overflow system. Detention and/or retention basins and associated berms and landscaping shall be designed to protect public safety and to be visually attractive. Detention and/or retention basins shall be provided in platted outlots, common areas or open space areas.
- 4) Design Storm Events - The following rainfall totals shall be used when completing runoff calculations for locations within the City of Houghton:
 - a. 2-year, 24-hour Storm = 2.4 inches.
 - b. 25-year, 24-hour Storm = 3.75 inches.
 - c. 100-year, 24-hour Storm = 4.75 inches.
- 5) Runoff Calculations:
 - a. Methods - All stormwater runoff calculations shall be completed using the Soil Conservation Service (SCS) TR-20 methodology, or equivalent methodology. Output from models that utilize TR-20 or equivalent methodologies is also acceptable.
 - b. Submittals – To demonstrate compliance with performance standards indicated in Articles 3.2(2) and 3.2(3) above, calculations must be supplied for, at a minimum, the three storm events listed in 3.2(4).

3.3 Landscaping and Vegetation

- 1) An applicant shall address the following guiding principles and standards:
 - a. Native, natural existing vegetation shall be retained to the maximum extent practicable. Species chosen for site vegetation shall be reviewed to ensure they have not been identified as invasive.
 - b. Native species shall be used for re-vegetation and landscaping to the maximum extent practicable.
 - c. The flood tolerance of proposed species shall be considered, particularly in stormwater management areas and components.
 - d. Water requirements of species proposed in areas other than stormwater management facilities shall be considered, with the goal of reducing their water demand and nutrient requirements to the maximum extent practicable.

- e. The stormwater management components shall be chemical-free zones within the development, with the exception of accepted management techniques for the establishment and maintenance of components associated with biotechnical stormwater control.
- f. Bio-retention areas shall be vegetated with species, which maximize the infiltration, uptake and evapotranspiration of water.

3.4 Buffer Zones

- 1) No building or impervious surface shall be constructed within 50 feet of the ordinary high water mark of a lake, pond or stream with the exception of Portage Lake. The definition of ordinary high water mark is as presented in Article 1.5.
- 2) No building or impervious surface shall be constructed within 50 feet of the delineated boundary of a wetland as defined in Article 1.5.

3.5 Variances

The City Council shall have the authority to interpret this Article and may grant variances to these requirements provided the variances are consistent with the general purpose and intent of the requirements. In addition to these procedures, when variances are requested from the stormwater management system Article, the applicant shall show that stormwater management systems have been provided to the maximum extent feasible with the requirements of this Article.

ARTICLE 4 – ENFORCEMENT

4.1 Violations

A person who violates any provision of this Article is responsible for a municipal civil infraction, subject to payment of a civil fine as set forth in section 42-38 of the Code. Repeat offenses under this Article shall be subject to increased fines as set forth in section 42-38 of the Code.

4.2 Stop Work Order

- 1) Stop work order - Where there is work in progress that causes a violation of any provision of this Article, the City is authorized to issue a stop work order to prevent further or continuing violations. All persons to whom the stop work order is directed, or who are involved in any way with the work or matter described in the stop work order shall fully and promptly comply with the order. The City may also undertake or cause to be undertaken any necessary measures to prevent violations of this Article or to avoid or reduce the effects of noncompliance. The cost of any such protective measures shall be the responsibility of the owner of the property upon which the work is being done and the responsibility of any person carrying out or participating in the work, and such cost shall be a lien upon the property until paid.
- 2) Emergency measures. When emergency measures are necessary to moderate a nuisance, to protect public safety, health and welfare, or to prevent loss of life, injury or damage to property, the City is authorized to carry out or arrange for all such emergency measures. Property owners

shall be responsible for the cost of such measures made necessary as a result of a violation of this Article, and shall promptly reimburse the City for all of such costs. Such costs shall be a lien upon the property until paid.

4.3 Restoration

Any violator of this Article may be required to restore land to its undisturbed condition and/or repair and stabilize damaged areas. In the event that restoration or repairs are not undertaken within a reasonable time after notice, the City may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

ARTICLE 5 – MAINTENANCE

5.1 Responsibility

- 1) Responsibility - Maintenance of stormwater facilities shall be the responsibility of the person or persons holding title to the property. These persons are responsible for the continual operation, maintenance, and repair of stormwater facilities and BMPs in accordance with the provisions of this Article.

For privately maintained stormwater facilities, the maintenance requirements specified in this Article shall be enforced by the City against the owner(s) of the property served by the stormwater facilities.

- 2) Maintenance plan - A maintenance plan, as specified in Article 2, shall include specific maintenance activities for each stormwater facility and any other elements of the approved stormwater management plan. The maintenance plan shall be submitted simultaneously for municipal review with all other required elements of the stormwater management plan.
- 3) Record keeping - Parties responsible for the operation and maintenance of stormwater facilities shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least five years. These records shall be made available to the City during inspection of the facility and at other reasonable times upon request.

All stormwater facilities shall be maintained according to the measures outlined in the approved stormwater management plan. The person(s) or organization(s) responsible for maintenance shall be designated in the plan. Options include:

- a. Property owner's association provided that provisions for financing necessary maintenance are included in deed restrictions or other contractual agreements.
- b. Means of permanent maintenance through agreement with the City of Houghton, or other appropriate governmental agency.

5.2 Access

When any new stormwater facilities are installed on private property, or when any new connection is made between private property and a public drainage control system, the property owner shall grant to the City through an easement the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This access includes the right to enter a property when the City

has reason to believe that a violation of this Article is occurring or has occurred, and to enter when necessary for the abatement of a public nuisance or correction of a violation of this Article.

5.3 Easements

- 1) Easements - The owner shall provide all easements necessary to implement the approved stormwater management plan and maintenance plan and to otherwise comply with this Article in form and substance required by the City and/or any other governmental agency assuming authority, and shall record such easements as directed by the City. The easements shall assure access for proper inspection and maintenance of stormwater facilities in perpetuity and shall provide adequate emergency overland flow-ways. The maintenance plan shall, among other matters, assure access for proper inspection and maintenance of stormwater facilities and adequate emergency overland flow-ways.

Easement widths will be determined by the City and be situated in such a way as to allow maximum maintenance access. In general, easement widths shall conform to the following:

- a. Open channels and watercourses: A minimum of 50 feet total width. Additional width may be required in some cases, including but not limited to: watercourses with floodplains delineated by FEMA; sandy soils, steep slopes, at access points from road crossings.
- b. Open swales (cross lot drainage): minimum of 30 feet total width.
- c. Enclosed storm drains: A minimum of 20 feet will be required, situated in such a way as to allow maximum maintenance access. Additional width will be required in some cases for facility maintenance and repair. These may include but are not limited to, pipe depths exceeding four feet from the top of pipe, sandy soils, and steep slopes.