

1300.0 Stormwater Management Items

1301.0 Drainage Plan Submission Requirements

The applicant shall certify on the drawings required as part of the submission requirements of Section 1000.0 that all clearing, grading, drainage, and construction shall be accomplished in strict conformance with the drainage plan.

In addition to the submission requirements of Section 1000.0 applicants may be required by the Village to submit information necessary to evaluate the environmental characteristics of the property, the potential adverse impacts of the development on water resources both on-site and downstream, and the effectiveness of the proposed drainage plan in managing stormwater runoff.

1302.0 Minimization of Increases in Runoff Volumes and Rates

In the preparation of site design and drainage plans for a development, the applicant shall evaluate and implement site design features that minimize the increase in runoff volumes and rates from the site. The applicant's drainage plan submittal should evaluate and consider site design features that are consistent with the following hierarchy:

1. Preserve natural resource features of the development site (e.g., native woodlands, prairie remnants, wetlands, floodplains and other areas recognized within the Village's Comprehensive Plan);
2. The restoration of wetlands in locations where natural features (e.g., depressional areas, hydric soils, prior converted wetlands) will support such restoration;
3. Preserve existing swales, drainage ways, streams, and depressions;
4. Minimize impervious surfaces on the property, consistent with the needs of the project (e.g., reduce pavement, minimize driveway lengths and width, share driveways, cluster houses);
5. Preserve the natural infiltration characteristics of the site and incorporate designed infiltration devices (e.g., trenches and basins);
6. Attenuate surface runoff by use of open vegetated swales and natural depressions;
7. Provide stormwater detention structures to slow the rate of runoff and reduce runoff pollutants leaving the site; and,
8. Construct storm sewers.

1303.0 Water Quality and Multiple Uses

The drainage system should be designed to minimize adverse water quality impacts downstream and on the property itself. Stormwater management shall incorporate design features to capture stormwater runoff pollutants and promote infiltration. Retention and infiltration of stormwater shall be implemented throughout the property's drainage system to reduce the volume of stormwater runoff and to reduce the quantity of runoff pollutants.

Appropriate Best Management Practices (BMPs) shall be incorporated into the design. Design guidance for BMPs is provided, but not limited to those in *the Village of Homer Glen Water Resource BMP Guidelines*.

The drainage system should incorporate multiple uses where practicable. Uses considered compatible with stormwater management include open space, aesthetics, aquatic habitat, recreation (boating, trails), wetlands and water quality mitigation. The applicant should avoid using portions of the property exclusively for stormwater management.

1304.0 Design Criteria, Standards, and Methods

1. **Release Rates:** the drainage system for a property shall be designed to control the peak rate of discharge from the property for the two-year, 24-hour and 100-year, 24-hour events to levels which will not cause an increase in flooding or channel instability downstream when considered in aggregate with other developed properties and downstream drainage capacities. The peak discharge from events less than or equal to the two-year event shall not be greater than 0.04 cfs per acre of property drained. The peak 100-year discharge shall not be greater than 0.15 cfs per acre of property drained.

Stormwater management shall be designed to maximize infiltration on the site so as to minimize the volume of stormwater runoff from the site. The total volume of water released from the site, exclusive of bypass flows, shall be calculated by an approved hydrograph method listed in Section 1304.0-7 below. The total volume of water leaving the site, calculated as the area under the hydrograph, shall be calculated for the 2-year, 24-hour storm event in both the undeveloped and developed conditions. The volume of runoff is not limited to the 24-hour duration of the storm, but it shall include the entire duration of runoff from the site. The total volume of water leaving the site for a 2-year storm event following development shall be equal to or less than the total volume of water leaving the site in the undeveloped condition. This may be accomplished through application of a permanent pool volume in a basin without, or partially without, an impermeable liner in combination with the infiltration requirements of Section 1309.0. In the event that the applicant deems that the existing soils for the site prevent subsurface infiltration from occurring as intended, it shall be so demonstrated by soil boring and/or soil sample data, hydrologic models and hydraulic calculations. In no event shall the infiltration area be less than specified in Section 1309.0 for purposes of water quality using bioengineered soils, native plantings or other best management practices.

In the event the downstream drainage facilities are inadequate to receive the release rate herein above provided, then the allowable release rate shall be reduced to that rate permitted by the receiving downstream sewers, streams, and channels; additional detention shall be required to store that portion of the runoff exceeding the capacity of the downstream facilities.

2. **Detention Basin Outlet Design**
Backwater on the outlet structure from the downstream drainage system shall be evaluated when designing the outlet.
3. **Maximum Bounce**
The maximum depth of water from design high water level (open restrictor) to normal water level, or outlet invert shall be six feet (6'). This maximum bounce may be adjusted up to 1' higher upon approval of the Village based on related conditions of the site, surrounding or downstream properties, structures or stormwater conveyance systems.

4. Detention Storage Requirements

Design maximum storage to be provided in a detention basin shall be based on the runoff from the 100-year, 24-hour event and reservoir (also called modified Puls or level pool) routing or equal. Detention storage shall be computed using hydrograph methods as described in this section.

5. Detention System Design Selection

Selection of the detention system design shall be based on the following hierarchy:

- A. Bio-Infiltration
- B. Wetland Detention Basin
- C. Wet Detention/Retention
- D. Dry Detention
- E. Underground Detention (commercial only)

The applicant shall first thoroughly investigate the first two preferred detention system designs (bio-infiltration followed by wetland detention). If these designs are found to be impractical, the applicant may then investigate the next detention system alternate. Underground detention systems will only be considered for commercial uses. All systems shall include an infiltration component in accordance with Section 1309.0.

6. Drainage System Design and Evaluation

Storm sewers shall be designed to convey the 10-year storm in a full pipe (non-surcharged) condition. Inlets shall have capacity to allow the inflow of the 10-year storm with no more than three (3) inches of ponding with 50% of the opening blocked. Storm sewer in public right-of-way shall be reinforced concrete pipe conforming to ASTM C76 with O-ring joints conforming to ASTM C443 with sufficient cover per IDOT specifications. Swales shall be designed to carry the 10-year storm without encroachment onto the shoulder of the road or any paved surface. The underlying objective is to provide capacity to pass the 10-year peak flow in the minor drainage system and an overland flow path for flows in excess of the design capacity.

- A. Design Methodologies: Major and minor conveyance systems for tributary areas up to five (5) acres may be designed using the Modified Rational Method. Runoff hydrograph methods as described in Section 1304.0-7 must be used for major drainage system design for all systems with greater than five (5) acres of drainage area and for the design of all detention basins.
- B. Positive Drainage: All areas of the property must be provided an overland flow path that will pass the 100-year flow from onsite and offsite tributary flow areas at a stage at least one foot (1') below the lowest foundation grade in the vicinity of the flow path. Overland flow paths shall be provided drainage easements. Street ponding and flow depths shall not exceed the edge of pavement by six inches (6") with no curb, nor exceed curb height by more than one inch (1") in the 100-year, plugged inlet condition. Rear yard ponding must not exceed twelve inches (12") in the 100-year, plugged inlet condition. An exhibit showing the extent of ponding in a 100-year, plugged inlet event shall be provided as part of the stormwater design calculations. When the 100-year flow path is to be contained within a closed

conduit system, inlets to that system shall be designed for 50% of the inlet flow area blocked.

7. Methods for Generating Runoff Hydrographs

Runoff hydrographs shall be developed incorporating the following assumptions of rainfall amounts and antecedent moisture described in Sections 1304.0-7-A and 1304.0-7-B. The following hydrologic design procedures are considered acceptable for generation of hydrographs: Corps of Engineers HEC-1, Soil and Water Conservation Service TR-20 (and TR-55, subject to rainfall distribution modifications), U.S. EPA's SWMM, and continuous simulation (e.g., HSPF). Other appropriate models may be considered acceptable by the Village.

A. Rainfall

Unless a continuous simulation approach to drainage system hydrology is used, all design rainfall events shall be based on the Illinois State Water Survey's Bulletin 70, Appendix A, Point Frequency Distributions. The first quartile point rainfall distribution shall be used for the design and analysis of conveyance systems with critical durations less than or equal to twelve (12) hours. The third quartile point rainfall distribution shall be used for the design and analysis of detention basins and conveyance system with critical durations greater than twelve (12) and less than or equal to twenty-four (24) hours. The fourth quartile distribution shall be used in the design and analysis of systems with durations greater than twenty-four (24) hours. The first, third, and fourth quartile distributions described by Huff are presented in Table 37 of Bulletin 70. The SCS Type II distribution may be used as an alternate to the Huff distributions.

B. Antecedent Moisture

Computations of runoff hydrograph which do not rely on a continuous accounting of antecedent moisture conditions shall assume a normal antecedent moisture condition (e.g., SCS TR-20 and TR-55 antecedent moisture condition number).

8. Detention Basin Design

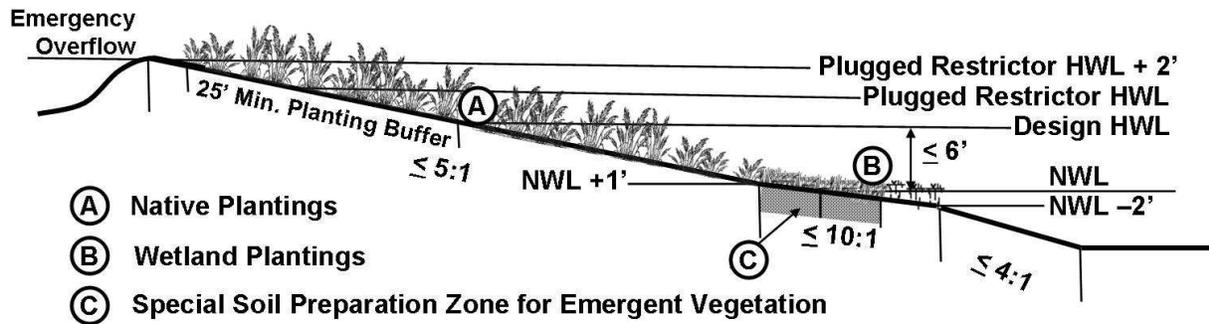
A. Wet Detention Basin Design

Wet detention basins shall be designed to remove stormwater pollutants, to be safe, irregularly shaped, aesthetically pleasing, and as much as feasible to be available for recreational use. A presedimentation basin, inlet / outlet orientation to avoid short-circuiting, and a planting / safety ledge with shallow wetland vegetation to limit shoreline erosion are required elements. They shall have a minimum depth of 8 feet under no less than 25% of the pond surface area to promote fish life.

B. Wet Basin Shoreline Slopes

Upper slopes of detention basins (higher than one foot above normal stage) should be no steeper than 5:1. Slopes flatter than 5:1 are preferred. From one foot above a normal stage to two feet (2') below normal stage the slopes shall be no steeper than 10:1. Below 2' below NWL the slopes shall be no steeper than 4:1.

Typical Detention Pond



Appropriate soil conditions shall be provided in the shoreline zone from one foot above the normal pool stage to at least one foot below the normal pool stage. First, compaction of both subsoil and topsoil shall be minimized (i.e., to less than 275 psi). Where subsoil compaction cannot be avoided, it should be disked to a depth of 6-8 inches with a chisel plow before spreading topsoil. Second, suitable, uncompacted topsoil at a minimum thickness of one foot, shall be spread to provide a suitable growth medium for aquatic plants. Coarse soils with minimal clay content and a high organic content are recommended.

C. Shoreline Vegetation

Water tolerant native vegetation shall be used to landscape the shorelines of wet detention facilities. The selected plants and planting methods shall conform to the soils, hydrology, and water quality condition present in such facilities, with plants being tolerant of highly variable hydrologic conditions and degraded water quality (e.g., high turbidity and salinity content). A critical consideration in site preparation is the provision of an adequate growing medium for new plants. Construction of stormwater facilities typically requires excessive grading, causing resultant soils to become highly disturbed and unsuitable for planting. The planning and sequencing of construction activity shall minimize the negative impacts on soils and provide means for restoring soils following construction. Guidance for the selection of shoreline vegetation is provided in the *Village of Homer Glen Water Resource BMP Guidelines*.

D. Permanent Pool Volume

The minimum permanent pool volume in a wet basin at normal depth shall be equal to the runoff volume from its watershed for the two-year event.

E. Wetland Detention Basin Design

In addition to the other requirements of this Ordinance, wetland basins shall be designed to remove stormwater pollutants, to be safe, to be aesthetically pleasing, and as much as feasible to be available for multiple uses.

F. Wetland Basin Grading

The side slopes of wetland basins (from one foot above the normal pool stage to at least one foot below the normal pool stage) and the basin bottom shall not be steeper than 10 to 1 (horizontal to vertical). Steeper slopes are permitted in settling basins and open water zones near the basin outlet.

Appropriate soil conditions shall be provided in the shoreline zone and basin bottom. First, compaction of both subsoil and topsoil shall be minimized (i.e., to less than 275 psi). Where subsoil compaction cannot be avoided, it should be disked to a depth of 6-8 inches with a chisel plow before spreading topsoil. Second, suitable uncompacted topsoil at a minimum thickness of one foot (1') shall be spread to provide a suitable growth medium for aquatic plants. Coarse soils with minimal clay content and a high organic content are recommended.

As indicated in the guidance for wet basins, soil preparation is critical in shoreline and shallow water zones. Guidance for the selection of wetland vegetation is provided in the *Village of Homer Glen Water Resource BMP Guidelines*.

Upper slopes of detention basins (higher than one foot (1') above normal stage) should be no steeper than 5:1. Slopes flatter than 5:1 are preferred.

G. Wetland Vegetation

Water tolerant native vegetation shall be used to landscape the bottoms (non-open water areas) of wetland detention facilities. The selected plants and planting methods shall conform to the soils, hydrology, and water quality conditions present in such facilities, with plants being tolerant of highly variable hydrologic conditions and degraded water quality (e.g., high turbidity and salinity content). Plant selection should conform to the guidance in the *Native Plant Guide for Streams and Stormwater Facilities in Northeastern Illinois* (NRCS et al, 1998), which is hereby adopted by reference.

Native vegetation is required for side slopes (higher than one foot above normal stage) of all wet and wetland detention facilities to a point two vertical feet (2') above the high water level during the plugged restrictor condition.

H. Stilling/Sedimentation Basins

Wetland detention basins shall be constructed with sediment basins or forebays at all major inlets to the basins. The volume of the basins should be at least 500 cubic feet per acre of impervious surface in the drainage area. Side slopes below one foot (1') of depth should be no steeper than 5 to 1 (horizontal to vertical) and basin depth should be at least three feet (3') and designed to allow access for sediment removal equipment.

I. Inlet and Outlet Orientation

To the extent feasible, the distance between detention inlets and outlets shall be maximized. If possible, they should be at opposite ends of the basin. There shall be no low flow bypass between the inlet and outlet and paved low flow channels shall not be used.

Maximizing the distance between inlets and outlets will prevent the short-circuiting of flows through a basin. Short-circuiting is counterproductive to the removal of stormwater pollutants. Short-circuiting can be avoided by designing elongated basins (ideal length: width ratio of at least 3:1), or by the use of baffles or berms in the basin bottom. Low flows and the "first flush" of storm runoff often contain the most concentrated pollutants, therefore it is critical that all flows be routed through a sedimentation basin to provide opportunities for effective pollutant removal. (See NIPC Model Stormwater Drainage & Detention Ordinance Pages 11 – 24.)

- J. **Minimum Detention Outlet Size**
Pipe outlets or orifice plates controlling discharge shall have a minimum diameter of two and one half inches (2 ½"). If this minimum orifice size permits release rates greater than those specified in this section, and regional detention is not a practical alternative, alternative outlet design shall be utilized that incorporates self-cleaning flow restrictors.
- K. **Dry Bottom Basin Design**
Dry bottom ponds shall have a minimum slope of 2% and maximum side slope of 4:1. There shall be no low flow bypass between the inlet and outlet. However, infiltration trenches, wet channels with soil stabilization fabric, or other permanent erosion and silt control measures are suitable erosion control techniques. They shall be irregularly shaped and aesthetically pleasing, landscaped and shall include native plantings.
- L. **Underground Basin Design**
Design of underground facilities shall include measures to collect sediment and floatable debris, designed with regards to access and maintenance. If approved infiltration calculations reveal that the 2 year-24 hour storm will be fully infiltrated within 24 hours, then fifty percent (50%) of the volume of stone void space shall be allowed as detention volume. All designs of underground facilities shall be signed and sealed by an Illinois Licensed Structural Engineer.
- M. **Detention Area Retaining Walls**
The use of retaining walls as part of any detention system shall be discouraged. However, as a design entrance feature or within commercial areas they may be considered by the Village subject to the following features which must be clearly documented in any request for a detention area retaining wall:
- i. Public Safety Provisions;
 - ii. Architectural Features;
 - iii. Habitat Features;
 - iv. Maintenance plan/funding provisions;
 - v. Maximum height of four feet (4'); and
 - vi. Any wall shall be designed and sealed by an Illinois Structural Engineer
- N. **Setback from public right of ways**
Detention facilities shall not be located within a distance of ten feet (10') plus one and one-half (1.5) times the depth of the detention facility from any public right-of-way.
- Any earthen berm shall not be constructed such that the toe of such berm will be nearer than ten feet (10') to any public right-of-way.
- O. The storage facilities shall be accessible and easily maintained. The top width of berm shall be a minimum of 5' but shall be increased to a minimum of 10' within the access route to the outlet control structure.

- P. Storage facilities shall facilitate sedimentation and catchment of floating material. Unless specifically approved by the Village, concrete lined low-flow ditches shall not be used in detention basins.
- Q. Storage facilities shall be designed such that the existing pre-development peak runoff rate from the 100-year critical duration rainfall will not be exceeded assuming the primary restrictor is blocked.

1305.0 Detention in Flood Fringe Areas

1. Storage facilities located within the regulatory floodplain are discouraged, but shall:
 - A. Conform to all applicable requirements specified in this Ordinance; and
 - B. Store the required amount of site runoff to meet the release rate requirement under all stream flow and backwater conditions in the receiving stream up to the 10-year flood elevation. However, the Village may approve designs which can be shown by detailed hydrologic and hydraulic analysis to provide a net watershed benefit not otherwise realized by strict application of this requirement.

2. **Compensatory Storage**

The placement of a detention basin in a flood fringe area shall require compensatory storage of at least 1.5 times the volume below the base flood elevation occupied by the detention basin at design HWL including any berms.

Excavations for compensatory storage along watercourses shall be opposite or adjacent to the area occupied by detention. All floodplain storage lost below the ten-year flood elevation shall be replaced below the ten-year flood elevation. All floodplain storage lost above the existing ten-year flood elevation shall be replaced above the proposed ten-year flood elevation. All compensatory storage excavations shall be constructed to drain freely and openly to the watercourse.

3. Detention in Floodways is prohibited.
4. On-Stream Detention is prohibited.

1306.0 Protection of Wetlands and Depressional Storage Areas

The function of existing on-site depressional storage shall be preserved for both on-site and off-site tributary flows in addition to required detention. When depressional storage is removed it must be compensated for in the site runoff storage facility at no less than a 1 to 1 ratio. This requirement is in addition to the site runoff storage required in this Ordinance. The Village may allow the function of depressional storage to be preserved if the applicant performs detailed pre- and post-project hydrologic and hydraulic modeling to identify the effect of the depressional storage on discharges over a range of rainfall frequencies. Wetlands and other depressional storage areas shall be protected from damaging modifications and adverse changes in runoff quality and quantity associated with land developments. In addition to the other requirements of this Ordinance, the following requirements shall be met for all developments whose drainage flows into wetlands and depressional storage areas (as appropriate).

1. Detention in Wetlands and Depressional Storage Areas

Existing wetlands shall not be modified for the purposes of storm water detention unless it is demonstrated that the existing wetland is low in quality and the proposed modifications will improve its habitat and ability to perform beneficial functions. Existing storage and release rate characteristics of wetlands and other depressional storage areas shall be maintained and the volume of detention storage provided to meet the requirements of this section shall be in addition to this existing storage.

Low quality wetlands are those that have been substantially disturbed. This disturbance is usually reflected in a low diversity of habitat and the presence of only insensitive and/or invasive plant species (e.g., a monoculture of cattails). Certain modifications of low quality wetlands, such as the limited excavation of open water areas, may actually enhance their value. It is important, however, that the storage functions of wetlands and depressional storage areas be preserved, in addition to meeting the detention requirements of this Ordinance.

2. Sediment Control

Existing wetlands shall be protected during construction by appropriate soil erosion and sediment control measures and shall not be filled.

3. Alteration of Drainage Patterns

Site drainage patterns shall not be altered to substantially decrease or increase the existing area tributary to the wetland.

4. Detention/Sedimentation

All runoff from the development shall be routed through a preliminary detention/sedimentation basin designed to capture the two-year, 24-hour event and hold it for at least twenty-four (24) hours before being discharged to the wetland. This basin shall be constructed before property grading begins. In addition, the drainage hierarchy defined in Section 1302.0 should be followed to minimize runoff volumes and rates being discharged to the wetland.

5. Vegetated Buffer Strip

A vegetated buffer strip of at least seventy-five feet (75') in width, containing native plant species, shall be maintained or restored around the periphery of existing or constructed wetlands which are not defined as wetland detention areas. Detention ponds require a twenty-five foot (25') buffer. This buffer width may be reduced to a minimum of 1/2 of the buffer width required, upon approval of the Village, provided that the total buffer area required is achieved adjacent to the area being buffered. The permitting and/or consultation process with any other agency such as the IDNR, USACE or U.S. Fish & Wildlife Service may override the ability to average buffer areas upon approval of the Village.

The native vegetation strip shall extend landward a minimum of 25 feet from the ordinary high water mark of a man made wet detention/retention pond.

6. Subsurface Drainage (Drain Tiles)

The applicant shall submit a subsurface drainage inventory with the final engineering plans. The inventory shall locate existing farm and storm drainage tiles by means of slit trenching and other appropriate methods performed by a qualified subsurface drainage consultant. All existing drain tile lines damaged during the investigation shall be repaired and functional.

Agricultural drainage systems shall be maintained so as to convey the expected flows for good drainage practices. The existing agricultural surface drainage systems shall not be enlarged unless such enlargement is consistent with all other sections of this ordinance.

- A. The applicant shall provide a topographical boundary map locating these lines showing:
 - i. Location of each slit trench and identified to correspond with the tile investigation report and field staked at no less than 50 foot intervals;
 - ii. Location of each drain tile with a flow direction arrow, tile size and any connection to adjoining properties; a summary of the tile investigation report showing trench identification number, tile size, material and quality, percentage of the tile filled with water, percentage of restrictions caused by sitting, depth of ground cover, and soil texture at grade.
 - iii. Name, address and phone number of person or firm conducting tile location investigation.
- B. Information collected during the drainage investigation shall be used to design and develop a stormwater management system that will provide drainage that is appropriate for the development and connecting tile lines on adjoining properties.
- C. Stormwater systems shall properly incorporate and be compatible with existing subsurface and surface drainage systems including agricultural systems. Designs shall not cause damage to the existing drainage system(s) or the existing adjacent or tributary land including those with agricultural uses. The following principles and requirements shall be observed in the design:
 - i. Off-Site Outfall: Existing downstream agricultural subsurface systems shall not be utilized for the outfall of any stormwater system. Existing downstream

- surface drainage systems shall be evaluated with regard to their capacity and capability to properly convey low flow groundwater and site runoff storage facility release without damage to downstream structures and land use on the adjacent property. If the existing outfall drainage systems prove to be inadequate it will be necessary to modify the existing systems or construct new systems which will not conflict with the existing systems and will not impact the existing agricultural land use.
- ii. On-Site: Agricultural drainage systems shall be located and evaluated on-site. All existing on-site agricultural drain tile not serving a beneficial use shall be abandoned by trench removal prior to other development and recorded on record plans. If any existing drain tiles continue to upland watersheds the developer must maintain drainage service during construction until new sewers can be installed for a permanent connection.
 - iii. Off-Site Tributary: Existing drainage systems shall be evaluated with regard to existing capabilities and reasonable future expansion capacities. All existing tributary drain tiles shall be incorporated into the new conduits including observation structures located at the property limits, shall provide a free flow discharge and shall not allow surface runoff to enter the system.
 - iv. New roadway construction shall preserve existing sub-surface systems within the right-of-way. Inspection wells shall be placed at the right-of-way (ROW) and tiles found to not be flowing between inspection wells at the end of the construction shall be replaced.
- D. Existing subsurface drains shall be excavated and removed to a point not less than ten feet (10') from any proposed structure within the development prior to the excavation of any foundation, or as a component of mass site grading, whichever is earlier and applicable to the proposed development.

1307.0 Extended Detention Requirement

The requirements of this section will apply only when an existing agricultural land use is downstream of and adjacent to a site runoff storage facility outlet. The runoff from not less than a 0.75-inch rainfall event over the hydraulically connected impervious area of the new development shall be stored below the elevation of the primary gravity outlet (extended detention) of the site runoff storage facility. The facility may be designed to allow for evapotranspiration or infiltration of this volume and shall not be conveyed through a direct positive connection to downstream areas.

The hydraulically connected impervious area used in the calculation of required extended detention volume may be reduced by the Village if the soils are prepared to maximize infiltration and deep rooted grasses or other plants selected for their ability to promote infiltration or water absorption are planted in areas appropriately dedicated. The reduction in hydraulically connected impervious area used in the calculation shall be equal to the area of the development meeting the above soils/native planting requirement.

Subsurface drainage systems may be designed as a component of the extended detention portion of the detention basin to assist in infiltration in accordance with the following criteria:

1. The extended detention volume shall be discharged at a rate no greater than that required to empty the calculated extended detention volume within 5 days of the storm event;
2. No subsurface drainage pipe shall be located within ten feet (10') of drainage pipes directly connected to the detention basin;
3. For purposes of meeting the maximum subsurface drainage discharge requirements, flow control orifices and weirs may be used;
4. All design extended detention volume shall be provided above the seasonal high ground water table or the invert elevation of the groundwater control system;
5. Farm field tile shall not be considered a subsurface drainage system; and
6. Design infiltration from extended detention facilities will be counted toward meeting the infiltration requirements for the site.

1308.0 Street, Parking Lot, Culvert, and Property Drainage

1. Streets

If streets are to be used as part of the minor or major drainage system, ponding depths shall not exceed the edge of pavement by six inches (6") with no curb, nor exceed curb height by more than one inch (1") and shall not remain flooded for more than eight (8) hours for any event less than or equal to the 100-year event. An exhibit showing the extent of ponding in a 100-year, plugged inlet event shall be provided as part of the stormwater design calculations.

2. Parking Lots

The maximum storm water ponding depth in any parking area shall not exceed six inches (6") in a plugged inlet condition. As parking lot detention provides little or no water quality benefits, it is, therefore, not allowed. An exhibit showing the extent of ponding in a 100-year, plugged inlet event shall be provided as part of the stormwater design calculations.

3. Culvert Road and Driveway Crossings

Sizing of culvert crossings shall consider entrance and exit losses as well as tail water conditions on the culvert.

4. Property Drainage

Drainage from a property within a development for which a stormwater management plan exists shall not cross property lines, except under the following conditions and restrictions:

- A. The drainage is contained within a drainage easement;
- B. The drainage is consistent with the approved overall grading plan of the development; and
- C. Any downspout or sump pump discharge line must outlet:
 - i. At least two feet from the foundation of the structure being drained;
 - ii. At least two feet from any adjacent property line; and
 - iii. Perpendicular to any adjacent property line and/or along the flow line of the drainage easement.

1309.0 Infiltration Requirements

1. Applicability

BMPs shall be followed during design, installation and maintenance to infiltrate runoff to the maximum extent practicable, except for:

- A. Storage and loading areas from industrial properties, although rooftops and parking areas shall be infiltrated;
- B. Fueling and vehicle maintenance areas;
- C. Areas with less than two feet (2') separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock;
- D. Areas with runoff from industrial, commercial and institutional parking lots and roads and residential arterial roads with less than four feet (4') separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock;
- E. Areas within four-hundred feet (400') of a community water system well or within one-hundred feet (100') of a private well except for residential infiltration devices capturing less than one (1) acre of tributary acreage; and
- F. Any area where the soil does not exhibit one of the following characteristics between the bottom of the infiltration system and the seasonal high groundwater and top of bedrock:
 - i. At least a 2-foot soil layer with 20% fines or greater; or
 - ii. At least a 4-foot soil layer with 10% fines or greater.

This exclusion does not apply where the soil medium within the infiltration system provides an equivalent level of protection and does not prohibit infiltration of roof runoff.

2. Exemptions

The following are not required to meet the requirements of this section:

- A. Areas where the infiltration rate of the soil is less than 0.4 inches/hour measured at the bottom of the infiltration system.
- B. Parking areas and access roads less than 5,000 square feet for commercial and industrial development.
- C. Roads in commercial, industrial and institutional land uses and arterial residential roads.

3. Residential Requirements

For residential developments one of the following shall be met:

- A. Infiltrate sufficient runoff volume so that the post development infiltration volume shall be at least 90% of the predevelopment infiltration volume, based on an average annual rainfall.

However, when designing appropriate infiltration systems to meet this requirement, no more than 1% of the project site is required as an effective infiltration area.

- B. Infiltrate 25% of the post development runoff volume from the 2-year, 24-hour design storm with a Type II distribution.

Separate curve numbers for pervious and impervious surfaces shall be used to calculate runoff volumes and not composite curve numbers as defined in TR-55. However, when designing appropriate infiltration systems to meet this requirement, no more than 1% of the project site is required as an effective infiltration area

Design infiltration from extended detention facilities will be counted toward meeting the infiltration requirements for the site.

4. Nonresidential Requirements

For nonresidential development, including commercial, industrial and institutional development, one of the following shall be met:

- A. Infiltrate sufficient runoff volume from rooftop and parking areas so that the post development infiltration volume shall be at least 60% of the predevelopment infiltration volume, based on an average annual rainfall over those areas.

However, when designing appropriate infiltration systems to meet this requirement, no more than 2% of the project site is required as an effective infiltration area.

- B. Infiltrate 10% of the post development runoff volume from rooftop and parking areas for the 2-year, 24-hour design storm with a Type II distribution.

Separate curve numbers for pervious and impervious surfaces shall be used to calculate runoff volumes and not composite curve numbers as defined in TR-55. However, when designing appropriate infiltration systems to meet this requirement, no more than 2% of the project site is required as an effective infiltration area.

Pretreatment: Before infiltrating runoff, pretreatment shall be required for parking lot runoff and for runoff from new road construction in commercial, industrial and institutional areas that will enter an infiltration system. The pretreatment shall be designed to protect the infiltration system from clogging prior to scheduled maintenance and to protect groundwater quality. Pretreatment options may include, but are not limited to, oil/ grease separation, sedimentation, bio-infiltration, filtration, swales and/or filter strips.

Design infiltration from extended detention facilities will be counted toward meeting the infiltration requirements for the site.

5. Soils

To effectively reduce runoff volumes, infiltration practices including basins, trenches, and porous pavement should be located on soils in hydrologic soil groups "A" or "B" as designated by the U.S. Soil and Water Conservation District when present within the project area. A sediment settling basin shall be provided to remove coarse sediment from stormwater flows before they reach infiltration basins or trenches.

6. Bypass During Construction

While under construction, and prior to the establishment of permanent soil stabilization practices, an upstream stormwater bypass system shall be constructed and maintained to

prevent siltation and plugging of infiltration BMPs. During this period, temporary stormwater controls shall be in place to prevent peak discharges in excess of those permitted of this Ordinance.

1. Vegetated Filter Strips and Swales

To effectively filter stormwater pollutants and promote infiltration of runoff, sites should be designed to maximize the use of vegetated filter strips and swales. Runoff from impervious surfaces should be directed onto filter strips and swales before being routed to a storm sewer or detention basin. Native vegetation should be used for landscaping of filter strips and swales.

1310.0 Safety Consideration

The drainage system, components, and especially all detention basins, shall be designed to protect the safety of any children or adults coming into contact with the system during or following runoff events.

1. Side Slopes

The side slopes of detention basins at 100-year capacity shall be as level as practicable to prevent accidental falls into the basin and for stability and ease of maintenance.

2. Velocity

Velocities throughout the surface drainage system shall be controlled to safe levels taking into consideration rates and depths of flow.

3. Overflow Structures

All stormwater detention basins shall be provided with an overflow structure capable of safely passing excess flows at a stage at least two feet (2') below the lowest top of foundation grade in the vicinity of the detention basin, including walk-outs and/or look-outs. The design flow rate of the overflow structure shall be equivalent to the 100-year inflow rate.

4. Inlet/Outlet Pipe Protection

The inlet and outlet pipes from all stormwater basins shall be designed to minimize the velocity of flow as it enters and exits the basin. Inlet and outlet pipes shall be supplied with sloped grating per IDOT Standards.

1311.0 Maintenance Considerations

The water resource management system shall be designed to minimize and facilitate maintenance. Detention basins shall be provided with alternate outflows which can be used to completely drain the pool for sediment removal. Pumping may be considered if drainage by gravity is not feasible. Pre-sedimentation basins shall be included, for localizing sediment deposition and removal. Access for heavy equipment shall be provided. On detention basin side slopes steeper than 5:1, excelsior blankets or similar erosion devices shall be used during construction to minimize erosion.

Long term maintenance shall adhere to a Village approved maintenance, monitoring and funding plan and shall include as a minimum: a) The routine removal of excessive trash or debris and the removal of obstructions from the basin outlet structure; b) Periodic removal of accumulated sediment (e.g., from swales, forebays, and settling basins) also shall be done to maintain the function and aesthetics of stormwater facilities. At a minimum, sediment shall be removed from forebays and sediment basins whenever one foot (1') or more of sediment has accumulated in the basin bottom; c) Maintenance of shorelines, water edges and vegetation; and d) Routine inspections in accordance with Section 1103.0.

Naturally landscaped areas of detention and drainage facilities may be maintained via controlled burning every one to three years, as needed to control invasive weeds. Where controlled burning is not feasible, a program of mowing and application of selective herbicides shall be performed as needed. Mowing should be performed on all turfed areas on a regular basis to maintain grass height below six inches (6").

1312.0 Natural Condition, Soils

The recommendations of the Will County Soil Manual must be followed with respect to the land plan and construction details of proposed subdivisions. Soil borings must be made to confirm the soils map information included in the USDA, NRCS Soil Survey of Will County, Illinois. Representative soil borings must be taken to a depth at least five feet (5') below the lowest proposed foundation, two feet (2') below the lowest proposed sewer, or the point of refusal. At least one boring must be made per ten acres (10) or more if necessary to confirm the Soil Survey.

1313.0 Accommodating Flows from Upstream Tributary Areas

Stormwater runoff from areas tributary to the property shall be considered in the design of the property's drainage system. Whenever practicable, flows from upstream areas that are not to be detained should be routed around the basin being provided for the site being developed.

1. Upstream Areas Not Meeting Ordinance Requirements

When there are areas not meeting the storage and release rates of this Ordinance, tributary to the applicant's property, regionalized detention on the applicant's property shall be explored by the applicant. The following steps shall be followed:

- A. The applicant shall compute the storage volume needed for his property and the tributary area using the release rates and procedures described in Section 1304.0;
- B. Areas tributary to the applicant's property, not meeting the storage and release rate requirements of this Ordinance, shall be identified; and

- C. Using the areas determined in Section 1313.0-1-B above plus the applicant's property area, total storage needed for the combined properties shall be computed.

Allowable release rates shall be computed using the combined property areas. Storage shall be computed as described in Section 1304.0. If tributary areas are not developed, a reasonable fully developed land cover, based on local zoning, shall be assumed for the purposes of computing storage.

Once the necessary combined storage is computed, the Village may require the applicant to implement regionalized detention to accommodate upstream flows. If regional storage is selected by the Village, then the design produced in Section 1314.0 shall be implemented. Procedures for regional detention shall be as outlined in Section 1314.0. If regional storage is rejected by the Village, the applicant shall bypass all tributary area flows around the applicant's basin whenever practicable.

2. Upstream Areas Meeting Ordinance Requirements

When there are areas, tributary to the applicant's property, which meet the storage and release rate requirements of this Ordinance, the upstream flows shall be bypassed around the applicant's detention basin, or be routed through the applicant's detention basin if this is the only practicable alternative. However, the 2-year and 100-year restrictors shall not be oversized to pass offsite flows. Storage needed for the applicant's property shall still be computed as described in Section 1313.1.A. The applicant must demonstrate that at no time will the runoff rate from the applicant's property exceed the allowable release rates for his/her property alone due to the combined release rate.

1314.0 Regional Detention

In instances where regional benefits and economies of scale can be achieved, the Village encourages adjacent properties to utilize a common regional detention basin. Developers of all single-family residential developments under five (5) acres in size and all other developments under one (1) acre in size shall consider the use of regional detention for stormwater management of their development. In these instances, the developer shall submit to the Village a study of the feasibility of regional detention for the local watershed. Upon review of this study, the Village may, at its discretion, require the implementation and/or use of regional detention facilities for the local watershed.

For the purposes of establishing regional detention facilities, the local watershed is defined as all lands that drain to a point downstream of the subject property. This point shall be the most upstream point to which the entire subject property drains.

Where regional detention facilities are required but have not been implemented, stormwater detention facilities shall be designed and constructed in conjunction with the initial development within the local watershed. Facilities shall be designed to serve the proposed development and all adjacent lands within the local watershed. The design of regional detention facilities shall meet all requirements of this Ordinance. The regional detention facilities shall be operational prior to the development of any lands tributary to the detention facility.

Subsequent to the construction of regional detention facilities, all development within the local watershed shall be required to utilize the regional detention facilities. The developers of lands tributary to a regional detention facility shall design and perform such modifications to the regional detention facility as may be necessary to bring it into compliance with the requirements of this Ordinance.

Property owners of lands tributary to regional detention facilities are encouraged to participate in cost sharing for the design and implementation of the regional detention. Where a cost sharing agreement cannot be reached or where there are no plans for development of other lands within the local drainage basin, the Village may:

1. Establish a recapture agreement to the developer for the regional drainage basin. The cost for land, design and construction of the regional detention shall be submitted by the initial developer and reviewed by the Village. Upon approval of the cost by the Village, a recapture agreement shall be prepared to allocate among the parcels benefited by the detention facilities the costs on a pro-rata basis according to the amount of land in the local watershed, exclusive of the detention facilities themselves;
2. Fund the construction portion of the regional detention system for future recapture to the Village, or;

Should every attempt at establishing either 1 or 2 above fail, reduce or eliminate the requirement for regional detention.

1315.0 Early Completion of Detention Facilities

Where detention, retention, or depressional storage areas are to be used as part of the drainage system for a property, they shall be constructed as the first element of the initial earthwork program. Any eroded sediment captured in these facilities shall be removed by the applicant before project completion in order to maintain the design volume of the facilities.

1316.0 Maintenance Responsibility

Maintenance of water resource management systems located on private property shall be the responsibility of the owner of that property. Maintenance includes mowing and/or burning, selective weed control, clearing debris, and repairing damaged components to ensure that the stormwater treatment capacity of the facility is maintained and shall include routine inspections and reports to the Village as required in Section 1103.

Before a building permit is obtained from the Village, the applicant shall execute a maintenance agreement with the Village guaranteeing that the applicant and all future owners of the property will maintain its stormwater drainage system. The maintenance agreement shall also specifically authorize representatives of the Village to enter onto the property for the purpose of inspections and maintenance of the drainage system. Such agreement shall be recorded with the Recorder of Deeds of Will County. The maintenance agreement shall include a schedule for regular maintenance of each aspect of the property's stormwater drainage system and shall provide for access to the system for inspection by the Village. The maintenance agreement shall also stipulate that if the Village notifies the property owner in writing of maintenance problems that require correction, the property owner shall make such corrections within thirty (30) calendar days of such notification. If the corrections are not made within this time period the Village may

have the necessary work completed and assess the cost to the property owner. The maintenance agreement shall also set forth the property owner's consent to the creation of a special service area hereinafter described.

The property owner and developer shall, prior to the issuance of a building permit, agree to and cooperate with the Village in the establishment of a special service area ("SSA") for the property to be utilized as a backup mechanism for the care, maintenance, renewal and replacement of the stormwater drainage facilities. In the event a property is developed into more than one lot or parcel which require one or more stormwater drainage facilities, the property owner and developer shall establish through a declaration of covenants on the property a property owner's association which shall have the primary responsibility for providing for the care, maintenance, renewal and replacement of the stormwater drainage facilities. Further, the property owner and developer shall in such covenants consent to the creation of an SSA on behalf of the property owner, developer, subsequent grantees, and their successors in interest. If at any time such property owner or property owner's association fails to perform such care, maintenance, renewal or replacement of the stormwater drainage facilities, then the Village shall have the right, but not the obligation, to undertake such care, maintenance, renewal or replacement and utilize the SSA to provide sufficient funds to pay the costs of such care, maintenance, renewal or replacement undertaken by the Village. The SSA shall provide for the authority of the Village to levy up to twenty cents (\$0.20) per \$100.00 of assessed valuation to fund the payment of the aforesaid costs and expenses. Notwithstanding the foregoing, the special tax roll shall not be levied hereunder, and the SSA shall be "dormant" and shall take effect only if the Village finds that the property owner or the property owner's association has failed to conduct such care, maintenance, renewal or replacement.

The Village has the option of requiring a bond to be filed by the property owner for maintenance of the storm water drainage system.

1317.0 Fee-In-Lieu of Detention

The developer may request in writing that a fee-in-lieu of detention be approved by the Village provided that all of the following are demonstrated to the sole satisfaction of the Village:

1. The drainage plan will not increase flooding, and
2. The drainage plan provides a net benefit in water quality compared to the existing development.
3. The fee shall be computed by the Village for each acre-foot of detention required and approved in accordance with the procedures of this ordinance.

