

CHAPTER 9 STORMWATER DRAINAGE AND DETENTION

The District has adopted the following Northeastern Illinois Planning Commission (NIPC) model ordinance regarding stormwater drainage and detention but will defer jurisdiction to the appropriate municipality or county if their ordinances are the same or more stringent.

- 9.01 Authority and Purpose
- 9.02 Definitions
- 9.03 Applicability
- 9.04 Drainage Plan Submittal Requirements
- 9.05 Basic Drainage Plan
- 9.06 Advanced Drainage Plan
- 9.07 Minimization of Increases in Runoff Volumes and Rates
- 9.08 Water Quality and Multiple Uses
- 9.09 Design Criteria, Standards and Methods
- 9.10 Accommodating Flows from Upstream Tributary Areas
- 9.11 Early Completion of Detention Facilities
- 9.12 Maintenance Responsibility
- 9.13 Administration
- 9.14 Penalties

9.01 AUTHORITY AND PURPOSE

This Chapter 9 is enacted pursuant to the powers granted to the District by the Illinois Compiled Statutes.

The purpose of this Chapter 9 is to diminish threats to public health, safety and welfare caused by runoff of excessive stormwater from new development and redevelopment. This excessive stormwater could result in the inundation of damageable properties, the erosion and destabilization of downstream channels, and the pollution of valuable stream and lake resources. The cause of increases in stormwater runoff quantity and rate and impairment of quality is the development and improvement of land and as such this section regulates these activities to prevent adverse impacts.

This Chapter 9 is adopted to accomplish the following objectives:

1. To assure that new development does not increase the drainage or flood hazards to others, or create unstable conditions susceptible to erosion;
2. To protect new buildings and major improvements to buildings from flood damage due to increased stormwater runoff;
3. To protect human life and health from the hazards of increased flooding on a watershed basis;

4. To lessen the burden on the taxpayer for flood control projects, repairs to flood-damaged public facilities and utilities, correction of channel erosion problems, and flood rescue and relief operations caused by increased stormwater runoff quantities from new development;
5. To protect, conserve and promote the orderly development of land and water resources;
6. To preserve the natural hydrologic and hydraulic functions of watercourses and floodplains and to protect water quality and aquatic habitats;
7. To preserve the natural characteristics of stream corridors in order to moderate flood and stormwater impacts, improve water quality, reduce soil erosion, protect aquatic and riparian habitat, provide recreational opportunities, provide aesthetic benefits and enhance community and economic development.

9.02 DEFINITIONS

In addition to those terms defined in Appendix A of this Code, certain terms used in this Chapter 9 are defined as follows:

Adverse Impacts: Any deleterious impact on water resources or wetlands affecting their beneficial uses including recreation, aesthetics, aquatic habitat, quality and quantity.

Applicant: Any person, firm or governmental agency who executes the necessary forms to procure official approval of a development or permit to carry out construction of a development from the Village.

Base Flood Elevation: The elevation at all locations delineating the level of flooding resulting from the 100-year frequency flood event.

Best Management Practice (BMP): A measure used to control the adverse stormwater related effects of development. BMPs include structural devices (e.g., swales, filter strips, infiltration trenches and detention basins) designed to remove pollutants, reduce runoff rates and volumes and protect aquatic habitats. BMPs also include non-structural approaches, such as public education efforts to prevent the dumping of household chemicals into storm drains. *1999-97-42*

Bypass Flows: Stormwater runoff from upstream properties tributary to a property's drainage system but not under its control.

Channel: Any river, stream, creek, brook, branch, natural or artificial depression, ponded area, flowage, slough, ditch, conduit, culvert, gully, ravine, wash, or natural or manmade drainage way, which has a definite bed and bank or shoreline, in or into which surface or groundwater flows, either perennially or intermittently.

Channel Modification: Alteration of a channel by changing the physical dimensions or materials of its bed or banks. Channel modification includes damming, riprapping (or other armoring), widening, deepening, straightening, relocating, lining and significant removal of bottom or woody rooted vegetation. Channel modification does not include the clearing of debris or removal of trash.

Compensatory Storage: An artificially excavated, hydraulically equivalent volume of storage within the floodplain used to balance the loss of natural flood storage capacity when fill or structures are placed within the floodplain.

Conduit: Any channel, pipe, sewer or culvert used for the conveyance or movement of water, whether open or closed.

Detention Basin: A facility constructed or modified to provide for the temporary storage of stormwater runoff and the controlled release by gravity of this runoff at a prescribed rate during and after a flood or storm.

Detention Time: The mean residence time of stormwater in a detention basin.

Development: Any man-made change to real estate, including:

1. Preparation of a plat of subdivision;
2. Construction, reconstruction or placement of a building or any addition to a building;
3. Installation of a manufactured home on a site, preparing a site for a manufactured home, or installing a travel trailer on a site for more than 180 days;
4. Construction of roads, bridges or similar projects;
5. Redevelopment of a site;
9. Filling, dredging, grading, clearing, excavating, paving or other non-agricultural alterations of the ground surface;
7. Storage of materials or deposit of solid or liquid waste;
8. Any other activity that might alter the magnitude, frequency, deviation, direction or velocity of stormwater flows from a property.

Drainage Plan: A plan, including engineering drawings and supporting calculations, which describes the existing stormwater drainage system and environmental features, as well as the drainage system and environmental features which are proposed after development of a property.

Dry Basin: A detention basin designed to drain completely after temporary storage of storm-water flows and to normally be dry over the majority of its bottom area.

Erosion: The general process whereby earth is removed by flowing water or wave action.

Excess Stormwater Run-off: The volume and rate of flow of stormwater discharged from an urbanized drainage area which is or will be in excess of that volume and rate which pertained before urbanization.

Floodplain: That land adjacent to a body of water with ground surface elevations at or below the base flood or the 100-year frequency flood elevation. The floodplain is also known as the Special Flood Hazard Area (SFHA).

Flood Fringe: That portion of the floodplain outside of the regulatory floodway.

Floodway: The channel and that portion of the floodplain adjacent to a stream or watercourse which is needed to store and convey the anticipated existing and future 100-year frequency flood discharge with no more than a 0.1 foot increase in stage due to any loss of flood conveyance or storage and no more than a ten percent increase in velocities.

Hydrograph: A graph showing for a given location on a stream or conduit, the flow rate with respect to time.

Infiltration: The passage or movement of water into the soil surfaces.

Major Drainage System: That portion of a drainage system needed to store and convey flows beyond the capacity of the minor drainage system.

Minor Drainage System: That portion of a drainage system designed for the convenience of the public. It consists of street gutters, storm sewers, small open channels and swales and, where manmade, is usually designed to handle the 10-year runoff event or less.

Mitigation: Mitigation includes those measures necessary to minimize the negative effects which stormwater drainage and development activities might have on the public health, safety and welfare. Examples of mitigation include compensatory storage, soil erosion and sedimentation control, and channel restoration.

Natural: Conditions resulting from physical, chemical and biological processes without intervention by man.

Office: Office of Water Resources (OWR), Illinois Department of Natural Resources (IDNR).

100-Year Event: A rainfall, runoff or flood event having a one percent chance of occurring in any given year.

Peak Flow: The maximum rate of flow of water at a given point in a channel or conduit.

Positive Drainage: Provision for overland paths for all areas of a property including depression-al areas that may also be drained by storm sewer.

Property: A parcel of real estate.

Regulatory Floodway: The channel, including on-stream lakes, and that portion of the flood plain adjacent to a stream or watercourse as designated by OWR, which is needed to store and convey the existing and anticipated future 100-year frequency flood discharge with no more than a 0.1 foot increase in stage due to the loss of flood conveyance or storage, and no more than a 10 percent increase in velocities. The regulatory floodways are designated for Crystal Creek, Woods Creek and Woods Creek Tributary, Kishwaukee Creek and Kishwaukee Creek Tributaries, and on the Flood Boundary and Floodway Map prepared by FEMA (or Department of Housing and Urban Development) and dated May 19, 1997. The regulatory floodways from those parts of unincorporated McHenry County that are within the extra territorial jurisdiction of the District that may be annexed into the District are designated for Crystal Creek, Woods Creek and Woods Creek Tributary and Kishwaukee Creek (south) on the Flood Boundary and Floodway maps prepared by FEMA (or Department of Housing and Urban Development) and dated May 19, 1997. To locate the regulatory floodway boundary on site the regulatory floodway boundary should be scaled off the regulatory floodway map and located on a site plan, using reference marks common to both maps. Where interpretation is needed to determine the exact location of the regulatory floodway boundary, the Office should be contacted for the interpretation.

Retention Basin: A facility designed to completely retain a specified amount of stormwater runoff without release except by means of evaporation, infiltration, emergency bypass or pumping.

Sedimentation: The process that deposits soils, debris, and other materials either on other ground surfaces or in bodies of water or stormwater drainage systems.

Stormwater Drainage System: All means, natural or man-made, used for conducting stormwater to, through or from a drainage area to the point of final outlet from a property. The stormwater drainage system includes but is not limited to any of the following: conduits and appurtenance features, canals, channels, ditches, streams, culverts, streets, storm sewers, detention basins, swales and pumping stations.

Stormwater Runoff: The waters derived from melting snow or rain falling within a tributary drainage basin which are in excess of the infiltration capacity of the soils of that basin, which flow over the surface of the ground or are collected in channels or conduits.

Storm Sewer: A closed conduit for conveying collected stormwater.

Time of Concentration: The elapsed time for stormwater to flow from the most hydraulically remote point in a drainage basin to a particular point of interest in that watershed.

Tributary Watershed: All of the land surface area that contributes runoff to a given point.

Two-year Event: A runoff, rainfall, or flood event having a fifty percent chance of occurring in any given year.

Wet Basin: A detention basin designed to maintain a permanent pool of water after the temporary storage of stormwater runoff.

9.03 APPLICABILITY

This Chapter 9 shall apply to all development in the District.

9.04 DRAINAGE PLAN SUBMITTAL REQUIREMENTS

Each applicant shall submit the following information, depending on development size, to ensure that the provisions of this Chapter 9 are met. The submittal shall include sufficient information 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. The applicant shall certify on the drawings that all clearing, grading, drainage and construction shall be accomplished in strict conformance with the drainage plan. The following information shall be submitted for both existing and proposed property conditions.

Properties smaller than 10 acres shall submit only the Basic Drainage Plan called for in Section 9.05. Properties larger than 10 acres shall comply with the submittal requirements of both the Basic Drainage Plan and the Advanced Drainage Plan of Section 9.06.

9.05 BASIC DRAINAGE PLAN

The following information is required in a basic drainage plan:

1. Topographic Map: A topographic survey of the property at one-foot contours under existing and proposed conditions, and areas upstream and downstream, necessary to determine off-site impacts of the proposed drainage plan. The map shall be keyed to a consistent datum specified by the District.
2. Drainage System: Mapping and descriptions, where relevant, of existing and proposed drainage system features of the property and immediate vicinity including:
 - A. The banks and centerline of streams and channels;
 - B. Shoreline of lakes, ponds and detention basins;

- C. Farm drains and tiles;
 - D. Sub-watershed boundaries within the property;
 - E. Watershed soils classifications;
 - F. The property's location within the larger watershed;
 - G. Location, size and slope of stormwater conduits and drainage swales;
 - H. Sanitary or combined sewers;
 - I. Depressional storage areas;
 - J. Delineation of upstream and downstream drainage features and watersheds which might be affected by the development;
 - K. Detention facilities;
 - L. Roads and streets and associated stormwater inlets;
 - M. Base flood elevation and regulatory floodway where identified for the property; and
 - N. Basis of design for the final drainage network components.
3. Environmental Features: A depiction of environmental features of the property and immediate vicinity including the following:
- A. The limits of wetland areas;
 - B. Any designated natural areas; and
 - C. Any proposed environmental mitigation features.

9.06 **ADVANCED DRAINAGE PLAN**

The same information as required in Section 9.05 is required for properties larger than 10 acres along with the following additional information for the minor drainage system's design runoff event and the 100-year runoff event of critical duration:

- 1. Elevations and maps of 100-year flooding;
- 2. Cross-section data for open channel flow paths and designated overland flow paths;

3. Direction of storm flows;
4. Flow rates and velocities at representative points in the drainage system; and
5. A statement by the design engineer of the drainage system's provisions for handling events greater than the 100-year runoff.

9.07 MINIMIZATION OF INCREASES IN RUNOFF VOLUMES AND RATES

In the selection of a drainage plan for a development, the applicant shall evaluate and implement, where practicable, site design features which minimize the increase in runoff volumes and rates from the site. The applicant's drainage plan submittal shall include evaluations of site design features which are consistent with the following hierarchy:

1. Minimize impervious surfaces on the property, consistent with the needs of the project;
2. Attenuate flows by use of open vegetated swales and natural depressions and preserve existing natural stream channels;
3. Infiltrate runoff on-site;
4. Provide stormwater retention structures;
5. Provide stormwater detention structures; and
9. Construct storm sewers.

9.08 WATER QUALITY AND MULTIPLE USES

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

9.09 DESIGN CRITERIA, STANDARDS AND METHODS

A. Release Rates: The drainage system for a property shall be designed to control the peak rate of discharge from the property for the 2-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 2-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 0.05 CFS per acre^e of property drained.

B. Detention Basin Outlet Design: Backwater on the outlet structure from the downstream drainage system shall be evaluated when designing the outlet.

C. Detention Storage Requirements: The 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 pools or level pool) routing or equal. Detention storage shall be computed using hydrograph methods as described in this Section 9.09.

D. Drainage System Design and Evaluation: The following criteria should be used in evaluating and designing the drainage system. The underlying objective is to provide capacity to pass the 10-year peak flow in the minor drainage system and an overload flow path for flows in excess of the design capacity.

1. Design Methodologies: Major and minor conveyance systems for areas up to 10 acres may be designed using the rational formula. The rational formula may also be used in sizing the minor drainage system for larger sites. Runoff hydrograph methods as described in Section 9.09-A must be used for major drainage system design for all systems with greater than 10 acres of drainage area and for the design of all detention basins.
2. Positive Drainage: Whenever practicable, all areas of the property must be provided an overland flow path that will pass the 100-year flow at a stage at least 1 foot below the lowest foundation grade in the vicinity of the flow path. Overland flow paths designed to handle flows in excess of the minor drainage system capacity shall be provided drainage easements. Street ponding and flow depths shall not exceed curb heights by more than one inch.

E. Methods for Generating Runoff Hydrographs: Runoff hydrographs shall be developed incorporating the following assumptions of rainfall amounts and antecedent moisture:

1. 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. 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 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 12 and less than or equal to 24 hours. The fourth quartile distribution shall be

¹ This is a modification of the NIPC model ordinance.

used in the design and analysis of systems with durations greater than 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.

2. Antecedent Moisture: Computations of runoff hydrographs which do not rely on a continuous accounting of antecedent moisture conditions shall assume a conservative wet antecedent moisture condition as a minimum.

F. Wet Detention Basin Design: Wet detention basins shall be designed to remove stormwater pollutants, to be safe, to be aesthetically pleasing, and as much as feasible to be available for recreational use.

1. Wet Basin Depths: Wet basins shall be at least three feet deep, excluding near shore banks and safety ledges. If fish habitat is to be provided they shall be at least 10 feet deep over 25 percent of the bottom area to prevent winter freeze out.
2. Wet Basin Shoreline Slopes: The side slopes of wet basins at the normal pool elevation shall not be steeper than 5 to 1 (horizontal to vertical).
3. Permanent Pool Volume: The permanent pool volume in a wet basin at normal depth shall be equal to the runoff volume from its watershed for the 2-year event.
4. 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.

G. Wetland and Dry Detention Basin Design: In addition to the other requirements of this Chapter 9, wetland and dry 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.

1. Wetland and Dry Basin Drainage: Wetland and dry basins shall be designed so the portion of their bottom area which is intended to be dry shall have standing water no longer than 72 hours for all runoff events less than the 100-year event. Under drains directed to the outlet control may be used to accomplish this requirement.
2. Velocity Dissipation: Velocity dissipation measures shall be incorporated into dry basin designs to minimize erosion at inlets and outlets and to minimize the resuspension of pollutants.

3. 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.

H. Minimum Detention Outlet Size: Where a single pipe outlet or orifice plate is to be used to control discharge, it shall have a minimum diameter of four inches. If this minimum orifice size permits release rates greater than those specified in this Section 9.09, and regional detention is not a practical alternative, alternative outlet designs shall be utilized which incorporate self-cleaning flow restrictors.

I. Detention in Floodplains: The placement of detention basins within the floodplain is strongly discouraged because of questions about their reliable operation during flood events. However, the stormwater detention requirements of this Chapter 9 may be fulfilled by providing detention storage within flood fringe areas on the project site provided the following provisions are met.

1. Detention in Flood Fringe Areas: The placement of a detention basin in a flood fringe area shall require compensatory storage for 1.5 times the volume below the base flood elevation occupied by the detention basin including any berms. The release from the detention storage provided shall still be controlled consistent with the requirements of this section. The applicant shall demonstrate its operation for all stream flow and floodplain backwater conditions. Excavations for compensatory storage along watercourses shall be opposite or adjacent to the area occupied by detention. All floodplain storage lost below the 10-year flood elevation shall be replaced below the 10-year flood elevation. All floodplain storage lost above the existing 10-year flood elevation shall be replaced above the proposed 10-year flood elevation. All compensatory storage excavations shall be constructed to drain freely and openly to the watercourse.
2. Detention in Floodways: Detention basins shall be placed in the floodway only in accordance with Section 9.09-J.
3. On-Stream Detention: On-stream detention basins are discouraged but allowable if they provide regional public benefits and if they meet the other provisions of this Chapter 9 with respect to water quality and control of the 2-year and 100-year, 24-hour events from the property. Further criteria are presented in Section 9.10 herein. If on-stream detention is used for watersheds larger than one square mile, it is recommended that the applicant use dynamic modeling to demonstrate that the design will not increase stage for any properties upstream or downstream of the property. Also, impoundment of the stream as part of on-stream detention:

- a. Shall not prevent the migration of indigenous fish species, which require access to upstream areas as part of their life cycle, such as for spawning;
- b. Shall not cause or contribute to the degradation of water quality or stream aquatic habitat;
- c. Shall include a design calling for gradual bank slopes, appropriate bank stabilization measures and a presedimentation basin;
- d. Shall not involve any stream channelization or the filling of wetlands;
- e. Shall require the implementation of an effective nonpoint source management program throughout the upstream watershed;
- f. Shall not occur downstream of a wastewater discharge; and
- g. Shall comply with 92 Illinois Administrative Code Parts 702 and 708.

J. Drainage into Wetlands: 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 Chapter 9, the following requirements shall be met for all developments whose drainage flows into wetlands:

- 1. Detention in Wetlands: Existing wetlands shall be modified for the purposes of stormwater detention unless it is demonstrated that the existing wetland is low in quality and the proposed modifications will maintain or improve its habitat and ability to perform beneficial functions. Existing storage and release rate characteristics of wetland and other depressional storage areas shall be maintained and the volume of detention storage provided to meet the requirements of this Section 9.09 shall be in addition to this existing storage.
- 2. Sediment Control: The existing wetland 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 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 9.07 should be followed to minimize runoff volumes and rates being discharged to the wetland.

5. **Vegetated Buffer Strip:** A buffer strip of at least 25 feet in width, preferably vegetated with native plant species, shall be maintained or restored around the periphery of the wetland.

L. **Street, Parking Lot and Culvert Drainage:**

1. **Streets:** If streets are to be used as part of the minor or major drainage system, ponding depths shall not exceed curb heights by more than one inch and shall not remain flooded for more than eight hours for any event less than or equal to the 100-year event.
2. **Parking Lots:** The maximum stormwater ponding depth in any parking area shall not exceed six inches for more than four hours.
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.

M. **Infiltration Practices:** 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 Conservation Service. Infiltration basins and trenches designed to recharge groundwater shall not be located within 75 feet of a water supply well or a building foundation. A sediment settling basin shall be provided to remove coarse sediment from stormwater flows before they reach infiltration basins or trenches. Stormwater shall not be allowed to stand more than 72 hours over 80 percent of a dry basin's bottom area for the maximum design event to be ex-filtrated. The bottom of infiltration facilities shall be a minimum of four feet above seasonally high groundwater and bedrock.

N. **Safety Considerations:** The drainage system components, especially all detention basins, shall be designed to protect the safety of any children or adults coming in contact with the system during runoff events.

1. **Side Slopes:** The side slopes of all 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. Side slopes of detention basins and open channels shall not be steeper than 3 to 1 (horizontal to vertical).
2. **Safety Ledge:** All wet detention basins shall have a level safety ledge at least four feet in width (2.5 to 3) feet below the normal water depth.

4. Velocity: Velocities throughout the surface drainage system shall be controlled to safe levels taking into consideration rates and depths of flow.
5. Overflow Structures: All stormwater detention basins shall be provided with an overflow structure capable of safely passing excess flows at a stage at least one foot below the lowest foundation grade in the vicinity of the detention basin. The design flow rate of the overflow structure shall be equivalent to the 100-year inflow rate.

O. Maintenance Considerations: The stormwater drainage system shall be designed to minimize and facilitate maintenance. Turfed side slopes shall be designed to allow lawn mowing equipment to easily negotiate them. Wet 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.) Presedimentation basins shall be included, where feasible, for localizing sediment deposition and removal. Access for heavy equipment shall be provided.

9.10 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 Requirements: When there are areas not meeting the storage and release rates of this Chapter 9, 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 using the release rates of Section 9.09, the applicant's property area and the procedures described in Section 9.09 herein.
 - B. Areas tributary to the applicant's property, not meeting the storage and release rate requirements of this Chapter 9 shall be identified.
 - C. Using the areas determined in paragraph 1B of Section 9.10 herein 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 pursuant to Section 9.09 herein. 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 District may choose to pay for oversizing the applicant's detention basin to accommodate the regional flows. The applicant's responsibility will be limited to the storage for his property as computed in paragraph 1a of Section 9.10. If regional storage is selected by the District, then the design produced in paragraph 1c of Section 9.10 herein shall be implemented. If regional storage is rejected by the District, the applicant shall bypass all tributary area flows around the applicant's basin whenever practicable. If the applicant must route upstream flows through his basin and the upstream areas exceed one square mile in size, the applicant must meet the provisions of Section 9.09-I-3 herein for on-stream basins.

2. Upstream Areas Meeting Requirements: When there are areas which meet the storage and release rate requirements of this Chapter 9, tributary to the applicant's property, 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. Storage needed for the applicant's property shall be computed as described in paragraph 1c in Section 9.10. However, if the District decides to route tributary area flows through an applicant's basin, the final design stormwater releases shall be based on the combined total of the applicant's property plus tributary areas. It must be shown that at no time will the runoff rate from the applicant's property exceed the allowable release rate for his/her property alone.

9.11 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.

9.12 MAINTENANCE RESPONSIBILITY

Maintenance of stormwater drainage facilities located on private property shall be the responsibility of the property owner. Before a permit is obtained from the District the applicant shall execute a maintenance agreement with the District guaranteeing that the applicant and all future property owners will maintain its stormwater drainage system. The maintenance agreement shall also specifically authorize representatives of the District 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. 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 authorized personnel of the District. The maintenance agreement shall also stipulate that if the District Manager notifies the property owner in writing of maintenance problems which require correction, the property owner shall make such corrections within 30 calendar days of such notification. If the corrections are not made within this time period the District may have the necessary work completed and assess the cost to the property owner.

The District has the option of requiring a bond to be filed by the property owner for maintenance of the stormwater drainage system.

9.13 ADMINISTRATION

A. Inspections:

1. **Inspections During Construction:** General site grading shall not begin until the District Engineer has certified in writing to the applicant that any necessary detention facilities are in place and operational. The District Engineer or his representative will also conduct periodic inspections of the work in progress to be certain that the drainage system is being built as designed. If any violations of the provisions or requirements of this Chapter 9 are noted during such inspections, the District shall notify the property owner in writing of the items needing correction. The property owner shall have 10 calendar days to make such corrections unless given a specific extension of time in writing by the District.

Failure to complete such corrections within the specified time period shall constitute a violation of this Chapter 9.

2. **Final Inspection:** Upon notification by the applicant that the drainage system is completed, the District Engineer or his representative shall conduct a final inspection. If the drainage system is found to contain deficiencies which require correction the District Engineer or his representative shall notify the property owner of the necessary corrections. The property owner shall correct such deficiencies within 10 calendar days unless given a specific extension of time in writing by the District Engineer. Failure to make necessary corrections within the specified time period shall constitute a violation of this ordinance. Upon finding that the drainage system meets the provisions and requirements of this Chapter 9 the District shall issue in writing a notice of drainage system completion to the property owner.
3. **Routine Inspections:** All privately owned drainage systems shall be inspected by representatives of the District not less often than once per year. A written report shall be filed of the results of any inspection and a copy sent to the property owner detailing any problems which need correction.

B. **Enforcement:** The administration and enforcement of this Chapter 9 shall be the responsibility of the Board of Trustees or their representatives.

C. **Appeals:** All appeals to the Manager's decisions regarding the interpretation of this Chapter 9 shall be heard by the Board of Trustees.

9.14 PENALTIES

Any person convicted of violating any of the provisions or requirements of this Chapter 9 shall be guilty of a misdemeanor and shall be subject to a fine of not more than \$1,000 or be imprisoned for not more than 14 days. Each day the violation continues shall be considered a separate offense.