Chapter Six

STORMWATER DETENTION DESIGN STANDARDS FOR PEAK FLOW CONTROL

Detention/Retention Facilities shall be constructed to temporarily detain the stormwater runoff that exceeds the maximum peak release rate authorized by the Ordinance or these Technical Standards. The required volume of storage provided in these basins, together with such storage as may be authorized in other on-site facilities, shall be sufficient to control excess runoff from the 2-year, 10-year or 100-year storm as explained below in Section "B.". Detention/Retention Facilities shall be constructed to provide adequate capacity to allow for sediment accumulation resulting from development and to permit the Facility to function for reasonable periods between cleanings.

The following shall govern the design of any Detention/Retention Facilities with respect to the detention of stormwater runoff for peak flow control.

A. Acceptable Detention/Retention Facilities

The increased stormwater runoff resulting from a proposed development shall be detained on-site by the provisions of appropriate above- or below-ground wet bottom or dry bottom Detention/Retention Facilities, parking lots, or other acceptable techniques.

B. Allowable Release Rates

1. General Release Rates

Control devices shall limit the stormwater discharge such that the post-developed release rate does not exceed the pre-development discharge rate.

Should the site impact more than one drainage area and the complexity of the site and reasonable configuration of the design and discharge, while not exceeding pre-development discharge level, causes slight increase in the discharge within the overall watershed, so long as the applicant can show no negative impact to the watershed, downstream of the discharge point, the increase within a single drainage area shall be acceptable.

For sites where the pre-developed area has more than one (1) outlet, the release rate should be computed based on pre-developed discharge to each outlet point. The computed release rate for each outlet point shall not be exceeded at the respective outlet point even if the post developed conditions would involve a different arrangement of outlet points.

2. Management of Off-site Runoff

Runoff from all upstream tributary areas (off-site land areas) may be bypassed around the Detention/Retention facility without attenuation. Unless the Detention/Retention Facility is being designed as a regional detention facility and therefore all off-site runoff to the Detention/Retention Facility will be detained, the primary outlet structure shall be sized and the invert elevation of the emergency overflow weir determined according to the on-site runoff only.

3. Downstream Restrictions

Immediate downstream channel or storm sewer system capacity should be evaluated and, if warranted, the design may take such capacity into consideration when determining overall Detention/Retention Facility capacity.

C. General Detention/Retention Facility Design Requirements

1. The design shall ensure that a minimum 90% of the original detention capacity is restored within 24 hours from the start of the design 100-year storm.

2. The 100-year elevation of stormwater Detention/Retention Facilities shall be distant by not less than 25 feet from any building or structure to be occupied. The top of bank for all Detention/Retention Facilities shall be at least one foot above the 100-year ponding elevation (except for emergency spillway); this is commonly referred to as "freeboard". The Lowest Adjacent Grade (including walkout basement floor elevation) for all residential, commercial, or industrial buildings, within the designed watershed contributing to the Detention/Retention Facility, shall be set a minimum of 2 feet above the 100-year pond elevation or 2 feet above the emergency overflow weir elevation, whichever is higher. In addition to the Lowest Adjacent Grade requirements, any basement floor must be at least a foot above the normal water level of any wet-bottom Detention/Retention Facility or the local groundwater table, whichever is higher, to avoid the overuse of sump pumps and frequent flooding of the basement.

3. No Detention/Retention Facility or other water storage area, permanent or temporary, shall be constructed within a utility easement or within 20 feet of any high voltage electric line.

4. Slopes no steeper than 3 horizontal to 1 vertical (3:1) for safety, erosion control, stability, and ease of maintenance shall be permitted above normal pooling level, except where the Drainage Facility is tying into or connecting with other Drainage Facilities.

5. Storm drain pipes discharging into a wet bottom Detention/Retention Facility shall not be submerged below the normal pool elevation.

6. Unless specifically required by the CCDB, the decision to use fencing around a Detention/Retention Facility is left to the owner or the developer. Recommendations contained within this document do not relieve the applicant and owner/developer from the responsibility of taking all necessary steps to ensure public safety with regards to a Detention/Retention facility.

7. Outlet control structures shall be designed to operate as simply as possible and shall require little or no maintenance and/or attention for proper operation. For maintenance purposes, if the discharge is into a water body, the outlet from the Detention/Retention Facility shall be a minimum of 0.5 foot above the normal water level of the receiving water body.

   For above ground facilities, if an outlet control structure includes an orifice to restrict the flow rate, such orifice shall be no less than 6 inches in diameter, even if the 6-inch diameter orifice results in a discharge that exceeds the predetermined maximum authorized peak flow release rates. However, note that the sizing of the pond must still be based on the more restrictive maximum allowable release rate.

8. Emergency overflow facilities such as a weir or spillway shall provide for the release of exceptional storm runoff or in emergency conditions should the normal discharge devices become totally or partially inoperative. The overflow facility shall be of such design that its operation is automatic and does not require manual attention.

   Emergency overflow facilities shall be designed to convey, an amount equal to the 100-year design storm event runoff from the entire contributing watershed draining to the Detention/Retention Facility, assuming post-development condition on-site and existing condition off-site. The length of the weir is to be determined using the weir equation, with the overflow weir control elevation at the Detention/Retention Facility's 100-year elevation (Detention/Retention Facility is assumed full to the overflow weir control elevation), discharge equal to the peak 100-year inflow, and the maximum head being the difference between the weir control elevation and the top of the bank.

   The emergency overflow routing from the emergency overflow facility to an adequate receiving system must be positive (by gravity), located either within a Common Area or easement, and shown on the construction plans and on the plat. **No flow-limiting encroachments into the emergency overflow will be permitted.** It must be sized to accommodate the design flow of the Detention/Retention Facility's emergency overflow weir. Fifteen feet on each side of the centerline of this emergency overflow route shall be designated as permanent drainage easement. No fences or landscaping can be constructed within the drainage easement areas. The lowest adjacent grade of all residential, commercial, or industrial buildings along this emergency overflow route shall be set a minimum of 2 feet above the 100 year hydraulic grade line

along the route, calculated based on the Detention/Retention Facility's emergency overflow weir design discharge.

9. Grass or other suitable vegetative cover shall be provided along the banks of the Detention/Retention Facility. Vegetative cover around Detention/Retention Facilities should be maintained as appropriate.

10. Debris and trash removal and other necessary maintenance shall be performed on a regular basis to assure continued operation in conformance to design.

11. All Drainage Facilities must be located in a dedicated drainage easement or dedicated public right-of-way and be accessible by an ingress/egress easement to a public way. Unless waived by CCDB, any Detention/Retention Facility, assumed full to the 100-year water surface elevation or the emergency overflow weir elevation, whichever is higher, shall be placed within a common area either platted or legally described and recorded as a perpetual stormwater easement. A minimum of 15 feet horizontally from the top of bank of the facility, or the 100-year pool if no defined top of bank is present, shall be dedicated as permanent stormwater easement if the above-noted boundary of the common area does not extend that far.

12. Anti-Clog Features: Detention/Retention Facility outlet structures with orifices of 8 inches or less require anti-clog devices acceptable to the CCDB.

13. The Detention/Retention Facility shall be constructed prior to any other earth moving or land disturbing activities taking place and must be designed to function as a sediment basin through the construction period. The Detention/Retention Facility design must be checked for capacity due to additional runoff generated by disturbed site conditions. No construction trash or debris shall be allowed to be placed within a Detention/Retention Facility permanent pool. The project performance sureties will not be released until sediment has been cleaned out of the Detention/Retention Facility and elevations and grades have been reestablished as noted in the accepted plans.

D. Additional Requirements for Wet-Bottom Facility Design

Where part of a Detention/Retention Facility will contain a permanent pool of water, all the items required for detention storage shall apply. Also, a controlled positive outlet will be required to maintain the design water level in the wet bottom facility and provide required detention storage above the design water level. However, the following additional conditions shall apply:

1. Unless waived by the CCDB, all wet Detention/Retention Facilities should be constructed in as natural a shape (footprint) as possible. The Detention/Retention Facility shall either have a safety ledge 6 inches below normal pool or a native vegetative bank to create a 10 foot wide riparian buffer.

All Detention/Retention Facility slopes above normal pool elevation shall be 3:1 (horizontal to vertical) or flatter. Detention/Retention Facility slopes below normal pool elevation shall be constructed at a maximum slope of 2H:1V.

2. If a retaining wall is used below the normal pool of a wet bottom Detention/Retention Facility, the wall shall have either steps or a ladder incorporated into the construction at the center of the wall span.

3. Periodic maintenance is required in lakes to control weed and larval growth.

4. If the facility is being located near an airport, a minimum horizontal separation distance between the airport property and the Detention/Retention Facility will need to be provided in accordance to Federal Aviation Administration (FAA) advisory Circulars.

E. Additional Requirements for Dry-Bottom Detention/Retention Facility Design

In addition to general design requirements, Detention/Retention Facility that will not contain a permanent pool of water shall comply with the following requirements:

1. Provisions shall be incorporated into Drainage Facilities for complete interior drainage of dry bottom Drainage Facilities, including the provisions of natural grades to outlet structures, longitudinal and transverse grades to perimeter Drainage Facility. If the longitudinal slope of the swale at the bottom of the Drainage Facility is less than 1.1%, a paved concrete swale as approved by the CCDB shall be required. Unless waived by CCDB, minimum slope on concrete swales shall be 0.5%.

F. Parking Lot Storage

Paved parking lots may be designed to provide temporary detention storage of storm water directly from the parking area, but are not appropriate for storing large volumes. Ponding should, in general, be confined to those positions of the parking lots farthest from the area served. Ponding areas must not conflict with handicapped parking and access routes. Such ponding areas should be exposed to sunlight in winter months to minimize icing. Storage depth must be limited so as not to conflict with parking lot use. Any Detention/Retention Facility utilizing a parking lot must take resurfacing and other parking lot maintenance activities into consideration during design.

G. Joint Development of Control Systems

Stormwater control systems may be planned and constructed jointly by two or more developers as long as compliance with the Ordinance or these Technical Standards is maintained.

H. Diffused Outlets

When the allowable runoff is released in an area that is susceptible to flooding or erosion, the developer may be required to construct appropriate storm drains through such area to avert increased flood hazard caused by the concentration of allowable runoff at one point instead of the natural overland distribution. The requirement of diffused outlet drains shall be at the discretion of the CCDB.

I. IDNR Requirements

Any construction in the floodway must satisfy IDNR permit requirements.

J. Maintenance

The routine maintenance of Detention/Retention Facilities (i.e. trash pickup, aeration, weed control, sediment removal etc.) is the responsibility of the owner, developer, or the Homeowners' Association, as shall be set forth in the Long Term Maintenance Agreement. In the event the responsible person or entity fails to perform the maintenance duty, the CCDB may perform the required maintenance and shall have the right to assess each lot served by the Drainage Facility in the subdivision a proportionate amount of the associated costs. If necessary, a notice of lien shall be filed against the affected lots. The lien shall be enforced in the same manner as a mortgage lien under Indiana law and, therefore, shall include reimbursement of attorney's fees, title expenses, interest, and costs of collection.

Chapter Seven

CONSTRUCTION SITES STORMWATER POLLUTION PREVENTION STANDARDS

The pollution prevention standards set forth in this Chapter shall be addressed in the Stormwater Pollution Prevention Plan ("SWPPP"), as it pertains to the MS4 Construction Stormwater General Permit.

A. EROSION AND SEDIMENT CONTROL REQUIREMENTS

In calculating the total area of land disturbance, for the purposes of determining applicability of this section to a project, the following guidelines should be used:

1. Off-site construction activities that provide services (for example, road extensions, sewer, water, offsite stockpiles, and other utilities) to a land disturbing project site, must be considered as a part of the total land disturbance calculation for the project site, when the activity is under the control of the project site owner.

2. Multi-lot projects that are part of a common plan of development where the total planned land disturbance exceeds 1 acre, whether on one or multiple lots, are subject to the requirements of this Chapter.

The principles governing erosion and sediment control practices are set forth in the Technical Plat Review Form which is part of the SWPPP completion requirements.

1. If required in other Chapters of this Ordinance, access to building sites that cross a natural watercourse, drainage easement, or swale/channel shall have a culvert of appropriate size.

2. Drainageways and swales design must protect against any resultant velocities that may cause channel or outlet scouring.

B. COMMON CONTROL PRACTICES

All erosion control and stormwater pollution prevention measures required to comply with the Ordinance or these Technical Standards shall meet the design criteria, standards, and specifications similar to or the same as those outlined in the "Indiana Drainage Handbook" and "Indiana Storm Water Quality Manual," (ISWQM) or other comparable and reputable references. Table 7-1 lists some of the more common and effective practices for preventing stormwater pollution from construction sites. Details of each practice can be found in the Indiana Drainage Handbook, ISWQM, or in Appendix C. These practices should be used to protect ***every*** potential pollution pathway to stormwater conveyances.

C. Table 7-1

Common Stormwater Pollution Control Practices for Construction Sites

Practice No.	BMP Description	Applicability	Fact Sheet
1	Site Assessment	All sites	ISWQM (Ch.2)
2	Development of A Construction Sequence Schedule	All sites	ISWQM (Ch. 5)
3	Tree Preservation and Protection	Nearly all sites	ISWQM
4	Temporary Construction Ingress/Egress Pad	All sites	ISWQM
5	Wheel Wash	All sites	CN - 101
6	Silt Fence	Small drainage areas	ISWQM
7	Surface Roughening	Sites with slopes that are to be stabilized with vegetation	ISWQM
8	Temporary Seeding	Areas of bare soil where additional work is not scheduled to be performed for a minimum of 15 days	ISWQM
9	Mulching	Temporary surface stabilization	ISWQM
10	Erosion Control Blanket (Surface)	Temporary surface stabilization, anchor for mulch	ISWQM
11	Temporary Diversion	Up-slope and down-slope sides of construction site, above disturbed slopes within site	ISWQM
12	Rock Check Dam	2 acres maximum contributing drainage area	ISWQM
13	Temporary Slope Drain	Sites with cut or fill slopes	ISWQM
14	Geotextile Fabric Drop Inlet Protection	1 acre maximum contributing drainage area	ISWQM
15	Insert (Basket) Curb Inlet Protection	1 acre maximum contributing drainage area	ISWQM
16	Temporary Sediment Trap	5 acre maximum contributing drainage area	ISWQM
17	Temporary Dry Sediment Basin	30 acre maximum contributing drainage area	ISWQM
18	Dewatering Structures	Sites requiring dewatering	CN-102
19	Dust Control	All sites	ISWQM
20	Spill Prevention and Control	All sites	CN - 103
21	Solid Waste Management	All sites	CN - 104
22	Hazardous Waste Management	All sites	CN - 105

D. INDIVIDUAL LOT

A proposed construction sequence shall be part of the SWPPP, as required by the Construction Stormwater General Permit.
All erosion and sediment control measures must be properly maintained throughout construction. Temporary and permanent seeding should be watered as needed until established. For further information on individual lot erosion and sediment control, please see the "Required Stormwater Controls on Individual Building Lots" in Appendix B and also the IDNR, Division of Soil Conservation's pamphlet titled "Erosion and Sediment control for Individual Building Sites".

E. Procedures and Requirements

1. Project sites that are 1 acre or larger, or part of a common plan of development that is 1 acre or larger, must comply with the following procedures:

    a) The project site owner or her representative must become familiar with, and comply with, the requirements of Indiana Department of Environmental Management ("IDEM") regarding erosion/sediment control.

    b) Submit to the CCDB's designee, the Clark County Soil & Water Conservation District ("CCSWCD"), a (SWPPP) that complies with current IDEM erosion/sediment control guidelines and the Clark County Stormwater Ordinance. This will typically be done as part of the development plan review process. The SWPPP shall be submitted with the site development application.

    c) The owner shall provide to CCDB, a copy of the SWPPP approved by CCSWCD and 24 hour advance notice of the intent to commence construction.

2. In accordance with the Construction Stormwater General Permit a pre-construction meeting shall occur with the CCDB designee.

3. At the completion of construction activities, a Notice of Termination must be issued and termination procedures followed.

Chapter Eight

POST-CONSTRUCTION STORMWATER QUALITY MANAGEMENT STANDARDS

A. POST-CONSTRUCTION BMPs

The CCDB adopts the definitions, standards, calculations, procedures, and practices set forth in the latest version of the Indiana Storm Water Quality Manual for post-construction stormwater quality management standards and compliance with said Manual shall meet the standards of this Ordinance.

Chapter Nine

SIZING OF BMPs

The CCDB adopts the definitions, standards, calculations, procedures, and practices set forth in the latest version of the Indiana Storm Water Quality Manual for appropriately establishing the sizing of Best Management Practices. Compliance with said Manual shall meet the standards of this Ordinance.

Chapter Ten

MISCELLANEOUS REQUIREMENTS

A. LOT DRAINAGE

All lots shall be laid out so as to provide drainage away from all buildings, and individual lot drainage shall be coordinated with the general stormwater drainage pattern for the subdivision. Drainage shall be designed so as to avoid the concentration of stormwater runoff from a lot onto adjacent lots. Each lot owner shall maintain the lot grade, as it relates to stormwater drainage, in compliance with the approved construction plans.

C. NO NET LOSS FLOODPLAIN STORAGE REQUIREMENTS

Any construction in a floodplan must meet the requirements established by the Indiana Department of Environmental Management, the Indiana Department of Natural Resources, the United States Army Corp of Engineers and the United States Environmental Protection Agency. The CCDB shall defer to these entities to regulate such construction.