

**City of Dyersburg
STORMWATER
ORDINANCE**

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Section 1. General provisions.

1.1 Purpose. It is the purpose of this ordinance to:

- 1.1.1 Protect, maintain, and enhance the environment of the City of Dyersburg and the public health, safety and the general welfare of the citizens of the city, by controlling discharges of pollutants to the city's storm water system and to maintain and improve the quality of the receiving waters into which the storm water outfalls flow, including, without limitation, lakes, rivers, streams, ponds, wetlands, and groundwater of the city.
- 1.1.2 Enable the City of Dyersburg to comply with the National Pollution Discharge Elimination System permit (NPDES) and applicable regulations, 40 CFR '122.26 for storm water discharges.
- 1.1.3 Allow the City of Dyersburg to exercise the powers granted in Tennessee Code Annotated '68-221-1105, which provides that, among other powers municipalities have with respect to storm water facilities, is the power by ordinance or resolution to:
 - 1.1.3.1 Exercise general regulation over the planning, location, construction, and operation and maintenance of storm water facilities in the municipality, whether or not owned and operated by the municipality;
 - 1.1.3.2 Adopt any rules and regulations deemed necessary to accomplish the purposes of this statute, including the adoption of a system of fees for services and permits;
 - 1.1.3.3 Establish standards to regulate the quantity of storm water discharged and to regulate storm water contaminants as may be necessary to protect water quality;

- 1.1.3.4 Review and approve plans and plats for storm water management in proposed subdivisions or commercial developments;
- 1.1.3.5 Issue permits for storm water discharges, or for the construction, alteration, extension, or repair of storm water facilities;
- 1.1.3.6 Suspend or revoke permits when it is determined that the permittee has violated any applicable ordinance, resolution, or condition of the permit;
- 1.1.3.7 Regulate and prohibit discharges into storm water facilities of sanitary, industrial, or commercial sewage or waters that have otherwise been contaminated; and
- 1.1.3.8 Expend funds to remediate or mitigate the detrimental effects of contaminated land or other sources of storm water contamination, whether public or private.
- 1.1.3.9 The City of Dyersburg shall be provided the right of access to all properties inside the city limits for the purpose of inspections.

1.2 Administering entity. The City of Dyersburg Storm Water Management Department shall administer the provisions of this ordinance.

Section 2. Definitions. For the purpose of this chapter, the following definitions shall apply: Words used in the singular shall include the plural, and the plural shall include the singular; words used in the present tense shall include the future tense. The word "shall" is mandatory and not discretionary. The word "may" is permissive. Words not defined in this section shall be construed to have the meaning given by common and ordinary use as defined in the latest edition of Webster's Dictionary.

2.1 *As built plans:* means drawings depicting conditions as they were actually constructed.

- 2.2 *Best management practices* or *BMPs*: are physical, structural, and/or managerial practices that, when used singly or in combination, prevent or reduce pollution of water, that have been approved by the City of Dyersburg Storm Water Management Department, and that have been incorporated by reference into this ordinance as if fully set out therein.
- 2.3 *Channel*: means a natural or artificial watercourse with a definite bed and banks that conducts flowing water continuously or periodically.
- 2.4 *Community water*: means any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs, wetlands, wells and other bodies of surface or subsurface water, natural or artificial, lying within or forming a part of the boundaries of the City of Dyersburg.
- 2.5 *Contaminant*: means any physical, chemical, biological, or radiological substance or matter in water.
- 2.6 *Design storm event*: means a hypothetical storm event, of a given frequency interval and duration, used in the analysis and design of a storm water facility.
- 2.7 *Discharge*: means dispose, deposit, spill, pour, inject, seep, dump, leak or place by any means, or that which is disposed, deposited, spilled, poured, injected, seeped, dumped, leaked, or placed by any means including any direct or indirect entry of any solid or liquid matter into the municipal separate storm sewer system.
- 2.8 *Easement*: means an acquired privilege or right of use or enjoyment that a person, party, firm, corporation, municipality or other legal entity has in the land of another.
- 2.9 *Erosion*: means the removal of soil particles by the action of water, wind, ice or other geological agents, whether naturally occurring or acting in conjunction with or promoted by

construction or recreational activities or effects.

- 2.10 *Erosion and sediment control plan*: means a written plan (including drawings or other graphic representations) that is designed to minimize the accelerated erosion and sediment runoff at a site during construction activities.
- 2.11 *Hotspot (priority area)*: means an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water or any other area within proximity to or subject to contribute contaminants to local waters.
- 2.12 *Illicit connections*: means illegal and/or unauthorized connections to the municipal separate storm water system whether or not such connections result in discharges into that system.
- 2.13 *Illicit discharge*: means any discharge to the municipal separate storm sewer system that is not composed entirely of storm water and not specifically exempted under Section 3.3. This includes, but is not limited to the introduction of pesticides (i.e. Roundup) not approved by the City of Dyersburg Storm Water Management Department.
- 2.14 *Land disturbing activity*: means any activity on property that results in a change in the existing soil cover (both vegetative and non-vegetative) and/or the existing soil topography for an area of 5,000 sq/ft. or larger. Land-disturbing activities include, but are not limited to, development, re-development, demolition, construction, reconstruction, clearing, grading, filling, and excavation.
- 2.15 *Maintenance*: means any activity that is necessary to keep a storm water facility in good working order so as to function as designed. Maintenance shall include complete

reconstruction of a storm water facility if reconstruction is needed in order to restore the facility to its original operational design parameters. Maintenance shall also include the correction of any problem on the site property that may directly impair the functions of the storm water facility.

- 2.16 *Maintenance agreement*: means a document recorded in the land records that acts as a property deed restriction, and which provides for long-term maintenance of storm water management practices.
- 2.17 *Municipal separate storm sewer system (MS4)*: means the conveyances owned or operated by the municipality for the collection and transportation of storm water, including the roads and streets and their drainage systems, catch basins, curbs, gutters, ditches, man-made channels, and storm drains.
- 2.18 *National Pollutant Discharge Elimination System permit or NPDES permit*: means a permit issued pursuant to 33 U.S.C. 1342.
- 2.19 *Off-site facility*: means a structural BMP located outside the subject property boundary described in the permit application for land development activity.
- 2.20 *On-site facility*: means a structural BMP located within the subject property boundary described in the permit application for land development activity.
- 2.21 *Peak flow*: means the maximum instantaneous rate of flow of water at a particular point resulting from a storm event.
- 2.22 *Person*: means any and all persons, natural or artificial, including any individual, firm or association and any municipal or private corporation organized or existing under the laws of this or any other state or country.

- 2.23 *Priority area*: means hot spot as defined in section 2.11
- 2.24 *Runoff*: means that portion of the precipitation on a drainage area that is discharged from the area into the municipal separate storm water system.
- 2.25 *Sediment*: means solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.
- 2.26 *Sedimentation*: means soil particles suspended in storm water that can settle in stream beds and disrupt the natural flow of the stream.
- 2.27 *Soils Report*: means a study of soils on a subject property with the primary purpose of characterizing and describing the soils. The soils report shall be prepared by a qualified soils engineer, who shall be directly involved in the soil characterization either by performing the investigation or by directly supervising employees.
- 2.28 *Stabilization*: means providing adequate measures, vegetative and/or structural, that will prevent erosion from occurring.
- 2.29 *Storm water*: means storm water runoff, snow melt runoff, surface runoff, street wash waters related to street cleaning or maintenance, infiltration and drainage.
- 2.30 *Storm water management*: means the programs to maintain quality and quantity of storm water runoff to pre-development levels.
- 2.31 *Storm water management facilities*: means the drainage structures, conduits, ditches, combined sewers, sewers, and all device appurtenances by means of which storm water is collected, transported, pumped, treated or disposed of.
- 2.32 *Storm water management plan*: means the set of drawings and other documents that

comprise all the information and specifications for the programs, drainage systems, structures, BMPs, concepts and techniques intended to maintain or restore quality and quantity of storm water runoff to pre-development levels.

- 2.33 *Storm water pollution prevention plan (SWPPP)*: consist of an Erosion and Sediment Control Plan and a Storm Water Management Plan.
- 2.34 *Storm water runoff*: means flow on the surface of the ground, resulting from precipitation.
- 2.35 *Storm water utility*: means the storm water utility created by ordinance of the city to fund the administration of the storm water management ordinance, and other storm water rules and regulations adopted by the municipality.
- 2.36 *Structural BMPs*: means devices that are constructed to provide control of storm water runoff.
- 2.37 *Surface water*: includes waters upon the surface of the earth in bounds created naturally or artificially including, but not limited to, streams, other water courses, lakes and reservoirs.
- 2.38 *Watercourse*: means a permanent or intermittent stream or other body of water, either natural or man-made, which gathers or carries surface water.
- 2.39 *Watershed*: means all the land area that contributes runoff to a particular point along a waterway.

Section 3. Land disturbance permits.

3.1 When required.

3.1.1 Every person will be required to obtain a land disturbance permit from the City of Dyersburg Storm Water Management Department in the following cases:

3.1.1.1 Land disturbing activity disturbs one (1) or more acres of land;

3.1.1.2 Land disturbing activity of less than one (1) acre of land if such activity is part

of a larger common plan of development that affects one (1) or more acre of land;

3.1.1.3 Land disturbing activity of less than one (1) acre of land, if in the discretion of the City of Dyersburg Storm Water Management Department such activity poses a unique threat to water, or public health or safety, or land disturbance is 5,000 sq/ft. or more.

3.1.1.4 The creation and use of borrow pits, fill areas, or stockpiles.

3.2 Building permit. No building permit shall be issued until the applicant has obtained a land disturbance permit where the same is required by this ordinance.

3.3 Exemptions. The following activities are exempt from the requirement to obtain a permit:

3.3.1 Any emergency activity that is immediately necessary for the protection of life, property, or natural resources; however, activities must comply with all control requirements.

3.3.2 Existing nursery and agricultural operations conducted as a permitted main or accessory use.

3.3.3 Any logging or agricultural activity that is consistent with an approved farm conservation plan or a timber management plan prepared or approved by the appropriate Federal or State agency.

3.3.4 Additions or modifications to existing single family structures disturbing less than 5000 sq/ft.

3.4 Application for a land disturbance permit.

3.4.1 Each application shall include the following:

- 3.4.1.1 Name of applicant;
 - 3.4.1.2 Business or residence address of applicant;
 - 3.4.1.3 Name, address and telephone number of the owner of the property of record in the office of the assessor of property;
 - 3.4.1.4 Address and legal description of subject property including the tax reference number and parcel number of the subject property;
 - 3.4.1.5 Name, address and telephone number of the contractor/site operator and any subcontractor(s) who shall perform the land disturbing activity and who shall implement the erosion and sediment control plan;
 - 3.4.1.6 A statement indicating the nature, extent and purpose of the land disturbing activity including the size of the area for which the permit shall be applicable and a schedule for the starting and completion dates of the land disturbing activity.
 - 3.4.1.7 The applicant shall obtain from any other state or federal agency any other appropriate environmental permits that pertain to the property. However, the inclusion of those permits in the application shall not foreclose the City of Dyersburg Storm Water Management Department from imposing additional development requirements and conditions, commensurate with this ordinance, on the development of property covered by those permits.
- 3.4.2 Each application shall be accompanied by:
- 3.4.2.1 A sediment and erosion control plan as described in Section 5.5
 - 3.4.2.2 A storm water management plan as described in Section 5.4, providing for

storm water management during the land disturbing activity and after the activity has been completed.

3.4.2.3 Each application for a land disturbance permit or resubmittal of a denied application shall be accompanied by payment of the appropriate land disturbance permit fee.

3.4.2.4 A written request for a waiver, where applicable.

3.5 Review and approval of application.

3.5.1 The City of Dyersburg Storm Water Management Department will review each application for a land disturbance permit to determine its conformance with the provisions of this ordinance. Within ten (10) days after receiving an application, the City of Dyersburg Storm Water Management Department shall provide one of the following responses in writing:

3.5.1.1 Approval of the permit application;

3.5.1.2 Approval of the permit application, subject to such reasonable conditions as may be necessary to secure substantially the objectives of this ordinance, and issue the permit subject to these conditions; or

3.5.1.3 Denial of the permit application, indicating the reason(s) for the denial.

3.5.1.4 If waiver is granted a Land Disturbance Permit will be issued.

3.5.2 If the City of Dyersburg Storm Water Management Department has granted conditional approval of the permit, the applicant shall submit a revised plan that conforms to the conditions established by the City of Dyersburg Storm Water Management Department.

3.5.3 No development plans will be released until the land disturbance permit has been approved.

3.6 Permit duration.

Every land disturbance permit shall expire and become null and void if substantial work authorized by such permit has not commenced within one hundred eighty (180) calendar days of issuance. In all other situations, the permit will remain in effect until a Notice of Termination has been filed and accepted.

3.7 Notice of Intent.

The applicant must notify, in writing, the City of Dyersburg Storm Water Management Department twenty (20) working days in advance of the commencement of construction. Regular inspections of the storm water management system construction shall be conducted by the City of Dyersburg Storm Water Management Department. All inspections shall be documented and written reports prepared that contain the following information:

3.7.1 The date and location of the inspection;

3.7.2 Whether construction is in compliance with the submitted storm water management plan;

3.7.3 Variations from the submitted construction specifications;

3.7.4 Any violations that exist.

3.8 Performance bonds.

3.8.1 The City of Dyersburg Storm Water Management Department may, at its discretion, require the submittal of a performance security or performance bond prior to issuance of a permit in order to ensure that the storm water practices are installed by the permit

holder as required by the submitted storm water management plan. The amount of the installation performance security or performance bond shall be the total estimated construction cost of the structural BMPs listed under the permit plus any reasonably foreseeable additional related costs, e.g., for damages or enforcement. [Or plus a certain percentage of the total estimated costs.] The performance security shall contain forfeiture provisions for failure to complete work specified in the storm water management plan. The applicant shall provide an itemized construction cost estimate complete with unit prices which shall be subject to acceptance, amendment or rejection by the City of Dyersburg Storm Water Management Department. Alternatively the City of Dyersburg Storm Water Management Department reserves the right to calculate the cost of construction cost estimates.

- 3.8.2 The performance security or performance bond shall be released in full only upon submission of as-built plans and written certification by a registered professional engineer licensed to practice in Tennessee that the structural BMP has been installed in accordance with the approved plan and other applicable provisions of this ordinance. The City of Dyersburg Storm Water Management Department will make a final inspection of the structural BMP to ensure that it is in compliance with the submitted plan and the provisions of this ordinance. Provisions for a partial pro-rata release of the performance security or performance bond based on the completion of various development stages can be made at the discretion of the City of Dyersburg Storm Water Management Department.

Section 4. Waivers.

- 4.1 General. Every applicant shall provide a storm water pollution prevention plan as required by this ordinance, unless a written request is filed to waive this requirement. Requests to waive the SWPPP requirements shall be submitted to the City of Dyersburg Storm Water Management Department for approval.
- 4.2 Conditions for waiver. The requirements for a Storm water Pollution Prevention Plan may be waived in whole or in part upon written request of the applicant, provided that all sediment remains on site and at least one of the following conditions applies:
- 4.2.1 It can be demonstrated that the proposed development is not likely to impair attainment of the objectives of this ordinance.
- 4.2.2 Alternative minimum requirements for on-site management of storm water discharges have been established in a storm water management plan that has been submitted to the City of Dyersburg Storm Water Management Department.
- 4.2.3 Provisions are made to manage storm water by an off-site facility. The off-site facility must be in place and designed to provide the level of storm water control that is equal to or greater than that which would be afforded by on-site practices. Further, the facility must be operated and maintained by an entity that is legally obligated to continue the operation and maintenance of the facility.
- 4.3 Downstream damage, etc. prohibited. In order to receive a waiver, the applicant must demonstrate to the satisfaction of the City of Dyersburg Storm Water Management Department that the waiver will not lead to any of the following conditions downstream:
- 4.3.1 Deterioration of existing culverts, bridges, dams, and other structures;

- 4.3.2 Degradation of biological functions or habitat;
 - 4.3.3 Accelerated stream bank or streambed erosion or siltation;
 - 4.3.5 Increased threat of flood damage to public health, life or property.
- 4.4 Land disturbance permit not to be issued where waiver requested. No land disturbance permit shall be issued where a waiver has been requested until the waiver is granted. If no waiver is granted, the request must be resubmitted with a storm water management plan and the appropriate Land Disturbance fee.

Section 5. Storm water system design and management standards.

- 5.1 Storm water design or BMP manual.
- 5.1.1 Adoption. The municipality adopts as its storm water design and best management practices (BMP) manual the following publications, which are incorporated by reference in this ordinance as is fully set out herein:
 - 5.1.1.1 TDEC Sediment and Erosion Control Manual
 - 5.1.1.2 TDEC Post Construction BMP Manual
 - 5.1.2 This manual includes a list of acceptable BMPs including the specific design performance criteria and operation and maintenance requirements for each storm water practice. The manual may be updated and expanded from time to time, at the discretion of the governing body of the municipality, upon the recommendation of the City of Dyersburg Storm Water Management Department, based on improvements in engineering, science, monitory and local maintenance experience. Storm water facilities that are designed, constructed and maintained in accordance with these BMP criteria will be presumed to meet the minimum water quality performance

standards.

5.2 General performance criteria for storm water management. Unless granted a waiver or judged by the City of Dyersburg Storm Water Management Department to be exempt, the following performance criteria shall be addressed for storm water management at all sites:

5.2.1 All site designs shall control the peak flow rates of storm water discharge associated with design storms specified in this ordinance or in the BMP manual and reduce the generation of post construction storm water runoff to pre-construction levels. These practices should seek to utilize pervious areas for storm water treatment and to infiltrate storm water runoff from driveways, sidewalks, rooftops, parking lots, and landscaped areas to the maximum extent practical to provide treatment for both water quality and quantity.

5.2.2 To protect stream channels from degradation, specific channel protection criteria shall be provided as prescribed in the BMP manual.

5.2.3 Storm water discharges to critical areas with sensitive resources (i.e., cold water fisheries, shellfish beds, swimming beaches, recharge areas, water supply reservoirs) may be subject to additional performance criteria, or may need to utilize or restrict certain storm water management practices.

5.2.4 Storm water discharges from hot spots may require the application of specific structural BMPs and pollution prevention practices.

5.2.5 Prior to or during the site design process, applicants for land disturbance permits shall consult with the City of Dyersburg Storm Water Management Department to determine if they are subject to additional storm water design requirements.

- 5.2.6 The TR-55, SCS, USGS or other approved calculations for determining peak flows, shall be used for sizing all storm water facilities.
- 5.2.7 As of July 1, 2005 all site operators must complete a state sponsored erosion and sediment control workshop, such as TDEC Level I Erosion and Sediment Control.
- 5.2.8 Land disturbance permits must be posted on site.
- 5.2.9 The Sediment and Erosion Control Plan and Storm Water Management Plan must be kept on site where possible, or easily accessible.
- 5.2.10 Controls will be inspected according to BMP manual standards, but not less than fourteen day intervals, and reports kept on site.
- 5.2.11 A rain gauge must be installed on site and records kept of rain fall events.

5.3 Minimum control requirements.

- 5.3.1 Storm water designs shall meet the multi-stage storm frequency storage requirements as identified in the BMP manual unless the City of Dyersburg Storm Water Management Department has granted the applicant a full or partial waiver for a particular BMP under Section 4.
- 5.3.2 If hydrologic or topographic conditions warrant greater control than that provided by the minimum control requirements, the City of Dyersburg Storm Water Management Department may impose any and all additional requirements deemed necessary to control the volume, timing, and rate of runoff.

5.4 Storm water management plan requirements. The storm water management plan shall include sufficient information to allow the City of Dyersburg Storm Water Management Department to evaluate the environmental characteristics of the project site, the potential

impacts of all proposed development of the site, both present and future, on the water resources, and the effectiveness and acceptability of the measures proposed for managing storm water generated at the project site. To accomplish this goal the storm water management plan shall include the following for all sites over (1) one acre, and at the discretion of the Storm Water Manager may include the following for sites less than (1) one acre:

- 5.4.1 Topographic Base Map: A 1" = 100' topographic base map of the site which extends to areas that effect or are effected by the proposed land disturbance.
 - 5.4.1.1 Existing surface water drainage including streams, ponds, culverts, ditches, wetlands; and the type, size, elevation, etc., of nearest upstream and downstream drainage structures;
 - 5.4.1.2 Current land use including all existing structures, locations of utilities, roads, and easements;
 - 5.4.1.3 All other existing significant natural and artificial features;
 - 5.4.1.4 Proposed land use with tabulation of the percentage of surface area to be adapted to various uses; drainage patterns; locations of utilities, roads and easements; the limits of clearing and grading;
 - 5.4.1.5 Proposed structural BMPs;
 - 5.4.1.6 A written description of the site plan and justification of proposed changes in natural conditions may also be required.
- 5.4.2 Calculations: Hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in the BMP manual.

These calculations must show that the proposed storm water management measures are capable of controlling runoff from the site in compliance with this ordinance and the guidelines of the BMP manual. Such calculations shall include:

5.4.2.1 A description of the design storm frequency, duration, and intensity where applicable;

5.4.2.2 Time of concentration;

5.4.2.3 Soil curve numbers or runoff coefficients including assumed soil moisture conditions;

5.4.2.4 Peak runoff rates and total runoff volumes for each watershed area;

5.4.2.5 Infiltration rates, where applicable;

5.4.2.6 Culvert, storm water sewer, ditch and/or other storm water conveyance capacities;

5.4.2.7 Flow velocities;

5.4.2.8 Data on the increase in rate and volume of runoff for the design storms referenced in the BMP manual; and documentation of sources for all computation methods and field test results.

5.4.3 Soils Information: If a storm water management control measure depends on the hydrologic properties of soils (e.g., infiltration basins), then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles and soil survey reports. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soil types present at the location of the control measure.

- 5.4.4 Maintenance and Repair Plan: The design and planning of all storm water management facilities shall include detailed maintenance and repair procedures to ensure their continued performance. These plans will identify the parts or components of a storm water management facility that need to be maintained and the equipment and skills or training necessary. The facility owner shall demonstrate the ability to garner and apply the financial resources necessary for long-term maintenance requirements. This method of funding must be demonstrated to be permanent and transferable to another entity with equivalent longevity. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program and the need for revisions or additional maintenance procedures shall be included in the plan. A permanent elevation benchmark shall be identified in the plans to assist in the periodic inspection of the facility.
- 5.4.5 Landscaping Plan: The applicant must present a detailed plan for management of vegetation at the site after construction is finished, including who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved. Where it is required by the BMP, this plan must be prepared by a competent landscape architect .
- 5.4.6 Maintenance Easements: The applicant must ensure access to the site for the purpose of inspection and repair by securing all the maintenance easements needed. These easements must be binding on the current property owner and all subsequent owners of the property and must be properly recorded in the land record.
- 5.4.7 Maintenance Agreement:

5.4.7.1 The owner of property to be served by an on-site storm water management facility must execute an inspection and maintenance agreement that shall operate as a deed restriction binding on the current property owner and all subsequent property owners.

5.4.7.2 The maintenance agreement shall:

5.4.7.2.1 Assign responsibility for the maintenance and repair of the storm water facility to the owner of the property upon which the facility is located and be recorded as such on the plat for the property by appropriate notation.

5.4.7.2.2 The property owner shall provide for a periodic inspection for the purpose of documenting maintenance and repair needs and ensure compliance with the purpose and requirements of this ordinance. The property owner will arrange for this inspection to be conducted by a registered professional engineer licensed to practice in the State of Tennessee who will submit a sealed report of the inspection to the City of Dyersburg Storm Water Management Department. It shall also grant permission to the city to enter the property at reasonable times and to inspect the storm water facility to ensure that it is being properly maintained.

5.4.7.2.3 Provide that the minimum maintenance and repair needs

include, but are not limited to: the removal of silt, litter and other debris, the cutting of grass, grass cuttings and vegetation removal, and the replacement of landscape vegetation, in detention and retention basins, and inlets and drainage pipes and any other storm water facilities. It shall also provide that the property owner shall be responsible for additional maintenance and repair needs consistent with the needs and standards outlined in the BMP manual.

5.4.7.2.4 Provide that maintenance needs must be addressed in a timely manner, on a schedule to be determined by the City of Dyersburg Storm Water Management Department.

5.4.7.2.5 Provide that if the property is not maintained or repaired within the prescribed schedule, the City of Dyersburg Storm Water Management Department shall perform the maintenance and repair at its expense, and bill the same to the property owner. The maintenance agreement shall also provide that the City of Dyersburg Storm Water Management Department's cost of performing the maintenance shall be a lien against the property.

5.4.7.2.6 Sediment and Erosion Control Plans: The applicant must prepare a sediment and erosion control plan for all construction activities that complies with Section 5(5) below.

5.5 Sediment and erosion control plan requirements. The sediment and erosion control plan shall accurately describe the potential for soil erosion and sedimentation problems resulting from land disturbing activity and shall explain and illustrate the measures that are to be taken to control these problems. The length and complexity of the plan is to be commensurate with the size of the project, severity of the site condition, and potential for off-site damage. The plan shall be constructed using good engineering practices. The plan shall also conform to the requirements found in the BMP manual, and shall include at least the following for all sites over (1) one acre, and at the discretion of the Storm Water Manager may include the following for sites less than (1) one acre:

5.5.1 Project Description - Briefly describe the intended project and proposed land disturbing activity including number of units and structures to be constructed and infrastructure required.

5.5.2 A topographic map with contour intervals of two (2) feet or less showing present conditions and proposed contours resulting from land disturbing activity.

5.5.3 All existing drainage ways, including intermittent and wet-weather. Include any designated floodways or flood plains.

5.5.4 A general description of existing land cover. Individual trees and shrubs do not need to be identified.

5.5.5 Stands of existing trees as they are to be preserved upon project completion, specifying their general location on the property. Differentiation shall be made between existing trees to be preserved, trees to be removed and proposed planted trees. Tree protection measures must be identified, and the diameter of the area

involved must also be identified on the plan and shown to scale. Information shall be supplied concerning the proposed destruction of exceptional and historic trees in setbacks and buffer strips, where they exist. Complete landscape plans may be submitted separately. The plan must include the sequence of implementation for tree protection measures.

- 5.5.6 Approximate limits of proposed clearing, grading and filling.
- 5.5.7 Approximate flows of existing storm water leaving any portion of the site.
- 5.5.8 A general description of existing soil types and characteristics and any anticipated soil erosion and sedimentation problems resulting from existing characteristics.
- 5.5.9 Location, size and layout of proposed storm water and sedimentation control improvements.
- 5.5.10 Proposed drainage network.
- 5.5.11 Proposed drain tile or waterway sizes.
- 5.5.12 Approximate flows leaving site after construction and incorporating water run-off mitigation measures. The evaluation must include projected effects on property adjoining the site and on existing drainage facilities and systems. The plan must address the adequacy of outfalls from the development: when water is concentrated, what is the capacity of waterways, if any, accepting storm water off-site; and what measures, including infiltration, sheeting into buffers, etc., are going to be used to prevent the scouring of waterways and drainage areas off-site, etc.
- 5.5.13 The projected sequence of work represented by the grading, drainage and sedimentation and erosion control plans as related to other major items of

construction, beginning with the initiation of excavation and including the construction of any sediment basins or retention facilities or any other structural BMPs.

5.5.14 Specific remediation measures to prevent erosion and sedimentation run-off. Plans shall include detailed drawings of all control measures used; stabilization measures including vegetation and non-vegetation measures, both temporary and permanent, will be detailed. Detailed construction notes, inspection and maintenance schedules shall be included for all control measures in the plan.

5.5.15 Specific details for: the construction of rock pads, wash down pads, and settling basins for controlling erosion; road access points; eliminating or keeping soil, sediment, and debris on streets and public ways at a level acceptable to the City of Dyersburg Storm Water Management Department. Soil, sediment, and debris brought onto streets and public ways must be removed by the end of the work day by machine, broom or shovel to the satisfaction of the City of Dyersburg Storm Water Management Department. Failure to remove the sediment, soil or debris shall be deemed a violation of this ordinance.

5.5.16 Proposed structures; location (to the extent possible) and identification of any proposed additional buildings, structures or development on the site.

5.5.17 A description of on-site measures to be taken to recharge surface water into the ground water system through infiltration.

Section 6. Post Construction.

6.1 As built plans. All applicants are required to submit actual as built plans for any structures located on-site after final construction is completed. The plan must show the final design

specifications for all storm water management facilities and must be sealed by a registered professional engineer licensed to practice in Tennessee. A final inspection by the City of Dyersburg Storm Water Management Department is required before any performance security or performance bond will be released. The City of Dyersburg Storm Water Management Department shall have the discretion to adopt provisions for a partial pro-rata release of the performance security or performance bond on the completion of various stages of development. In addition, occupation permits shall not be granted until corrections to all BMPs have been made and accepted by the City of Dyersburg Storm Water Management Department

6.2 Landscaping and stabilization requirements.

6.2.1 Any area of land from which the natural vegetative cover has been either partially or wholly cleared by development activities shall be revegetated according to a schedule approved by the City of Dyersburg Storm Water Management Department. The following criteria shall apply to revegetation efforts:

6.2.1.1 Reseeding must be done with an annual or perennial cover crop accompanied by placement of straw mulch or its equivalent of sufficient coverage to control erosion until such time as the cover crop is established over ninety percent (90%) of the seeded area.

6.2.1.2 Replanting with native woody and herbaceous vegetation must be accompanied by placement of straw mulch or its equivalent of sufficient coverage to control erosion until the plantings are established and are capable of controlling erosion.

6.2.1.3 Any area of revegetation must exhibit survival of a minimum of seventy-five percent (75%) of the cover crop throughout the year immediately following revegetation. Revegetation must be repeated in successive years until the minimum seventy-five percent (75%) survival for one (1) year is achieved.

6.2.2 In addition to the above requirements, a landscaping plan must be submitted with the final design describing the vegetative stabilization and management techniques to be used at a site after construction is completed. This plan will explain not only how the site will be stabilized after construction, but who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved.

6.3 Inspection of storm water management facilities. Periodic inspections of facilities shall be performed as provided for in Section 5.4.7.2.2.

6.4 Records of installation and maintenance activities. Parties responsible for the operation and maintenance of a storm water management facility shall make records of the installation of the storm water facility, and of all maintenance and repairs to the facility, and shall retain the records for at least 5 years. These records shall be made available to the City of Dyersburg Storm Water Management Department during inspection of the facility and at other reasonable times upon request.

6.5 Failure to meet or maintain design or maintenance standards. If a responsible party fails or refuses to meet the design or maintenance standards required for storm water facilities under this ordinance, the City of Dyersburg Storm Water Management Department, after reasonable notice, may correct a violation of the design standards or maintenance needs by performing all

necessary work to place the facility in proper working condition. In the event that the storm water management facility becomes a danger to public safety or public health, the City of Dyersburg Storm Water Management Department shall notify in writing the party responsible for maintenance of the storm water management facility. Upon receipt of that notice, the responsible person shall have 7 days to effect maintenance and repair of the facility in an approved manner. In the event that corrective action is not undertaken within that time, the City of Dyersburg Storm Water Management Department may take necessary corrective action. The cost of any action by the City of Dyersburg Storm Water Management Department under this section shall be charged to the responsible party.

Section 7. Existing locations and developments.

7.1 Requirements for all existing locations and developments. The following requirements shall apply to all locations and development at which land disturbing activities have occurred previous to the enactment of this ordinance:

7.1.1 Denuded areas must be vegetated or covered under the standards and guidelines specified in the BMP manual and on a schedule acceptable to the City of Dyersburg Storm Water Management Department.

7.1.2 Cuts and slopes must be properly covered with appropriate vegetation and/or retaining walls constructed.

7.1.3 Drainage ways shall be properly covered in vegetation or secured with rip-rap, channel lining, etc., to prevent erosion.

7.1.4 Trash, junk, rubbish, etc. shall be cleared from drainage ways.

7.1.5 Storm water runoff shall be controlled to the extent reasonable to prevent pollution of local waters. Such control measures may include, but are not limited to, the following:

7.1.5.1 Ponds

- 7.1.5.1.1 Detention pond
- 7.1.5.1.2 Extended detention pond
- 7.1.5.1.3 Wet pond
- 7.1.5.1.4 Alternative storage measures

7.1.5.2 Constructed wetlands

7.1.5.3 Infiltration systems

- 7.1.5.3.1 Infiltration/percolation trench
- 7.1.5.3.2 Infiltration basin
- 7.1.5.3.3 Drainage (recharge) well
- 7.1.5.3.4 Porous pavement

7.1.5.4 Filtering systems

- 7.1.5.4.1 Catch basin inserts/media filter
- 7.1.5.4.2 Sand filter
- 7.1.5.4.3 Filter/absorption bed
- 7.1.5.4.4 Filter and buffer strips

7.1.5.5 Open channel

- 7.1.5.5.1 swale

7.2 Requirements for existing problem locations. The City of Dyersburg Storm Water Management Department shall in writing notify the owners of existing locations and

developments of specific drainage, erosion or sediment problem affecting such locations and developments, and the specific actions required to correct those problems. The notice shall also specify a reasonable time for compliance.

- 7.3 Inspection of existing facilities. The City of Dyersburg Storm Water Management Department may, to the extent authorized by state and federal law, establish inspection programs to verify that all storm water management facilities, including those built before as well as after the adoption of this ordinance, are functioning within design limits. These inspection programs may be established on any reasonable basis, including but not limited to: routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher than typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher than usual discharges of contaminants or pollutants or with discharges of a type which are more likely than the typical discharge to cause violations of the municipality's NPDES storm water permit; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and evaluating the condition of drainage control facilities and other BMPs.
- 7.4 Corrections of problems subject to appeal. Corrective measures imposed by the storm water utility under this section are subject to appeal under Section 11 of this ordinance.

Section 8. Illicit discharges.

8.1 Scope. This section shall apply to all water generated on developed or undeveloped land entering the municipality's separate storm sewer system.

8.2 Prohibition of illicit discharges. No person shall introduce or cause to be introduced into the municipal separate storm sewer system any discharge that is not composed entirely of storm water. The commencement, conduct or continuance of any non-storm water discharge to the municipal separate storm sewer system is prohibited except as described as follows:

8.2.1 Uncontaminated discharges from the following sources are allowed:

8.2.1.1 Water line flushing or other potable water sources,

8.2.1.2 Landscape irrigation or lawn watering with potable water,

8.2.1.3 Diverted stream flows,

8.2.1.4 Rising ground water,

8.2.1.5 Groundwater infiltration to storm drains,

8.2.1.6 Pumped groundwater,

8.2.1.7 Foundation or footing drains,

8.2.1.8 Crawl space pumps,

8.2.1.9 Air conditioning condensation,

8.2.1.10 Springs,

8.2.1.11 Non-commercial washing of vehicles,

8.2.1.12 Natural riparian habitat or wet-land flows,

8.2.1.13 Swimming pools (if dechlorinated - typically less than one PPM chlorine),

8.2.1.14 Fire fighting activities, and

- 8.2.1.15 Any other uncontaminated water source.
- 8.2.2 Discharges specified in writing by the City of Dyersburg Storm Water Management Department as being necessary to protect public health and safety.
- 8.2.3 Dye testing is an allowable discharge if the dye used is environmentally safe.
- 8.2.4 Commercial and benefit car washing is an allowed discharge, but we encourage the use of biodegradable detergents and measures to filter other pollutants. (i.e. catch basin filters or allowing wash water to infiltrate into grassy areas)
- 8.3 Prohibition of illicit connections.
 - 8.3.1 The construction, use, maintenance or continued existence of illicit connections to the separate municipal storm sewer system is prohibited.
 - 8.3.2 This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.
- 8.4 Reduction of storm water pollutants by the use of best management practices. Any person responsible for a property or premises, which is, or may be, the source of an illicit discharge, may be required to implement, at the person's expense, the BMPs necessary to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of storm water associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this section.
- 8.5 Notification of spills. Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or

operation has information of any known or suspected release of materials which are resulting in, or may result in, illicit discharges or pollutants discharging into storm water, the municipal separate storm sewer system, the person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials the person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, the person shall notify the City of Dyersburg Storm Water Management Department in person or by telephone or facsimile no later than the next business day. Notifications in person or by telephone shall be confirmed by written notice addressed and mailed to the City of Dyersburg Storm Water Management Department within three (3) business days of the telephone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least 5 years.

Section 9. Enforcement

9.1 Enforcement authority. The manager of the City of Dyersburg Storm Water Management Department or his designees shall have the authority to issue notices of violation and citations, and to impose the civil penalties provided in this section.

9.2 Notification of violation.

9.2.1 Written Notice. Whenever the manager of the City of Dyersburg Storm Water Management Department finds that any permittee or any other person discharging storm water has violated or is violating this ordinance or a permit or order issued

hereunder, the manager may serve upon such person written notice of the violation. Within seven (7) days of this notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted to the manager. Submission of this plan in no way relieves the discharger of liability for any violations occurring before or after receipt of the notice of violation.

9.2.2 Consent Orders. The manager is empowered to enter into consent orders, assurances of voluntary compliance, or other similar documents establishing an agreement with the person responsible for the noncompliance. Such orders will include specific action to be taken by the person to correct the noncompliance within a time period also specified by the order. Consent orders shall have the same force and effect as administrative orders issued pursuant to paragraphs (9.2.4) and (9.2.5) below.

9.2.3 Show Cause Hearing. The manager may order any person who violates this ordinance or permit or order issued hereunder, to show cause why a proposed enforcement action should not be taken. Notice shall be served on the person specifying the time and place for the meeting, the proposed enforcement action and the reasons for such action, and a request that the violator show cause why this proposed enforcement action should not be taken. The notice of the meeting shall be served personally or by registered or certified mail (return receipt requested) at least seven (7) days prior to the hearing.

9.2.4 Compliance Order. When the manager finds that any person has violated or

continues to violate this ordinance or a permit or order issued thereunder, he may issue an order to the violator directing that, following a specific time period, adequate structures, devices, be installed or procedures implemented and properly operated. Orders may also contain such other requirements as might be reasonably necessary and appropriate to address the noncompliance, including the construction of appropriate structures, installation of devices, self-monitoring, and management practices.

9.2.5 Cease and Desist Orders. When the manager finds that any person has violated or continues to violate this ordinance or any permit or order issued hereunder, the director may issue an order to cease and desist all such violations and direct those persons in noncompliance to:

9.2.5.1 Comply forthwith; or

9.2.5.2 Take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation, including halting operations and terminating the discharge.

9.3 Conflicting standards. Whenever there is a conflict between any standard contained in this ordinance and in the BMP manual adopted by the municipality under this ordinance, the strictest standard shall prevail.

Section 10. Penalties.

10.1 Violations. Any person who shall commit any act declared unlawful under this ordinance, who violates any provision of this ordinance, who violates the provisions of any permit issued pursuant to this ordinance, or who fails or refuses to comply with any lawful communication or

notice to abate or take corrective action by the City of Dyersburg Storm Water Management Department, shall be guilty of a civil offense.

- 10.2 Penalties. Under the authority provided in Tennessee Code Annotated Section 68-221-1106, the municipality declares that any person violating the provisions of this ordinance may be assessed a civil penalty by the City of Dyersburg Storm Water Management Department of not less than fifty dollars (\$50.00) and not more than five thousand dollars (\$5,000.00) per day for each day of violation. Each day of violation shall constitute a separate violation. The penalty shall increase by 25% of the previous penalty amount for every subsequent but separate offence made by the same person, company or facility.
- 10.3 Measuring civil penalties. In assessing a civil penalty, the manager of the City of Dyersburg Storm Water Management Department may consider:
- 10.3.1 The harm done to the public health or the environment;
 - 10.3.2 Whether the civil penalty imposed will be a substantial economic deterrent to the illegal activity;
 - 10.3.3 The economic benefit gained by the violator;
 - 10.3.4 The amount of effort put forth by the violator to remedy this violation;
 - 10.3.5 Any unusual or extraordinary enforcement costs incurred by the municipality;
 - 10.3.6 The amount of penalty established by ordinance or resolution for specific categories of violations; and
 - 10.3.7 Any equities of the situation which outweigh the benefit of imposing any penalty or damage assessment.
- 10.4 Recovery of damages and costs. In addition to the civil penalty in subsection (2) above, the

municipality may recover;

10.4.1 All damages proximately caused by the violator to the municipality, which may include any reasonable expenses incurred in investigating violations of, and enforcing compliance with, this ordinance, or any other actual damages caused by the violation.

10.4.2 The costs of the municipality's maintenance of storm water facilities when the user of such facilities fails to maintain them as required by this ordinance.

10.5 Other remedies. The municipality may bring legal action to enjoin the continuing violation of this ordinance, and the existence of any other remedy, at law or equity, shall be no defense to any such actions.

10.6 Remedies cumulative. The remedies set forth in this section shall be cumulative, not exclusive, and it shall not be a defense to any action, civil or criminal, that one (1) or more of the remedies set forth herein has been sought or granted.

Section 11. Appeals. Pursuant to Tennessee Code Annotated '68-221-1106(d), any person aggrieved by the imposition of a civil penalty or damage assessment as provided by this ordinance may appeal said penalty or damage assessment to the municipality's governing body or by board established to hear appeals.

11.1 Appeals to be in writing. The appeal shall be in writing and filed with the municipal recorder or clerk within thirty (30) days after the civil penalty and/or damage assessment is served in any manner authorized by law.

11.2 Hearing. Upon receipt of an appeal, the municipality's SWAC (Storm Water Advisory Committee) shall hold a hearing within thirty (30) days. Ten (10) days notice by registered mail shall also be provided to the aggrieved party, such notice to be sent to the address provided

by the aggrieved party at the time of appeal. The decision of the SWAC of the municipality shall be final.

- 11.3 Appealing decisions of the municipality's SWAC. Any alleged violator may appeal a decision of the municipality's SWAC pursuant to the provisions of Tennessee Code Annotated, title 27, chapter 8.

Section 12. Severability

- 12.1 Should any article, section, subsection, clause or provision of this Comprehensive Storm Water Management Ordinance be declared by a court of competent jurisdiction to be unconstitutional or invalid, such decision shall not effect the validity of the ordinance as a whole or any part thereof other than the part declared to be unconstitutional or invalid, each article, section clause and provision being declared severable.
- 12.2 If any provision of this ordinance and any other provision of law impose overlapping or contradictory regulations, or contain any restrictions covering any of the same subject matter, that provision which is more restrictive or imposes the higher standards or requirements shall govern.

Section 13. Schedule of Fees

13.1	Land Disturbance Permit for 5,000 ² ft up to one (1)acre with Waiver	\$25
13.2	Land Disturbance Permit for 5,000 ² ft up to one (1)acre	\$125
13.3	Land Disturbance Permit for one (1) to five (5) acres	\$200
13.4	Land Disturbance Permit for five (5) acres and up	\$300
13.5	Site reinspection after Notice of Violation	\$20
13.6	Resubmital of denied application	SAME AS ORIGINAL FEE

Appendix A
City of Dyersburg
WATER QUALITY BUFFER ORDINANCE

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Section 1. Description

1.1 A water quality buffer zone is a strip of undisturbed native vegetation, either original or re-established, that borders streams and rivers, ponds and lakes, wetlands, and seeps. Buffer zones are most effective when storm water runoff is flowing into and through the buffer zone as shallow sheet flow, rather than in concentrated form such as in channels, gullies, or wet weather conveyances. Therefore, it is critical that the design of any development include management practices, to the maximum extent practical, that will result in storm water runoff flowing into and through the buffer zone as shallow sheet flow.

Buffer zones protect the physical and ecological integrity of water bodies from surrounding upland activities in the following ways:

- 1.1.2 Filtering excess amounts of sediment, organic material, nutrients and other chemicals;
- 1.1.3 Providing flood protection;
- 1.1.4 Reducing storm runoff velocities;
- 1.1.5 Protecting channel bank areas from scour and erosion;
- 1.1.6 Providing shade for cooling adjacent water; which allows waters to hold a greater level of dissolved oxygen; and
- 1.1.7 Providing leaf litter and large woody debris important to aquatic organisms.

Section 2. Intent

2.1 The intent of this policy is to protect and maintain the native vegetation in riparian areas by implementing specifications for the establishment, protection and long-term maintenance of water quality buffers zones along all intermittent and perennial stream waterways and wetlands, in or adjacent to new development and significant redevelopment within our jurisdictional authority. This policy serves to clarify the requirements for streamside water quality buffers.

Section 3. Design Standards for Water Quality Buffer Zones

3.1 A water quality buffer zone is required along all perennial and intermittent stream waterways and wetlands as identified on a 7.5-minute USGS quadrangle map, or as determined by the Tennessee Department of Environment and Conservation or City of Dyersburg Storm Water Management Department. The buffer width shall be calculated as follows:

- 3.1.1 In areas where a floodway profile has been computed as part of an approved flood study, the buffer zone shall be the width of the floodway plus at least thirty (30) feet perpendicular from the edge of the floodway on each side of the waterway, or sixty (60) feet perpendicular from the top of bank on each side of the waterway, whichever is greater.
- 3.1.2 In areas where a floodway profile has not been computed as part of an approved flood study, the buffer zone shall be at least thirty (30) feet perpendicular from the top of bank on each side of the waterway.

- 3.1.3 When delineated wetland or critical areas extend beyond the edge of the required buffer zone width, the buffer zone shall be adjusted so that the buffer zone consists of the extent of the delineated wetland plus twenty five (25) feet extending perpendicular beyond the wetland edge.

3.2 Water quality buffer zone width adjustment:

- 3.2.1 If there are 15% to 24% slopes which are within the required buffer zone width, the buffer width must be adjusted to include an additional twenty (20) feet.
- 3.2.2 If there are 25% or greater slopes which are within the required buffer zone width, the buffer width must be adjusted to include an additional fifty (50) feet.
- 3.2.3 If the adjacent land use involves drain fields from on-site sewage disposal and treatment system (i.e., septic systems), subsurface discharges from a wastewater treatment plant, or land application of biosolids or animal waste, the buffer zone width must be adjusted to include an additional fifty (50) feet.
- 3.3.4 If the land use or activity involves the storage of hazardous substances or petroleum facilities, the buffer zone width must be adjusted to include an additional one hundred (100) feet.
- 3.3.5 If the land use or activity involves raised septic systems or animal feedlot operations, the buffer zone width must be adjusted to include an additional two hundred (200) feet.
- 3.3.6 If the land use or activity involves solid waste landfills or junkyards, the buffer zone width must be adjusted to include an additional two hundred fifty (250) feet.

Section 4. Water Quality Buffer Zone Management and Maintenance

- 4.1 The function of the water quality buffer zone is to protect the physical and ecological integrity of the waterway, to reduce flooding potential, and to filter runoff from residential and commercial development. The buffer zone vegetative target is undisturbed native vegetation.

Management of the water quality buffer zone includes specific limitations on alteration of the natural conditions. The following practices and activities are restricted within the water quality buffer zone, except with prior approval by the City of Dyersburg Storm Water Management Department:

- 4.1.1 Clearing or grubbing of existing vegetation;
- 4.1.2 Soil disturbance by grading, stripping, or other practices;
- 4.1.3 Filling or dumping; and
- 4.1.4 Use, storage, or application of pesticides, herbicides, and fertilizers.

- 4.2 The following structures, practices, and activities are permitted in the water quality buffer zone,

subject to the prior approval of the City of Dyersburg Storm Water Management Department and the following specific design or maintenance features:

4.2.1 Stream crossings, paths, and utilities

4.2.1.1 An analysis needs to be conducted to ensure that no economically feasible alternative is available;

4.2.1.2 The right of way should be the minimum width needed to allow for maintenance access and installation;

4.2.1.3 The angle of a crossing shall be perpendicular to the stream or buffer in order to minimize clearing requirements;

4.2.1.4 The minimum number of crossings should be used within each development, and no more than one crossing is allowed for every one thousand (1,000) linear feet of buffer zone. Where possible, the design of roadways and lots within a development should be aligned such that all streams are either to the rear or the side of individual lots, never along the front.

4.2.2 Individual trees within the water quality buffer zone may be removed if in danger of falling, causing damage to dwellings or other structures, or causing blockage of the stream. The root wad or stump should be left in place, where feasible, to maintain soil stability.

4.3 All site development plans and plats prepared for recording shall:

4.3.1 Show the extent of any water quality buffer zone on the subject property by metes and bounds and be labeled as "Water Quality Buffer Zone";

4.3.2 Provide a note to reference any water quality buffer zone stating, "There shall be no clearing, grading, construction or disturbance of soil and/or native vegetation except as permitted by the City of Dyersburg Storm Water Management Department"; and

4.3.3 Provide a note to reference any protective covenants governing all water quality buffer zones stating, "Any water quality buffer zone shown hereon is subject to protective covenants which may be found in the land records and which restrict disturbance and use of these areas."

4.4 All water quality buffer zones must be protected during development activities. Prior to the initiation of development activities, ensure adequate visibility of the water quality buffer zones by staking and flagging. Permanent boundary markers, in the form of signage approved by the City of Dyersburg Storm Water Management Department, shall be installed prior to the completion of the development activities.

4.5 Stream banks and other areas within the water quality buffer zone must be left in a stabilized condition upon completion of the development activities. The vegetative condition of the entire streamside water quality buffer must be monitored and landscaping or stabilization performed to repair erosion, damaged vegetation, or other problems identified. Only native vegetation may be

used in conjunction with stabilization activities. A guide to selecting native vegetation can be found at www.tva.com/river/landandshore/stabilization/plantsearch.htm, or obtained by contacting the City of Dyersburg Storm Water Management Department.

All landscaping or stabilization activities within the water quality buffer zone must have prior approval by the City of Dyersburg Storm Water Management Department. In addition, performing work in and around waters of the state may require coverage under a state and possibly a federal permit. Contact the nearest Tennessee Department of Environment and Conservation, Division of Water Pollution Control environmental assistance center for more information on whether a proposed activity requires a permit.

- 4.6 All water quality buffer zones shall be maintained through a declaration of protective covenant, which is required to be submitted for approval by the City of Dyersburg Storm Water Management Department. The covenant shall be recorded in the land records and shall run with the land and continue in perpetuity.
- 4.7 All lease agreements must contain a notation regarding the presence and location of protective covenants for water quality buffer zones, and which shall contain information on the management and maintenance requirements for the water quality buffer zones for the new resident.

Section 5. Waivers/Variances

- 5.1 This water quality buffer zone policy shall apply to all proposed development except for a development which prior to the effective date of this ordinance:
 - 5.1.1 Is covered by a valid, unexpired plat in accordance with development regulations;
 - 5.1.2 Is covered by a current, executed public works agreement;
 - 5.1.3 Is covered by a valid, unexpired building permit; or
 - 5.1.4 Has been granted a waiver in accordance with current development regulations.
- 5.2 The City of Dyersburg Storm Water Management Department may grant a variance for the following:
 - 5.2.1 Those projects or activities where it can be demonstrated that strict compliance with the ordinance would result in practical difficulty or financial hardship; or
 - 5.2.2 Those projects or activities serving a public need where no feasible alternative is available;
 - 5.2.3 The repair and maintenance of public improvements where avoidance and minimization of adverse impacts to wetlands and associated aquatic ecosystems have been addressed.
- 5.3 Waivers for development may also be granted in two additional forms, if deemed appropriate by the City of Dyersburg Storm Water Management Department:
 - 5.3.1 The water quality buffer zone width may be relaxed and permitted to become narrower at some points as long as the width is not reduced to less than twenty one (21) feet perpendicular from the top of bank, and the overall average width of the buffer meets the

minimum requirement.

5.3.2 The City of Dyersburg Storm Water Management Department may offer credit for additional density elsewhere on the site in compensation for the loss of developable land due to the requirements of this ordinance. This compensation may increase the total number of dwelling units on the site up to the amount permitted under the base zoning.

5.4 The applicant shall submit a written request for a variance to the City of Dyersburg Storm Water Management Department. The application shall include specific reasons justifying the variance and any other information necessary to evaluate the proposed variance request. The City of Dyersburg Storm Water Management Department may require an alternatives analysis that clearly demonstrates that no other feasible alternatives exist and that minimal impact will occur as a result of the project or development.

5.5 When considering a request for a variance, the City of Dyersburg Storm Water Management Department may require additional information such as, but not limited too, site design, landscape planting, fencing, the placement of signs, and the establishment of water quality best management practices in order to reduce adverse impacts on water quality, streams, and wetlands.

Section 6. Conflict with Other Regulations

6.1 Where the standards and management requirements of this buffer ordinance are in conflict with other laws, regulations, and policies regarding streams, steep slopes, erodible soils, wetlands, floodplains, timber harvesting, land disturbance activities or other environmental protective measures, the more restrictive requirements shall apply.

Appendix B
City of Dyersburg
DRY DETENTION ORDINANCE

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Section 1. Description

- 1.1 A detention basin (also known as a detention pond) is the most common method to satisfy stormwater detention requirements. It is applicable to small and large developments, can be easily designed and constructed, and is long-lasting and durable while reducing peak flows (with adequate inspection and maintenance). This practice can also provide a reduction in sediment, as well as a reduction in nutrients, toxic materials, heavy metals, floatable materials, oxygen demanding substances, and oil and grease.
- 1.2 A dry detention basin is intended to drain dry between storm events but sometimes may not have a chance to drain completely between closely occurring storm events. The detention basin begins to fill as stormwater runoff enters the facility. The first flush volume is captured in order to improve water quality. One or more outlet structures then release the stormwater runoff slowly to reduce peak discharge rates and to provide time for sediments to settle. Litter and debris are prevented from leaving the detention basin, and soluble pollutants are captured by a combination of vegetation and soils.

Section 2. Selection Criteria

- 2.1 The primary objective is to reduce the incoming peak flow discharge and slow the stormwater runoff response from a particular property or development, thus reducing flooding downstream.
- 2.2 The secondary objective is to remove suspended sediments, trash and debris, oil, grease and other pollutants to protect the water quality of Tennessee streams and channels. Although dry detention basins are usually not as effective at removing soluble pollutants as wet detention basins and wetlands, dry detention basins are usually easier and less expensive to construct, inspect and maintain. Dry detention basins can be used wherever a lack of sufficient supply water would prevent the use of wet detention basins or wetlands.
- 2.3 Dry detention basins can also supply multiple benefits for passive recreation during dry periods (recreational trails, ball fields, picnicking). Portions of a dry detention basin that are not wetted frequently can be attractively landscaped or used for other purposes.

Section 3. Design and sizing considerations

- 3.1 A permanent detention basin design must be stamped by a professional engineer licensed in the state of Tennessee. The professional engineer must be qualified by education and experience to perform the necessary hydrologic and hydraulic calculations.
- 3.2 As the primary objective, dry detention basins must be designed to have adequate detention storage and outlet structures to limit the peak discharge rate for the

postdevelopment conditions to be no greater than the peak discharge rate for the predevelopment conditions. Multi-stage detention is required for the 1-year, 2-year, 5-year, 10-year, and 25-year storms (with NRCS Type II 24-hour rainfall distribution). Additional stages (i.e. 50-year and 100-year) may be required for special watersheds.

- 3.3 As the secondary objective, water quality improvement is obtained through the use of the first flush treatment volume. The first 0.5 inches of stormwater runoff, over the entire contributing drainage area of the development, is defined as the first flush volume (with a minimum value of 4500 cubic feet). The initial wave of stormwater runoff is more likely to contain aerially-deposited sediments, particulates from vehicles (such as incomplete combustion, dust from brake linings, tire particles), leaves, trash, cigarette butts, etc. The first flush volume must be captured and then slowly released over a minimum 24-hour period (and maximum of 72 hours).
- 3.4 Additional measures may be required to improve stormwater quality, depending upon the nature of the land use and expected pollutants. Pretreatment of stormwater runoff with a media filtration inlet or oil/water separator may be necessary. A trash rack for capturing floating debris is generally considered to be standard equipment for a stormwater treatment BMP.

Section 4. Location and layout

- 4.1 Basic elements of a dry detention basin are illustrated in Figure 1. The recommended design includes the use of a sediment forebay to reduce sediment loading, particularly if the post-construction detention basin is a modification from a temporary sediment basin during the construction phase. The use of an upper stage (for storage of infrequent storms) is optional; there are both benefits and drawbacks. A shallow detention basin with a large surface area will usually perform better than a deeper detention basin with the same volume. However, shallow storage areas increase the overall surface area needed for detention.

Design flow paths to minimize potential short-circuiting by locating the drainage inlets to the basin as far away from the outlet structure as possible. The length-to-width ratio of a basin should be at least 3:1. Baffles or backslope drains may be used to prevent short-circuiting for ratios less than 3:1. Increase pond area and volume to compensate for dead spaces if topography or aesthetics require the pond to have an irregular shape. It is important to reduce the velocity of incoming stormwater using riprap or other energy dissipaters.

Although dry detention basins are generally less expensive to construct and maintain than wet detention basins, they provide lower water quality benefits. The primary disadvantage of a dry detention basin is the amount of surface area required, which can be reduced somewhat by using concrete retaining walls on one or more sides. In general, concrete retaining walls should not face southward in order to reduce the potential for heating on hot summer days.

Interaction with site utilities must be considered during preliminary design. Typical utilities include electrical, telephone, cable TV, water, sewer, natural gas, petroleum, etc. These utilities may or may not be in a dedicated utility easement, so it is always necessary to conduct a careful site survey. Detention basins (including embankments) should not be allowed over utility lines. Conversely, utility trenches should not be constructed on existing detention basin structures.

Detention basin easements and access must be considered during preliminary design, in order to allow for the construction easement and maintenance. Detention basins that are not frequently inspected and maintained often become more of a nuisance than a beneficial part of a stormwater management program. In particular, provide access for inspection and maintenance to the sediment forebay and to the outlet control structure. It may also be desirable to encourage or discourage public access to the detention basin (by using site grading, signs, fences or gates). Additional safety elements include trash racks, grating over pipes and culverts, gentle side slopes whenever possible, increased visibility and/or lighting in residential areas, etc.

Small detention basins serving individual properties do not offer as much recreational benefits as community or regional detention basins would. Regional facilities can often be landscaped to offer recreational and aesthetic benefits. Jogging and walking trails, picnic areas, and ball fields are some of the typical uses. For example, portions of the facility for flood control of major design storms can be used for exercise areas, soccer fields, or football fields. Wildlife benefits can also be provided in the form of islands, buffer areas, or preservation zones. It is important to maintain such areas, however as their primary purpose is for stormwater management. Under no circumstances should debris be allowed to accumulate near the outlet.

Section 5. Volume and size

- 5.1 The volume of a dry detention basin consists of two elements: the live pool (the upper portion of the basin representing detention capability) and the first flush volume (the lower portion of the basin representing stormwater quality treatment). Since the post-development peak runoff may not exceed the pre-development peak flow rate, the upper section's volume should be based on a standard storage routing method.

Detention basins shall be sized to collect the 0.5 inches of stormwater runoff from the entire contributing area, or the first 4500 cubic feet of stormwater runoff, whichever is greater. The first flush volume must be released at a controlled rate over a minimum 24-hour period (and a maximum 72-hours period).

As a warning to those who design detention basins, it should be realized that future stormwater regulations are likely to be more stringent than the current regulations. This is mostly driven by national and state laws and regulations, which will require municipalities and county governments to accomplish additional

pollution reduction with a proportional effort for water quality monitoring and enforcement.

Section 6. Grading

- 6.1 Side slopes of detention basins and embankment dams shall be 3: 1 (H:V) or flatter, except where approved by the engineering reviewing authority. This encourages a strong growth of vegetation on the side slopes, helps to prevent soil erosion, and allows for safer mowing. Steep slopes, particularly on embankments or other fill soils, will contribute to soil erosion if not properly vegetated or stabilized, and thereby reduce or negate the effectiveness of a dry detention basin with respect to water quality. Vegetate the side slopes and basin bottom to the maximum extent practical. If significant side erosion is expected, consider the use of soil stabilization or armoring techniques. Detention basins should not be located immediately above or below a steep slope or grade, because impounded water may create slope stability problems.

Minimum width for top of embankment is 6 feet. The embankment height should allow for up to 10% settlement of embankment, unless the embankment is thoroughly compacted with vibratory equipment or sheepsfoot rollers. The top of embankment (after expected settlement) shall generally be at least 2 feet above the top of outlet structure and at least 1 foot above the peak 100-year water surface elevation. Compaction in the immediate area of the emergency spillway can be difficult, but is necessary.

The use of a backslope drain can be very beneficial in preventing erosion at detention basins. See Figure 5 for a typical detail. The backslope drain is also useful for increasing lengths of flow paths to prevent short circuiting of the detention basin. Intercepted stormwater can be routed around the detention basin to enter at the most hydraulically distant point from the outlet structure.

Section 7. Outlet Structure

- 7.1 Detention basin outlet structures should be constructed of durable materials, such as concrete. Corrugated metal pipe (CMP) and plastic (HDPE) risers and drain pipes are popular in engineering design, but are susceptible to crushing, corrosion, and flotation in detention basins. A concrete outlet structure is required because it is sturdier and more durable. Provisions should be made for sufficient reinforcement and anchoring of the riser and drain pipe system.

The specific flow-controlling elements of an outlet structure may include one or more of the following: a circular orifice, a noncircular orifice, a rectangular weir, a trapezoidal weir, a triangular weir, a V-notch weir, culvert entrance control or a riser overflow opening.

Figures 2 and 3 illustrate possible designs for the outlet structure. These details are only two possible ways to accomplish stormwater detention and stormwater

quality control. The first flush volume is typically drained during a minimum time of 24 hours by using an orifice with a designed size. Maximum drain time should be less than 72 hours to allow for sufficient volume recovery prior to the next period of rainfall. The first flush volume can be filtered through sand by using an underdrain system (shown in Figure 2) or by an aboveground filter box with sand or aggregate (shown in Figure 3). Figure 4 shows an alternative outlet structure with a water quality manhole. Provide an emergency spillway in order to route large storms through the facility without overtopping.

Section 8. Emergency Spillway

- 8.1 An emergency spillway should be included in addition to the primary outlet structure on a detention pond. The purpose of this spillway is to pass storm events that exceed the design capacity of the pond, in order to prevent overtopping the embankment. The emergency spillway should be located over an undisturbed abutment area and not over the embankment fill for stability reasons, except where approved by an engineering reviewing authority. The emergency spillway capacity should be designed to prevent overtopping the embankment structure or dam during a storm event commensurate with the impoundment volume, dam size, and downstream flood hazard potential in event of dam failure. The minimum spillway capacity should be capable of handling a 100-year storm event. Where feasible, the emergency spillway should be made independent from the riser control structure to avoid the possibility of overtopping from riser or drain pipe clogging from vandalism or trash. The designer is referred to the requirements set forth in the Tennessee Safe Dams Act and Regulations at: www.state.tn.us/environment/permits/safedam.htm.

Section 9. Other Design Elements

- 9.1 Sediment forebay – to facilitate the cleanout of sediment, trash, debris, leaves, etc. The sediment forebay typically contains 5% to 10% of the total volume. It should be located at a point where velocities have dissipated, to allow large sediments and debris to settle out. A forebay can be separated from the remainder of a detention basin by several means: a lateral sill with rooted wetland vegetation, rock-filled gabion, rock retaining wall, or rock check dam placed laterally across the basin. The sediment forebay should be easily accessible so that it can be inspected and maintained.
- 9.2 Public safety should be considered, particularly in residential areas. Operating detention basins often attract neighborhood children. Avoid steep slopes and drop-offs; consider routes for escaping the detention basin if a person accidentally falls in. Avoid depths over 4 feet when possible; provide fencing and signs in areas where children may potentially play, and where steep slopes are used in the detention area.
- 9.3 A low-flow channel (or concrete trickle ditch) can assist in completely draining detention basins with flat slopes. It also assists with the observation and removal

of accumulated sediment. A typical design would be a triangular ditch, 4' wide and 3" deep with a slope of 0.5 to 1.0 percent.

- 9.4 Anti-seep collars or a cutoff layer of compacted clay are required around the outlet pipe to prevent internal piping and erosion. An anti-seep collar should extend at least one pipe diameter from the culvert in all directions, with compacted clay backfill using small mechanical tampers. The designer is referred to the Tennessee Erosion & Sediment Control Handbook for anti-seep collar considerations.
- 9.5 To prevent the outlet riser from clogging, include trash racks or other debris barriers with a maximum opening size of 6 inches on all outlet structures, except for any emergency spillway structures that are designed for a 100-year storm or greater return period. Trash racks that are placed at an angle to the direction of flow tend to force debris up and away from the outlet opening and are somewhat less vulnerable to clogging. These racks should be regularly cleaned and maintained.
- 9.6 Provide a permanent means for vehicle access to the detention basin. Detention basins must be located in a maintenance easement so that authorities have the right to inspect the facility. This easement should be free of large trees and excessive vehicle grades.
- 9.7 A skimmer, oil/water separator or other type of stormwater runoff pretreatment is recommended for drainage areas having greater than 50 percent impervious surface or where there may be a potential source of oil and grease contamination. In addition to most large parking lots, oil and grease contamination is also likely for vehicle fueling and maintenance facilities.
- 9.8 An anti-vortex device for the outlet structure may be needed for very large detention basins in areas where public access is not controlled. The anti-vortex device may be a combination of vanes above the outlet structure or guide walls around the outlet structure, that increases the inlet flow efficiency and might lessen the chance of humans drowning or reduce the potential for erosion and structural undercutting. The designer is referred to the Tennessee Erosion & Sediment Control Handbook for anti-vortex and trash rack considerations.

Section 10. Construction /Inspection Considerations

- 10.1 Inadequate storage is the most frequent problem that occurs in the design review before construction, and also for the as-built review after construction. This can occur for several reasons:
 - 10.1.1 The design engineer may not allow enough room to construct the detention basin (most often due to insufficient design detail such as slope

transitions, setbacks, property lines, drainage easements, parking lot widths, inaccurate contours, or incorrect/omitted utilities locations).

- 10.1.2 The engineer who performs the stormwater computations may not be the same person who does the site layout and grading details. The required detention storage volume and outlet structure details need to be communicated clearly to the design engineer for inclusion on the plans and for construction layout.
 - 10.1.3 The construction contractor may not correctly follow the design plans, and consequently, does not excavate deep enough or build berms of sufficient height to hold the required detention volume. This may occur due to rock formations encountered or to groundwater. It is important that the elevation-volume configuration shown on the plans be preserved during construction so that the detention basin functions according to intended design.
 - 10.1.4 The construction contractor changes the basin configuration during the construction without being aware of the required volume. Approval from the engineer was not obtained for a design change.
- 10.2 It is highly recommended that the design engineer be involved in the construction and inspection phases of the detention basin. Special attention should be given to the requirements for detention basin volume, elevations and sizes of each outlet, embankment crest and emergency spillway crest elevations; embankment compaction, side slopes, size and shape of various weirs or orifices, outlet structure anchoring, trash racks, and installation of anti-seepage collars.

Proper hydraulic design of the outlet is critical to achieving good performance for both stormwater detention and stormwater quality of the dry detention basin. The two most common problems for detention basin outlets are:

- 10.2.1 The discharge capacity of the outlet system is too great at the detention design depth. This causes excessive basin outflows and results in fast drawdown times and inadequate filling of the detention basin volume. Both stormwater outflow and stormwater quality will suffer.
- 10.2.2 The outlet structure clogs because it is not adequately protected against trash and debris. The use of innovative trash racks is recommended. Effective trash racks are often created using welded rebar with 6-inch openings. Sloped trash racks are preferable to vertical ones for forcing floating debris upward and away from the opening, rather than being forced against the trash rack, and causing clogging. This is sufficient to stop most beverage cans, fast food containers, tree limbs, etc. Properly designed and installed trash racks also provide a measure of safety to children who may otherwise be pulled toward and held against the opening.

Section 11. Inspection and Maintenance

- 11.1 Effective and safe operation of a detention basin depends on continuous maintenance of all system components. Detention basin easements and access must be considered during the planning stage in order to allow for proper inspection and maintenance.
 - 11.1.1 Inspect the dry detention basin regularly (e.g. at least monthly) and particularly after heavy rainfall events. Record all observations and problems. Perform any maintenance and repair erosion promptly. Remove debris and trash after storm events. Check all outlet structures regularly for clogging.
 - 11.1.2 Detention basins should be surveyed approximately every 5 years to check for adequate embankment settlement and freeboard and for storage volume as per intended engineering design calculations and plans.
 - 11.1.3 Remove sediment when accumulation becomes noticeable (1" to 2" over a wide area) or if resuspension is observed or probable. Sediment may be permitted to accumulate if the detention basin volume has been oversized with adequate controls to prevent further sediment movement. If a sand underdrain is used, look for reduced first flush infiltration or ponded water; sand layer replacement or maintenance may be needed.
 - 11.1.4 Maintain a thick and healthy stand of vegetation (usually grass). Mow or trim at regular intervals to encourage thick growth. Remove leaves, grass clippings, or sticks from detention basin regularly to prevent stormwater pollution. Remove trees or nuisance vegetation as necessary to ensure structural integrity of embankments. Signs should be posted at detention ponds to discourage local homeowners from depositing yard trimmings, waste, and fill materials inside the basin. Appropriate signs and barriers such as fences should also be considered at detention basins where children have easy access to the site.

Section 12. Sediment Removal

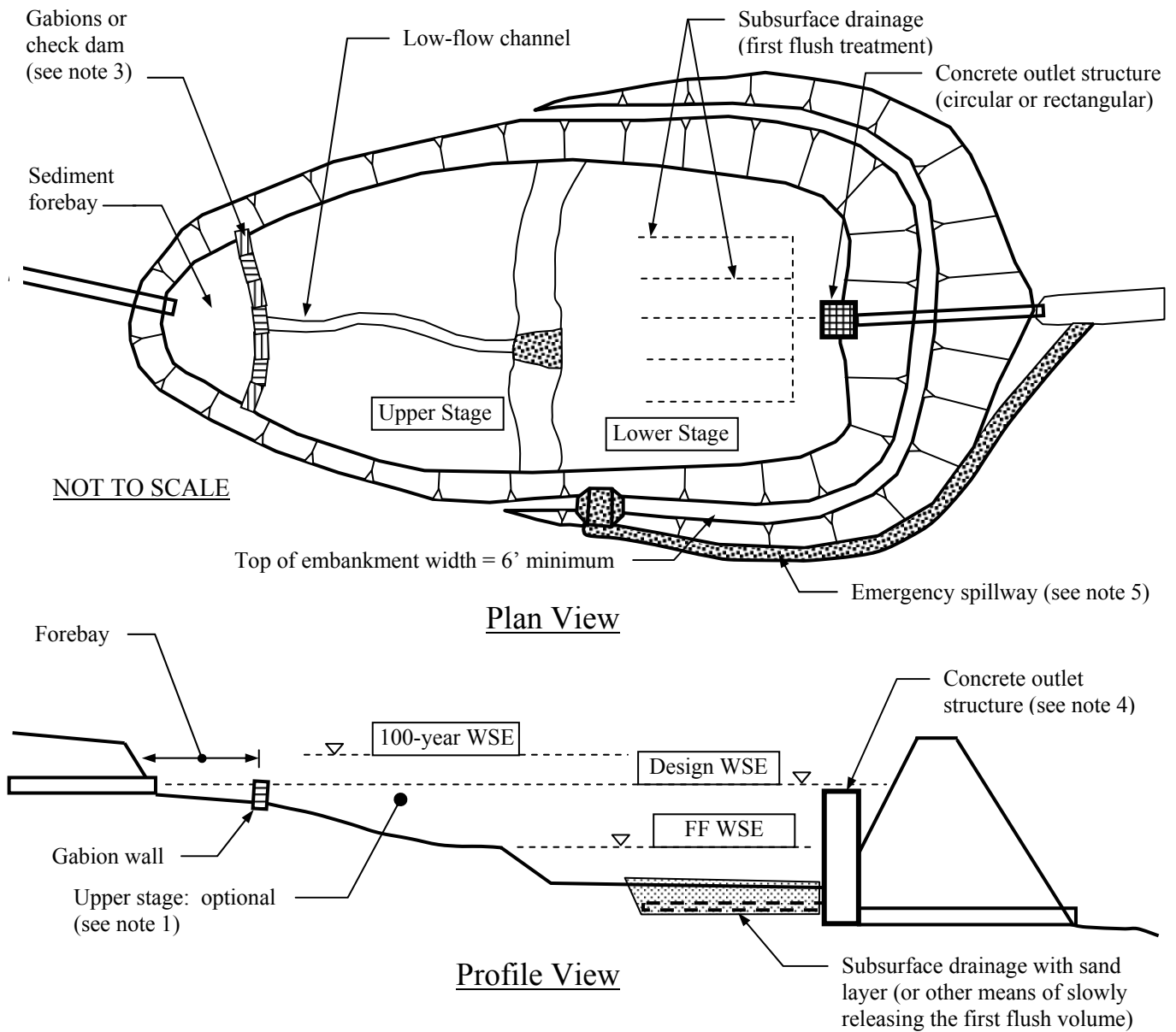
- 12.1 A primary function of stormwater treatment BMPs is to collect and remove sediment, which is a pollutant itself and is associated with several other attached pollutants. The sediment accumulation rate is dependent on a number of factors including watershed size, facility sizing, construction upstream, and nearby industrial or commercial activities, etc. Sediments should be identified before sediment removal and disposal is performed. Special attention or sampling should be given to sediments accumulated from industrial or manufacturing facilities, heavy commercial sites, fueling centers or automotive maintenance areas, parking areas, or other areas where pollutants are suspected. Sediment should be treated as potentially hazardous until proven otherwise.

Some sediment may contain contaminants for which TDEC requires special disposal procedures. Consult TDEC – Division of Water Pollution Control if there is any uncertainty about what the sediment contains or if it is known to contain contaminants. Clean sediment may be used as fill material or land spreading. It is important that this material not be placed in a way that will promote or allow resuspension in stormwater runoff. Some demolition or sanitary landfill operators will allow the sediment to be disposed at their facility for use as cover. This generally requires that the sediment be tested to ensure that it is innocuous.

Section 13. Limitations and Special Requirements

- 13.1 A dry detention basin will require frequent inspection and maintenance. Trash, debris, leaves and other large items should be removed from the detention basin following each rainfall event. If upstream erosion is not properly controlled, dry detention basins can be maintenance-intensive with respect to sediment removal, nuisance odors, insects and mosquitoes, etc.
- 13.2 A dry detention basin may not have sufficient vegetation on the slopes and bottom to prevent erosion. Vegetation must be maintained and cut at adequate intervals. Remove grass clippings from detention basin immediately after cutting, using rakes or other hand equipment.
- 13.3 A dry detention basin that impounds more than 30 acre-feet of volume (and minimum 6 feet high) or which is higher than 20 feet (and minimum 15 acre-feet of volume) is subject to the Tennessee Safe Dams Act of 1973 and as amended by law. The Safe Dams Act is administered by the TDEC Division of Water Supply; further information on design standards, regulations and permit applications is available at the TDEC website:

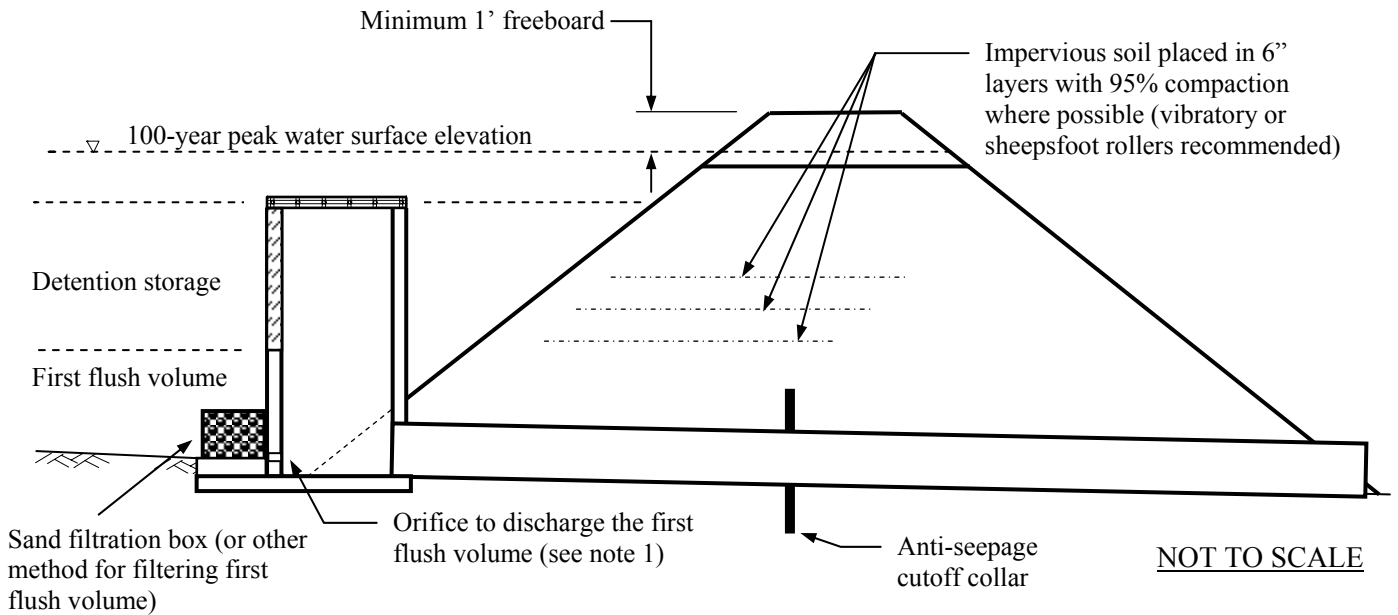
<http://www.state.tn.us/environment/permits/safedam.htm>



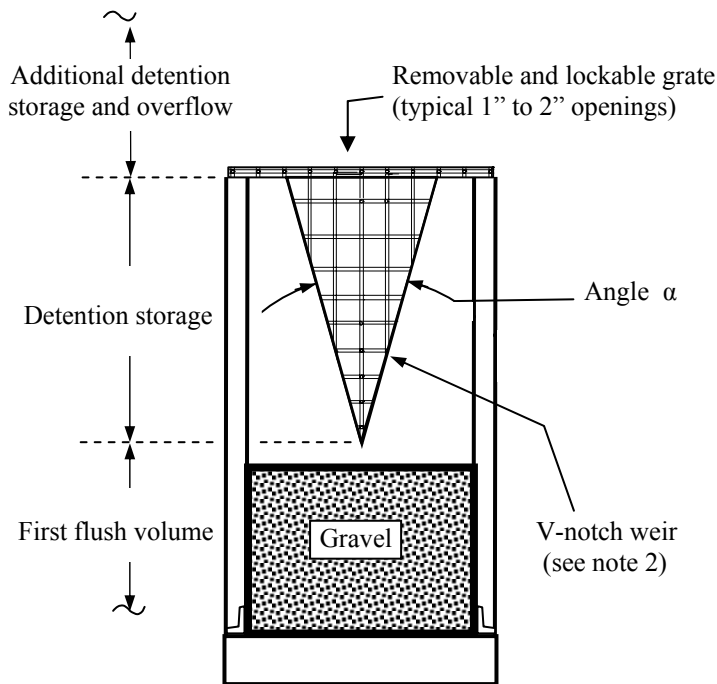
Notes:

1. This example of a typical dry detention basin layout shows an upper stage which is used for stormwater detention on infrequent storms. An upper stage can also be located on the side of a dry detention basin, eliminating the need for a low-flow channel.
2. The lower stage is sized to handle the first flush volume.
3. A forebay can be constructed from gabions, rock check dams, or a separate berm with culvert. A forebay can facilitate the capture and cleanup of coarse sediments, debris and trash.
4. The outlet structure typically has orifices or weirs at computed elevations that will release the 1-year, 2-year, 5-year, 10-year and 25-year storms at the specified predevelopment peak flow rates.
5. The emergency spillway is generally constructed on natural ground or excavated areas (rather than fill soils) to reduce the potential for erosion and washout.
6. There are several types of first-flush and outlet structures available. The designer should check with the design reviewing authority before submitting novel or alternative design approaches.

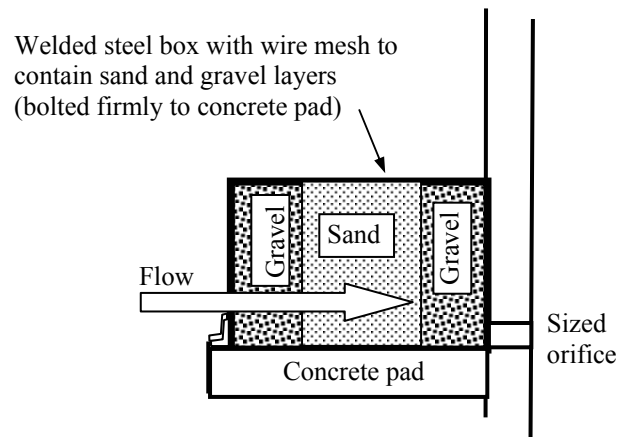
Figure 1 - Typical Dry Detention Basin Layout



Typical Outlet Structure (V-notch)



V-Notch Weir
(to control outflows)



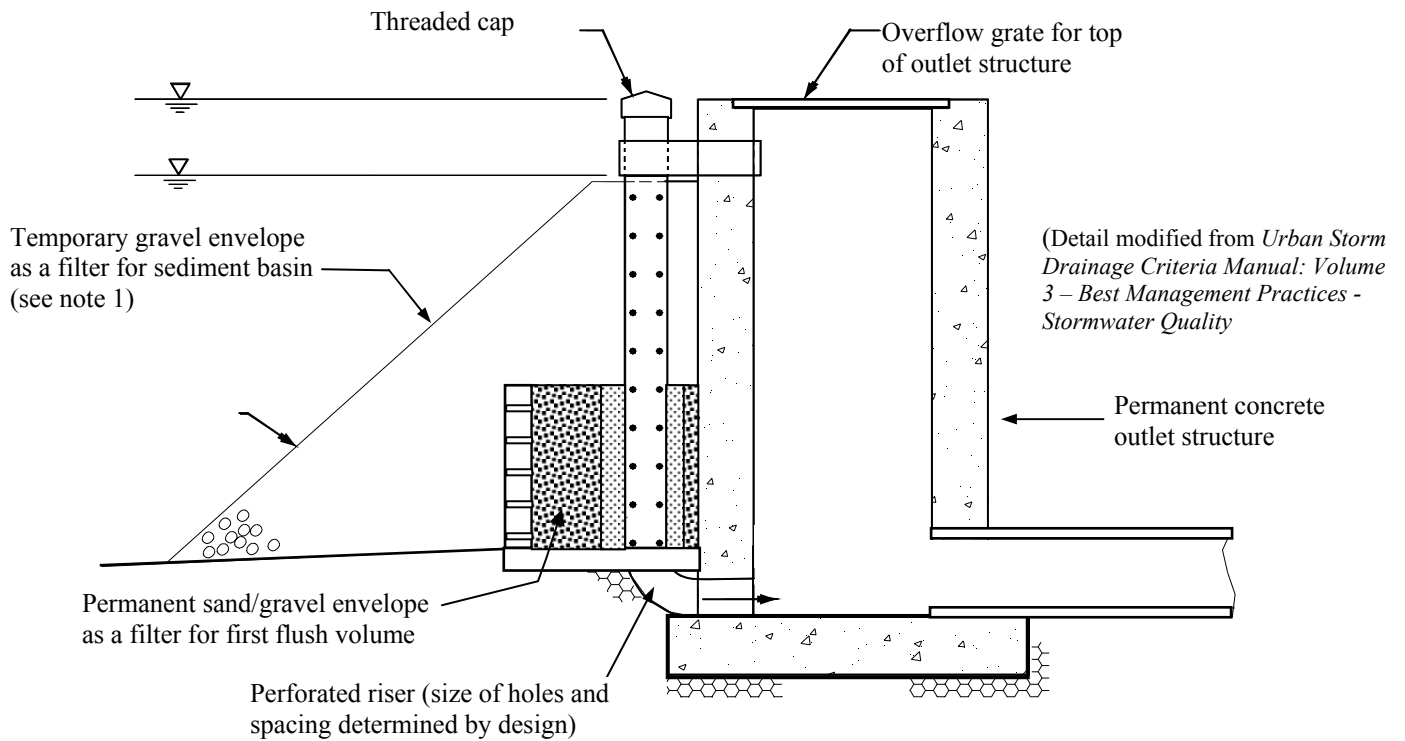
Sand Filtration Box
(first flush release)

Notes:

1. The orifice is sized to release the first flush volume over a period from 24 to 72 hours. Protect the orifice from clogging by a sand filtration box, gravel filtration box or with a trash rack.

2. This example of a typical outlet structure shows a V-notch weir which should be sized to release the 1-year, 2-year, 5-year, 10-year and 25-year storm peak flows at the predevelopment rates. Other control geometries such as orifices or culverts may also be used.

Figure 2 - Typical Outlet Structure
(shown with a V-notch weir & sand filtration box)



Notes:

1. This type of outlet structure may be used as a temporary modification to a dry detention basin (so that it may also be function as a sediment basin). A temporary plastic riser is securely fastened using bolts, screws or threaded connectors.
2. This type of outlet structure may be used as a permanent outlet structure for a dry detention basin. Maintain clean sand/gravel envelope in unclogged condition within an enclosure in front of outlet structure to protect the perforated riser.

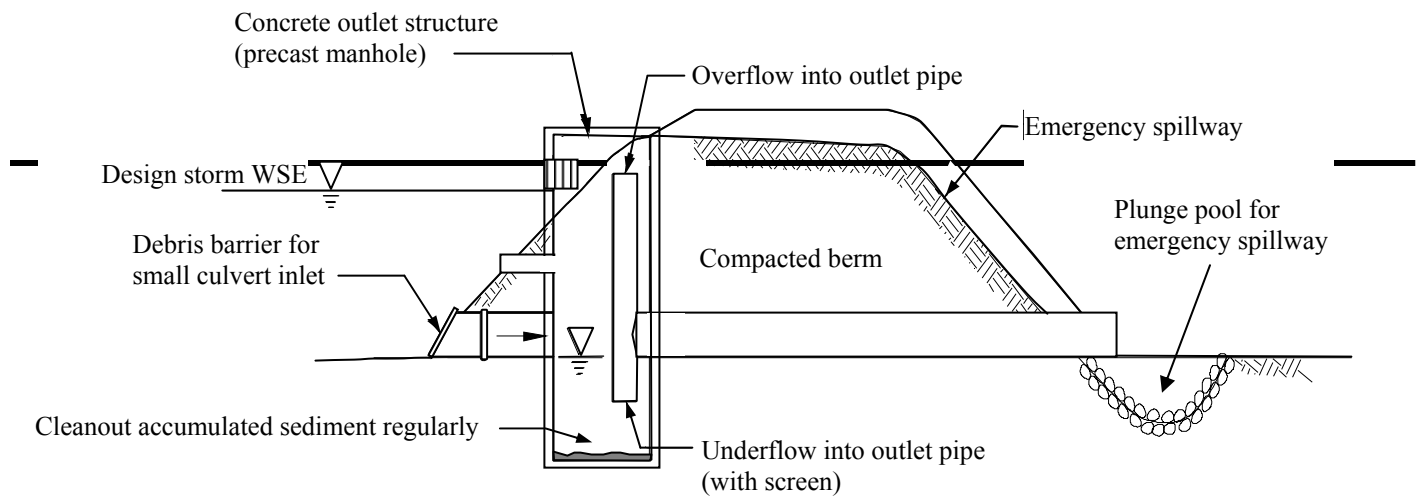


Figure 4 – Alternative Outlet Structure (B)
(includes water quality manhole with underflow)

A backslope drain has two purposes:

1. Safely convey stormwater to the bottom of a detention basin slope.
2. Increase flow paths by channeling stormwater into the detention basin far from outlet structure.

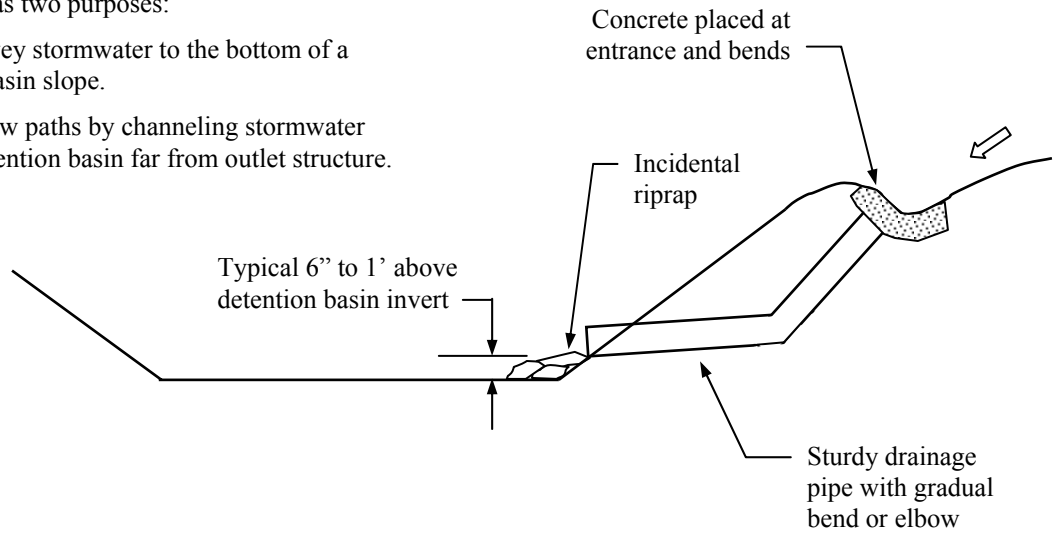


Figure 5
Typical Detail - Backslope Drain