

F. STORMWATER MANAGEMENT STANDARDS

1. General

- a. No person shall develop any land without having provided for appropriate drainage and stormwater management measures that control or manage runoff in compliance with these Regulations.
- b. The responsible Design Engineer shall not submit any plat of a subdivision or plan of development which does not make provision for stormwater runoff as required by these Regulations.
- c. All plans, specifications and calculations submitted to the City for review shall be prepared, signed and sealed by a licensed professional engineer registered in the State of Alabama.
- d. The Design Engineer shall submit a drainage narrative, drainage calculations, assumptions and maps for each inlet, pipe and ditch within the proposed development. The drainage narrative shall, at a minimum, summarize the assumptions, calculations and results of the design for each drainage basin as well as the whole project.
- e. The storm water drainage system shall be separate and independent of any sanitary sewer system.
- f. The developer and Design Engineer are encouraged to contact the City for a pre-design conference at the conceptual stage of the project. Such conference would be mutually beneficial to outline the complexity and scope of design, applicability of criteria and elimination of possible items of conflict during the review process. Subsequent conferences during the preparation of plans may be arranged by the Design Engineer or the developer to obtain preliminary, informal decisions on items in need of clarification.
- g. Drainage openings shall be designed as to not restrict flow of flood waters or increase upstream flood heights.
- h. Potential development may be derived from the most-current City or County comprehensive plan or zoning ordinances, or large-scale development master plans.
- i. The applicant shall be required to carry away by pipe or open ditch any spring or surface water within or affecting the Right of Way, that exists either previously to, or as a result of, the subdivision or development. Such drainage facilities shall be located in the road right-of-way or in areas with perpetual unobstructed drainage easements of sufficient width, unless approved by Spanish Fort Planning and Zoning Commission.
- j. Developments which produce an increase in the volume or velocity of stormwater runoff shall be required to construct stormwater management facilities. The Design Engineer shall submit

detailed engineering calculations and plans to the City including pre-development runoff, post-developed runoff, post-developed runoff with detention/retention, stormwater facility details, method of discharge, and other information as required for review.

- k. The drainage system and all stormwater management structures within the City limits or within the extra-territorial jurisdiction over which the City regulates subdivisions, whether publicly or privately owned, shall be designed to the same engineering and technical criteria and standards.
- l. Provisions shall be made to address an event in excess of the 100 year event to ensure that the retention/detention facility survive such event.
- m. All retention/detention facilities shall be owned, operated and maintained by the owner or Property Owners' Association and shall not be accepted for maintenance by the City of Spanish Fort. The developer/owner shall include the method and responsibility of maintenance for the retention/detention facility after it is constructed.
- n. Post-development release rates shall not exceed pre-development rates for a 2, 5, 10, 25, 50 and 100 year event. In no case shall discharge from a drainage basin exceed the hydraulic capabilities of the initial receiving downstream drainage structures. The Planning Commission may withhold approval of the subdivision until provision has been made for the necessary downstream improvement.

2. Minimum Requirements for Stormwater Management and Design Criteria

- a. The design criteria establishes minimum elements of design which must be implemented with good engineering and good workmanship. Use of the information contained herein for placement of any structure or use of land shall not constitute a representation, guarantee, or warranty of any kind by the City of Spanish Fort, its officers or employees, of the practicability, adequacy or safety of such designs and shall not create liability upon or a cause of action against any such public body, officer or employee for any damage that may result pursuant thereto.
- b. At a minimum, storm drainage structures shall be designed to the following standards:

DRAINAGE STRUCTURE	MAXIMUM STORM EVENT
Side Drain or Lateral Storm Sewer	10 year, 24 hour
Crossing (Closed) Storm Sewer	25 year, 24 hour
Culvert (Open) Cross Drainage	25 year, 24 hour
Bridge or Bridge Culvert	50 year, 24 hour*
Detention/Retention Ponds	100 year, 24 hour

*FEMA Flood Zone Requirements may require a 100 year design and FEMA coordination.

3. Drainage Systems

- a. The method of determining stormwater runoff shall be as follows:
 - i. For areas less than 200 acres, the engineer may use the Rational Method for determining inlet spacing, roadway spread, and the sizing of opened and closed pipe network and collection basins. The Kirpich Equation shall be the only method which may be used to determine the time of concentration.
 - ii. For areas greater than 200 acres, the engineer may only use Regression Equations (rural or urban) or SCS Method.
- b. Calculations shall include a scale map of the off-site and on-site drainage areas and the slope, type, size, flow, velocity and the headwater and tailwater elevations for each pipe and structure.
- c. The Design Engineer must analyze the backwater produced and verify that no upstream property will be flooded or otherwise adversely affected by the design storm.
- d. Inlets shall be provided so that surface water is not carried across any intersection or for a distance of more than 600 feet in the gutter. When calculations indicate that curb capacities are exceeded at a point, catch basins shall be used to intercept flow at that point. The spread of surface water carried in the gutter shall not exceed ½ of the design lane width.
- e. All cross drain pipes and common driveway culvert pipes shall be reinforced concrete and have a minimum size of 18 inches in diameter, or an equivalent arch pipe. Only pipe that meets specifications equaling ALDOT Specifications will be acceptable.
- f. Open ditches or swales shall be constructed with a maximum slope of 3:1 unless otherwise approved by the City Engineer. Ditches shall have flat bottoms. Calculations shall show the volume and velocity for each different ditch section. Ditch lining shall be designed based on the stormwater volume and velocity calculations.
- g. The longitudinal grade of an open ditch or swale shall not be less than 0.3%.
- h. A minimum 3:1 concrete sloped paved headwall shall be required on all pipe culverts; a minimum 4:1 concrete sloped paved headwalls are required on pipe culverts that are parallel to traffic flow.

- i. Where proposed lots will gain access across an existing or a proposed roadside ditch, calculations shall be submitted that show the required size of future driveway culverts. These culvert sizes must be shown on the Final Plat or Site Plan.
- j. Special types of headwalls, rip-rap and other materials may be required by the City Engineer or his/her designee when deemed necessary for erosion control, protection of existing downstream drainage facilities and roadside safety.
- k. Storm sewer networks, cross drains, driveway pipes, etc. located within right-of-ways or in easements must have an access opening – either an inlet or junction box – at a maximum spacing of 300 feet.

4. Detention/Retention Facilities

- a. The SCS Method shall be used to determine the sizing of stormwater detention/retention areas. The Rational Method will not be permitted for such use.
- b. Retention/detention facilities shall be dedicated as common space located within the parcel limits of the project under consideration. No retention/detention or ponding will be permitted within public road right-of-ways.
- c. Location of retention/detention facilities off-site will be considered by special request if proper documentation is submitted with reference to practicality, feasibility and proof of ownership or right-of-use of the area proposed.
- d. No retention/detention facility shall be located in jurisdictional wetlands, unless approved by the COE.
- e. It is required that retention/detention facilities along with access to those facilities shall be located in common areas. Projects developed under these procedures shall include provisions for maintenance by the owners or property owners' association.
- f. Existing areas that currently retain stormwater shall be preserved within common space and in their current state. The developer may request to fill the area as long as no wetlands are involved and similar capacity is provided onsite or included in a proposed retention/detention facility that discharges into the same drainage basin.
- g. In locations where the discharge from a development will be directly into a tidally influenced body of water, the Planning Commission may consider waiving the stormwater management requirement, upon request by the Design Engineer. The Planning Commission has the sole discretion of whether or not this will be allowed. This will not alleviate the developer from any

- erosion/sedimentation control requirements. However, the development will be required to control velocities of stormwater leaving the site.
- h. Differential runoff evaluation consists of determination of rates of runoff before and after development, determination of required volume of retention/detention and verification of adequacy of discharge and control structures.
 - i. Design of the facility outlet structure will be based upon land use conditions for the area within the proposed development and existing land use characteristics for upstream areas draining to the facility outlet structure.
 - j. The expected timing of flood peaks through the downstream drainage system shall be considered by the Design Engineer when planning the use of detention facilities.
 - k. Permanent lakes with fluctuating volume controls may be used as retention/detention areas provided that the limits of maximum ponding elevations are no closer than 30 feet horizontally from any building and less than 2 feet below the lowest sill elevation of any building.
 - i. Maximum size slopes for the fluctuating area of permanent lakes shall be one (1) foot vertical to three (3) feet horizontal (1:3); unless proper provisions are included for safety, stability and ease of maintenance.
 - ii. Special consideration is suggested for safety and accessibility for children in design of permanent lakes in residential areas.
 - iii. Viability of the permanent impoundment shall be considered. An acceptable guideline is to make the area of the permanent pool no greater than one-tenth the size of the tributary drainage area. It is suggested that the minimum depth of 25 percent of the permanent pool area be no less than 8 feet. Allowances for silting under denuded soil conditions (during construction) for a period no less than one year is also recommended.
 - iv. The entire fluctuating area of the permanent reservoir shall be seeded, fertilized and mulched, sodded or paved prior to release of surety if required by the City. Any area susceptible to or designed as overflow by higher design intensity rainfall, as indicated previously, shall be sodded or paved.
 - l. Other methods of retention/detention such as seepage pits, french drains, etc. are subject to approval by the City Engineer. If other methods are proposed, the Design Engineer shall submit documentation, including, but not limited to, soils data, percolation data, geological features, maintenance procedures, etc. for review and consideration.

- m. Calculations shall be included in the drainage narrative developed by the Design Engineer that demonstrates adequacy of the system for a 2, 5, 10, 25, 50 and 100 year event. Additional items include, but are not limited to:
 - i. Proof of volume of retention for each facility is included
 - ii. Ratios of in-flow to out-flow
 - iii. Tributary peak flow runoff to basin
 - iv. Sizing of the overflow structure(s)
 - v. Stability of berms, dikes, slopes, etc.
 - vi. Safety features
 - vii. Routing calculations in tabulated form
 - viii. Pre-development, post-development and post-development with detention intensity/duration graph to illustrate design is in compliance for each storm event.

5. Bridge Standards

- a. Any structure(s) – including culverts, battery of pipes, etc. – that spans 20 feet or more along the centerline of the roadway shall be considered a bridge structure. Any bridge structure proposed within the City’s jurisdiction shall be designed and constructed in accordance with the currently approved ALDOT Standard Specifications and Standard Drawings.
- b. A pre-design conference with the City is mandatory.
- c. The bridge structure must be designed to pass a minimum of a 50 year storm event with a minimum of 2 feet of freeboard to the girders. The City reserves the right to require greater design criteria requirements.
- d. The bridge structure shall be designed as to not affect upstream or downstream flood elevations. When a bridge structure is proposed within a flood prone area, the Design Engineer shall submit appropriate design calculations showing no adverse effect.
- e. All bridges used for vehicular traffic must be constructed with reinforced concrete components including, but not limited to, reinforced concrete pipe, precast bridge components or cast in place bridge components, unless otherwise approved by the City. No precast concrete box culverts are allowed.

6. Easements

- a. Where a subdivision or development is traversed by a watercourse, drainage way, channel, or stream, there shall be provided a stormwater or drainage easement conforming substantially to

the lines of such water course, and of such width as will be necessary for the purpose as determined by the City Engineer or his designee. Easement width must allow for maintenance access.

- b. As a minimum, easements shall have the following characteristics:
 - i. Provide adequate access to all portions of the drainage system and structures.
 - ii. Provide sufficient land area for maintenance equipment and personnel to adequately and efficiently maintain the system with a minimum of 10 feet along both sides, or 15 feet along one side, of all drainage ways, streams, channels, etc., and around the perimeter of all detention and retention facilities. This distance shall be measured from the top of the bank or toe of the dam, whichever is applicable.
 - iii. Restrict the use of the property containing stormwater maintenance facilities through the use of easements which shall prohibit all fences and structures which would interfere with access to the easement areas and/or the maintenance function of the drainage system.
- c. Where topography or other conditions are such as to make impractical the inclusion of drainage facilities within road right-of-ways, common areas with perpetual unobstructed easements at least twenty (20) feet in width for such drainage facilities shall be provided across property outside the road right-of-ways and with satisfactory access to the road. All existing and proposed easements shall be clearly indicated in the plan view of the proposed subdivision as depicted in the application for Final Plat or Site Plan approval. Such easements will vary in width according to depth of structure. Where drainage facilities are adjacent to public right-of-ways or public property, no fence, hedgerow or other obstruction may be placed in such a manner as to obstruct access to the drainage facilities from such public right-of-way or public property.
- d. A minimum 15 foot (total width) drainage easement shall be provided along all side and rear lot lines to allow for the proper drainage of stormwater from both rear yards and off-site areas.

7. Ownership and Municipality Participation

- a. Any stormwater discharge control facility which services a single lot or residential, commercial, or industrial development shall be privately owned and maintained. The owner thereof shall grant to the City a perpetual, non-exclusive easement which allows for public inspection and emergency repair, in accordance with the terms of the maintenance agreement set forth in Section 8 below.

- b. All storm water management measures relying on designated vegetated areas or special site features shall be privately owned and maintained as defined on the stormwater management plan.

8. Maintenance, Construction and Inspection

- a. Private maintenance requirements shall be a part of the restrictive covenant to the affected property and shown as necessary on the final plat.
- b. *Maintenance Agreement Required:* a proposed inspection and maintenance agreement shall be submitted to the City Engineer for all private on-site stormwater discharge control facilities prior to the approval of the stormwater management plan. Such agreement shall provide access to the facility by virtue of a non-exclusive perpetual easement in favor of the City at reasonable times for regular inspection by the City Engineer. The agreement will identify who will have the maintenance responsibility. No maintenance bond shall be released until proof of the formation of a property owners' association is complete, and the formation documents of the property owners' association are recorded. Possible arrangements for this maintenance responsibility might include the following:
 - i. Use of property owners' association(s)
 - ii. A statement that properties which will be served by the facility are granted rights to construct, use, reconstruct, repair, maintain and access the facility
 - iii. Routine and Non-routine maintenance: Description, expected schedule, and cost of maintenance activities that are routine and non-routine (expensive but infrequent, such as pond dredging or major repairs to stormwater structures). Non-routine maintenance shall be performed on an as-needed basis based on information gathered during regular inspections
 - iv. A statement that each lot served by the facility is responsible for repairs and maintenance of the facility and any unpaid ad valorem taxes, public assessments for improvements and unsafe building and public nuisance abatement liens charged against the facility, including all interest charges together with attorney fees, cost and expenses of collection. If an association is delegated these responsibilities, then membership into the association shall be mandatory for each parcel served by the facility and any successive buyer, the association shall have the power to levy assessments for these obligations, and that all unpaid assessments levied by the association shall become a lien on the individual parcel; and

- v. A statement that no amendments to the agreement will become effective unless approved by the municipality
- c. The agreement shall provide that preventative maintenance inspections of stormwater management facilities may be made by the City Engineer, at his option. Without limiting the generality of the foregoing, the City Engineer's inspection schedule may include an inspection during the first year of operation and once every year thereafter, and after major storm events (i.e., 25-year floods or greater).
- d. The agreement shall provide that if, after an inspection, the condition of a facility presents an immediate danger to the public health, safety or general welfare because of unsafe conditions or improperly maintenance, the City shall have the right, but not the duty, to take such action as may be necessary to protect the public and make the facility safe. Any cost incurred by the Municipality shall be paid by the owner.
- e. The agreement shall be recorded by the owner in the Probate Court prior to final plat recording.
- f. The final plat shall reference the recorded location of the agreement.
- g. The agreement shall provide that the City Engineer shall notify the owner(s) of the facility of any violation, deficiency or failure to comply with this Ordinance. The agreement shall also provide that upon a failure to correct violations requiring maintenance work, within 10 days after notice thereof, the City Engineer may provide for all necessary work to place the facility in proper working condition. The owner(s) of the facility shall be assessed the costs of the work performed by the City Engineer and there shall be a lien on all property of the owner which property utilizes or will utilize such facility in achieving discharge control, which lien, when filed in the Probate Court, shall have the same status and priority as liens for ad valorem taxes. Should such a lien be filed, portions of the affected property may be released by the City following the payments by the owner of such owner's pro-rata share of the lien amount based upon the acreage to be released with such release amount to be determined by the City Engineer, in his reasonable discretion.
- h. The City Engineer, at his sole discretion, may accept the certification of a registered engineer in lieu of any inspection required by this Ordinance.

G. LOW IMPACT DEVELOPMENT

While the planning and design standards contained within these regulations pertain to conventional methods of stormwater management, other practices may be acceptable to the City Engineer if they achieve an equivalent removal of sediment while ensuring water quality. Low Impact Development differs from conventional stormwater management in that it seeks to mimic a site's predevelopment