

Drainage Criteria Manual

City of Rollingwood

September 2016

PREFACE

CITY OF ROLLINGWOOD REQUIREMENTS FOR DRAINAGE:

The intent of this manual is to implement design principles and practices that control runoff from all development, during and after construction, such that no development will result in additional adverse flooding impacts. Any development that causes an increase in stormwater runoff requires mitigation by providing drainage analysis and a drainage plan performed by a Professional Engineer licensed in the State of Texas. The City's drainage policy shall govern the planning and design of drainage facilities within the Corporate Limits of the City. Definitions, criteria, procedures and data in this manual have been developed to support this policy.

For developments requiring drainage facilities, construction plans and all associated documents shall be provided to the City and shall conform to the requirements described within the Drainage Ordinance and the City's Drainage Criteria Manual. Drainage facilities located on private property shall be maintained by the property owner. Developments that include drainage improvements require an Operations and Maintenance (O&M) plan and schedule for routine inspection and maintenance of the drainage facilities to ensure proper functionality. The owner is responsible for complying with the O&M requirements.

TCEQ REQUIREMENTS FOR WATER QUALITY:

The City of Rollingwood is located within the Edwards Aquifer Recharge Zone. The Texas Commission on Environmental Quality (TCEQ) regulates activities having potential for polluting surface streams which recharge the Edwards Aquifer to protect existing and potential beneficial uses of groundwater in the Edwards Aquifer. TCEQ rules and regulations are found in the Texas Administrative Code – Chapter 213 Edwards Aquifer – Subchapter B. The City does not establish water quality design criteria within this ordinance. Any construction activity that requires TCEQ regulation shall conform to TCEQ chapter 213 requirements and required mitigative measures shall be presented to the City to demonstrate conformance. The City's drainage requirements are separate from TCEQ requirements and water quality BMP's provided per TCEQ requirements are to be separated from drainage facilities provided for the City's drainage requirements unless approved by the City Engineer.

Definitions:

BMP means Best Management Practices and is a term used to describe a type of water pollution control method and/or stormwater runoff control. The method may be temporary (for construction period) or permanent and may be structural or non-structural.

Construction activity means the disturbance of soils associated with clearing, grading, grubbing, demolition or excavating activities or other construction activities.

Conveyance refers to streams, channels, drainage ways, floodplains, storm drainage systems, watercourse, waterways and other means to convey runoff.

Discharge means any addition or introduction of stormwater, pollutants, sediment, or any other substance whatsoever into the municipal separate storm sewer system (MS4) or conveyances.

Design Engineer means the engineer responsible for performing engineering design for construction plans or engineering studies.

Detention Pond means a low lying area that is designed to temporarily hold a set amount of water while slowly releasing the water at a controlled rate.

Drainage Facility means any structure, installation, or activity from which purpose serves to convey or control stormwater runoff.

EPA means the United States Environmental Protection Agency and any federal department, agency, regional office, or commission under the authority and authorized official of the EPA.

EAPP means Edwards Aquifer Protection Plan, regulated by the TCEQ, and is an outline of best management practices that will be implemented and maintained – both during and after construction activities – to prevent contaminants found in stormwater reaching the Edwards Aquifer. The EAPP may include: a water pollution abatement plan, organized sewage collection system plan, underground storage tank facility plan, aboveground storage tank facility plan, contributing zone plan, or a modification, exception, or extension request granted by the TCEQ executive director.

Hazardous Substance means pollutants or contaminants in terms of their negative impact on people and the environment and include any material, substance, waste or combination thereof, because of its quantity, concentration or physical, chemical or infectious characteristic, may cause or significantly contribute to an increase in serious illness or pose a substantial or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of or otherwise managed. Hazardous substances are as described in the Code of Federal Regulations - 40 CFR 261 and extremely hazardous substances are as described in 40 CFR 355 – Emergency Planning and notification.

HEC-HMS means Hydrologic Engineering Centers Hydrologic Modeling System designed by the US Army Corps of Engineers to simulate the complete hydrologic processes of dendritic watershed systems.

HEC-RAS means Hydrologic Engineering Centers River Analysis System designed by the US Army Corps of Engineers to perform one-dimensional steady flow, unsteady flow, sediment transport/mobile bed computations, and water temperature modeling.

Impervious Cover (IC) means impermeable, constructed, or installed coverage of natural ground surfaces and includes only the footprint on a horizontal plane (vertical walls are not included).

Regulated Activity means (per TCEQ) any construction-related activity or post construction activity on the recharge zone of the Edwards Aquifer having the potential for polluting the Edwards Aquifer and hydrologically connected surface streams. Activities include: construction of buildings, utility station, utility lines, roads, highways, or railroads; clearing, excavation, or other disturbances of topography, geologic, or existing recharge characteristic of a site; any installation of aboveground or underground storage tanks, or any other activity that may pose a potential for contaminating the Edwards Aquifer and hydrologically connected surface streams.

Release means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the MS4 or conveyances.

Site means the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.

Stormwater Runoff means precipitation from rain events that flows over land or impervious surfaces and does not percolate into the ground.

SWPPP means Storm Water Pollution Prevention Plan. It is a site-specific, written document that identifies potential sources of stormwater pollution at the construction site, describes practices to reduce pollutants in stormwater discharges from the construction site, and identifies procedures the operator will implement to comply with the terms and conditions of a construction general permit.

TCEQ means Texas Commission on Environmental Quality or any duly authorized official of said agency.

TPDES means Texas Pollutant Discharge Elimination System and is a program delegated to the State of Texas by EPA pursuant to 33 USC 1342(b).

Trash/Garbage/Debris means any solid waste consisting of combustible materials such as paper, rags, cartons, furniture, synthetic materials, yard clippings, twigs, or noncombustible materials such as sediment, dirt, rock, gravel, sand, glass, and any metal waste.

WPAP means Water Pollution Abatement Plan and is a plan that outlines the best management practices that will be implemented in order to protect water quality when a regulated activity is conducted in the Edwards Aquifer recharge zone.

Water Quality means a standard, as set by TCEQ 31 Tex. Admin. Code Ch. 307, created to maintain the quality of water in the state consistent with public health and enjoyment, propagation and protection of terrestrial and aquatic life. Water Quality is also regulated by Ch. 213 Edwards Aquifer, created to regulate activities having the potential for polluting the Edwards Aquifer and hydrologically connected surface streams in order to protect existing and potential uses of groundwater and maintain Texas Surface Water Quality Standards.

Water Quality Facility means permanent BMP's that are designed for water quality control for total suspended solids (TSS) reduction. Typically BMP's include basins for capturing the first flush of stormwater runoff from upgradient drainage areas.

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Drainage Criteria Manual

1.1. GENERAL PLAN REQUIREMENTS

All development in the City shall be performed under a building permit obtained prior to any construction activity. Drainage and construction plans shall be submitted as part of the building permit approval process. The drainage plan shall include a vicinity map, construction notes, drainage area maps for pre and post-development conditions, grading and drainage plan, detention and water quality plan, sedimentation and erosion control plan, and construction details.

1.2. SITE IMPROVEMENT PLAN

The drainage plan submittal shall include the drainage plan and additional information as described below:

1.2.1. SITE IMPROVEMENT PLAN FORM

A Site Improvement Plan form will be provided when a building permit is applied for. The form requires input on the following aspects:

1. Existing site conditions
2. Summary of proposed improvements
3. Estimated construction time and completion date
4. Description of pre and post-development drainage conditions
5. Description of method for post-development control of runoff
6. Results of drainage analysis
7. Name of Professional Engineer assigned to drainage plan
8. Discussion on how TCEQ Chapter 213 requirements are met.

1.2.2. SITE PLAN

The site plan shall include a drainage plan, sediment and soil erosion control plan, and a rain harvest system plan (if applicable).

1.2.2.1. DRAINAGE PLAN

Provide drainage area maps for pre-development and post-development

conditions as two (2) individual maps. The pre-development drainage area map should demonstrate the on and off-site contributing watershed boundaries and all existing structures and hard surfaces that are to be demolished (if applicable). The post-development map should demonstrate the on and off-site watershed boundaries and all proposed construction with impervious surfaces clearly identified. At a minimum the map should include the following:

- a. Legible drawing(s), at a minimum 11x17, drawn to scale.
- b. On and off-site watershed boundaries with enclosed polylines, surface flow arrows and labeled contours clearly shown.
- c. Time of concentration (T_c) lines demonstrating flow pattern transition points for sheet flow, shallow concentrated, and channel/ditch/pipe.
- d. T_c calculation tables demonstrating equations, variables, and values used for pre-development and post-development conditions.
- e. Discharge points identified for each watershed boundary.
- f. Table demonstrating peak flows for 2, 10, 25, and 100 year storm events for pre-development and post-development conditions. If hand calculations are used to determine peak flows, provide table with equations, variables, and values used. If hydrologic modeling is performed, use HEC-HMS software and provide software generated report showing tabulated peak flows for pre-development and post-development conditions for a 100 year storm event including peak elevation in a detention pond (if applicable). Submit a copy of final hydrologic file with submittal.
- g. Construction details and applicable cross-sections for swales, detention structures, etc. with peak flow elevations demonstrated for a 100 year storm. If swales are designed for the 25 year storm event, provide the 25 year peak flow elevation and demonstrate method to prevent the 100 year storm flows from inundating surrounding properties.
- h. Table of impervious cover with detailed categories for the impervious cover type, i.e. separate sidewalk, driveway, decks, patios, etc. Provide calculations demonstrating total pre and post-development impervious cover (in square feet), as a percent of the total area of the lot, and the net increase (in square footage) of impervious cover with post-development conditions. Note that traditional decks (boards spaced with gaps) are calculated with 50% impervious cover and water surface area of swimming pools are not considered impervious cover.

If development includes a net increase of impervious cover of less than 250

square feet, then items b-h are not required.

1.2.2.2. SEDIMENT AND SOIL EROSION CONTROL PLAN

The sedimentation and soil erosion control plan shall include the following:

- a. Provide a general/sequence of construction for the life of the project as well as a sequence of construction specifically related to the time between when soil erosion control measures are in place, the roof and/or slab are completed and the permanent storm water controls are provided. The sequence must clearly identify the following:
 - 1) Install all BMP controls such as silt fence, stabilized construction entrance, sediment ponds, and drainage channels prior to any other site disturbances.
 - 2) Sequencing for all construction activities that require soil erosion control such as site clearing, grubbing, topsoil stripping, stockpiling, soil stabilization, and vegetation.
 - 3) Sequencing of post construction final measures including:
 - a) Vegetation for any bare soil areas
 - b) Inspection of all drainage facilities and removal of sediment and debris
 - c) Removal of temporary soil erosion control measures
 - d) Monitoring of seeded areas to ensure proper vegetation is established
- b. Clearly demonstrate the location of all erosion and sedimentation control plans including stabilized construction entrance, silt fence, triangular filter dikes, rock berms, check dams, etc.
- c. If an existing paved driveway is to be used as the construction entrance, please indicate on plans that machinery and construction related traffic shall be limited to the driveway for R.O.W access.
- d. Standard details for the silt fence, tree protection and a stabilized construction entrance, etc. City of Austin details are preferred.
- e. The following notes shall be required on plans:

- 1) The contractor shall be responsible for maintaining and inspecting, on a regular basis, all erosion and sediment control best management practices including the silt fences, construction entrances, rock filter dams, etc. during construction/demolition and including the removal and proper disposal of any accumulated silt and debris.
- 2) The contractor shall not begin any work until tree protection and the erosion and sediment control best management practices such as silt fence, construction entrances, rock filter dams, etc. have been installed.
- 3) The contractor shall be responsible for keeping the streets free of mud, dirt, debris and material at all times and shall clean/sweep the streets on a regular basis and at the direction of the City.
- 4) Increased stormwater peak flows during construction must be mitigated with temporary best management practices to prevent harm to neighboring properties.

1.2.2.3. WATER QUALITY BMP PLAN

Indicate if a BMP is planned with the site improvements and provide a description of the method including the stormwater runoff capture area and BMP method including runoff storage detention time and release rate (if applicable). If a rainwater harvest (RWH) system is the BMP chosen for compliance with TCEQ Chapter 213 requirements, please provide the following to the City Engineer:

- a. Indicate the amount of area to be captured by the rainwater harvesting system to decrease the effective IC, as required, to account for the net increase associated with the new construction.
- b. Indicate the size of the tank required, its location, and the size of the discharge area.
- c. Show the route and the discharge location for the overflow of the rainwater harvesting tanks. If the RWH overflow is to be directed to a detention facility, provide grading detail and any pipes, channels, etc. necessary to convey overflow.
- d. Provide a construction detail for the RWH system including the location, mounting and support of the tanks, overflow, pumps (if applicable), etc. with plan view and cross-section shown.