

SECTION 1 – DRAINAGE POLICY

Table of Contents

SECTION 1 – DRAINAGE POLICY Table of Contents	1-1
1.1.0 GENERAL	1-2
1.2.0 CITY OF ROUND ROCK DRAINAGE POLICY	1-2
1.2.1 Application	1-2
1.2.2 General	1-2
1.2.3 Street Drainage	1-3
1.2.4 Drainage System	1-3
1.2.5 Computations	1-6
1.2.6 Flood Plain Delineations	1-6
1.2.7 Grading	1-7
1.2.8 Erosion Control	1-8
1.3.0 DEFINITIONS	1-9

Drainage Criteria Manual

[SECTION 1 - DRAINAGE POLICY](#)

SECTION 1 - DRAINAGE POLICY

1.1.0 GENERAL

This Manual represents the application of accepted principles of stormwater drainage engineering and is a working supplement to basic information obtainable from standard drainage handbooks and other publications on drainage. The policy statements of this section provide the underlying principles by which all drainage facilities shall be designed. The application of the policy is facilitated by the technical criteria contained in the remainder of the manual.

1.2.0 CITY OF ROUND ROCK DRAINAGE POLICY

1.2.1 Application

The City's drainage policy shall govern the planning and design of drainage infrastructure within the Corporate Limits of the City and within all areas subject to its extra territorial jurisdiction, as required. Definitions, formulae, criteria, procedures and data in this manual have been developed to support this policy. If any condition requiring some additional measure of protection is identified during design or construction, the engineer shall make provisions within the design.

1.2.2 General

- A. Stormwater runoff peak flow rates for the two (2), ten (10), twenty-five (25) and one-hundred (100) year frequency storms shall not cause increased adverse inundation of any building or roadway surface.
- B. Street curbs, gutters, inlets and storm sewers shall be designed to intercept, contain and transport all runoff from the 25 year frequency storm.
- C. In addition to B above, the public drainage system shall be designed to convey those flows from greater than the 25 year frequency storm up to and including the 100 - year frequency storm within defined public rights-of-way or drainage easements.
- D. When stormwater detention is provided, stormwater runoff peak flow rates shall not be increased at any point of discharge for the two (2), ten (10), and twenty-five (25) year storm frequency events.

- E. Regulation of peak flows to allowable levels, as determined by the provisions of this policy, shall be achieved by storage on-site or off-site or by participation in the City of Round Rock's Regional Stormwater Management Program. The Detention Section of this manual provides a guide to acceptable methods, but does not limit the designer to the methods presented therein. Guidelines for participation in the City's Regional Stormwater Management Program are contained in the Stormwater Management Section of this manual.

1.2.3 Street Drainage

- A. No lowering of the standard height of street crown shall be allowed for the purposes of obtaining additional hydraulic capacity.
- B. For non-curbed streets all flows shall be contained within paralleling roadside ditches.

1.2.4 Drainage System

- A. Construction plans for proposed reinforced concrete box culverts, bridges and related structures may be adaptations of the current Texas Department of Transportation (TxDOT) Standards.
- B. For bridges and culverts in residential streets, runoff from the 100 year frequency flow shall not produce a headwater elevation at the roadway greater than either twelve (12) inches above the roadway crown elevation or any top of upstream curb elevation, whichever is lower.
- C. For bridges and culverts in streets other than a residential street, runoff from the 100 year frequency storm shall not produce a headwater elevation at the roadway greater than six (6) inches above the roadway crown elevation or six (6) inches above any top of upstream curb elevation, whichever is lower.
- D. All drainage facilities (including but not limited to headwalls, open channels, storm sewers, area inlets, and detention, retention and water quality controls and their appurtenances) shall comply with the following requirements, unless otherwise noted in this section.
 - 1. Storm sewer inlets and gutter transitions shall be designed to avoid future driveways and to avoid conflicts with standard water and wastewater service locations. No utilities shall be allowed to cross under a storm sewer inlet.
 - 2. Drainage channels and detention ponds that are to be maintained by the public (City) shall be contained within drainage lots. Adequate room for access shall be provided for drainage channels and detention ponds. Ramps no steeper than five (5) feet horizontal to one (1) foot vertical shall be provided at appropriate locations to allow access to drainage channels and detention ponds. The minimum bottom width for any channel with vegetative side slopes shall be eight (8) feet. An eight (8) foot wide, five (5) inch thick reinforced concrete trickle channel shall be provided in all newly constructed channels and from detention pond inlets to outlets. The area adjacent to trickle channels shall slope at a

minimum of two (2) percent.

3. Detention ponds shall be designed with adequate area around the perimeter for access and maintenance. Said area shall be a minimum of seven (7) feet wide for ponds with depths of five (5) feet or less (back slopes included) and a minimum of fifteen (15) feet wide for ponds over five (5) feet deep or with back slopes in excess of five (5) feet high. Said area shall not slope more than five (5) percent.
4. Rip-rap for slope protection or velocity dissipation shall be formed concrete dissipators or mortared rock.
5. Storm drains between lots (crossing blocks) shall be avoided as much as possible. When unavoidable, such mains shall be laid along a straight alignment (absent of curves, jogs and manholes/junction boxes when traversing between lots) with manholes/junction boxes provided at each intersecting street. Storm drains along rear of residential lots (through back yards) shall be avoided. Easements shall be a minimum of fifteen (15) feet in width with an additional two (2) feet of easement for every one (1) foot of depth over eight (8) feet. Drainage lots may be appropriate in some cases.
6. All bends, wyes and pipe size changes in storm sewers shall be prefabricated or shall occur at manholes/junction boxes.
7. Bedding of storm sewer shall be to the top of pipe.
8. Storm drains shall be reinforced concrete pipe (RCP), ASTM C76, minimum class III minimum eighteen (18) inches diameter. The engineer shall provide load analysis to the Engineering and Development Services Department as appropriate to demonstrate that class of pipe used is sufficient for the loading conditions. Higher strength pipes shall be used where loadings warrant such. Storm drains shall have a minimum of two (2) feet of cover in unpaved areas and a minimum of one and one half (1.5) feet of cover from subgrade in paved areas. Standard assignment for storm drains shall be five (5) feet off street centerline opposite of wastewater.
9. Junction boxes and manholes shall be reinforced concrete. Junction boxes in lieu of manholes shall be provided where any pipe opening exceeds thirty-seven (37) inches and where the distance from the outside surfaces of any two pipes entering a manhole is less than one (1) foot, measured along the inside of the manhole.
10. Open Sections:
 - I. Definitions:
 - Major Stream Drain five (5) square miles or more
 - Major Collector Drain twenty (20) acres or more
 - Minor Collector Drain less than twenty (20) acres

- II. Minor collectors shall be constructed with underground storm sewers. If it can be established by certified engineering data to the satisfaction of the City Engineer that storm sewers are not physically feasible, open ditches may be used, provided that such ditches are lined with concrete or other permanent materials accepted by the City Engineer. These structures shall be of sufficient cross section and slope as to fully contain design flows and facilitate self cleaning. Outfalls shall enter major collector drainageways and major streams at grade or be designed and constructed with adequate concrete aprons, energy dissipaters or similar features to prevent erosion.

 - III.
 - a. Major collector drainageways, detention ponds and related structures may utilize either existing natural open sections which may be modified, or newly constructed facilities. If modified or newly constructed facilities are utilized, they shall be lined with permanent materials including, but not limited to: concrete or vegetation.

 - b. Vegetated channels shall have sufficient grade but with velocities that will not be so great as to create erosion. Side slopes shall not be steeper than three (3) (horizontal) to one (1) (vertical) for channels four (4) feet or less in depth and no steeper than 4 to 1 in all other channels to allow for future growth and to promote slope stability. All slopes shall be hydromulched, sodded or seeded with approved grass, grass mixtures or ground cover suitable to the area and season in which they are applied. Seeded side slopes and buttons shall be lined with erosion protection matting.

 - IV. Major streams shall not be modified without consent of applicable state and federal agencies and authorization from the City Engineer.
11. Discharge from storm sewer outfalls shall not cause channel, bluff, or stream bank erosion. If the storm drain discharges to an open drainage facility (as determined by the City), the applicant must show acceptable nonerosive conveyance to that drainage facility, appropriate energy dissipation at the outfall and a stable headwall.
 12. Section 8.3.4 of this Manual shall apply for all stormwater management facilities, including water quality facilities and stormwater management infrastructure.
 13. No area within the limits of construction of the development shall allow stormwater to become stagnant. Maximum retention or "draw-down" time for detention ponds shall not exceed twenty-four (24) hours from the time of peak storage to the time of complete emptying of the pond, as determined by hydrograph routing or other calculations acceptable to the City. This requirement does not apply to facilities in which retention or "draw-down" time is required to be greater than twenty-four (24) hours.

14. In order to minimize vandalism and deterioration, use of exposed piping and appurtenances and any loose materials (other than access drive rock) shall be avoided or minimized. Use of all such items shall be approved by the City.

1.2.5 Computations

Computations to support all drainage designs shall be submitted to the appropriate city departments for review. The computations shall be in such form as to allow for timely and consistent review and also to be made a part of the permanent city record for future reference. Computation shall demonstrate that as a result of the proposed development there will not be any adverse impact to downstream properties adjacent to the drainage resulting from a 100 year event. The Engineer shall state that in the sealed report. All computations submitted shall be certified by an Engineer.

1.2.6 Flood Plain Delineations

A. City of Round Rock

1. In all cases where a flood plain delineation is required, its determination shall be based on the projected full development of all properties contributing to the point of consideration. It is the responsibility of the design engineer to determine, based on the most accurate information available, what the fully developed drainage area is.
2. The design engineer may elect to utilize a flood plain delineation previously approved by the City Engineer, assuming the same is still applicable under present requirements and criteria. In so doing the Engineer does not remove himself from the responsibility for the report's accuracy.
3. For purposes of this Manual, a drainage area of fifty (50) acres or greater is required within a contributing watershed to create a "flood plain". For areas of flow with less than fifty (50) acres of contributing area, no flood plain shall be defined; however, with regards to the drainage criteria contained in this Manual any concentrated flow necessitates the dedication of a drainage easement.

B. Federal Emergency Management Agency.

1. The Federal Emergency Management Agency (FEMA) maintains Flood Insurance Rate Maps (FIRMs) that depict floodplain and floodway boundaries. The floodplain and floodway boundaries depicted on FIRMs are based on existing conditions of development in the contributing area.
2. FEMA reviews and approves or denies all revisions or amendments to FIRMs. FEMA revises or amends FIRMs by approval of a Letter of Map Amendment (LOMA) or Letter of Map Revision (LOMR). FEMA establishes the process and fees necessary for review of an application for a LOMA or LOMR.
3. FEMA reviews the impact of proposed site developments and offers or denies conditional assurance that a FIRM may be changed by the proposed development. FEMA offers this assurance by a Conditional Letter of Map Amendment (CLOMA) or Conditional Letter of Map Revision (CLOMR). The

CLOMA or CLOMR is a conditional statement that the FIRM may be changed if (1) the development is constructed as proposed in the CLOMA/CLOMR application, and if (2) a complete LOMA/LOMR is submitted after construction of the proposed development.

C. Coordination of City of Round Rock and FEMA Floodplain Delineations.

1. If the floodplain depicted on the FIRM is required to be changed, due to updated analysis of the floodplain under existing conditions, then the following requirements are applicable:
 - (a) Prior to recordation of a final plat, the applicant must provide to the City evidence of receipt by FEMA of an application for a LOMR.
 - (b) Prior to final acceptance of the construction of the subdivision or issuance of building permits, the applicant must provide to the City evidence of final acceptance by FEMA of the LOMR submitted under (a) above.
2. If the floodplain depicted on the FIRM is required to be changed, due to land development activities that alter existing conditions, then the following requirements are applicable:
 - (a) Prior to approval of a final plat, the applicant must provide to the City evidence of receipt by FEMA of an application for a CLOMR.
 - (b) Prior to recordation of a final plat, the applicant must provide to the City evidence of approval of the CLOMR submitted under (a) above.
 - (c) If the final plat is approved before it is determined that a CLOMR is necessary or desired, then prior to release of subdivision construction plans, the applicant must provide to the City a letter of acknowledgement by FEMA of receipt of a complete application for a CLOMR.
 - (d) Prior to final acceptance of the construction of the subdivision or issuance of building permits, the applicant must provide to the City evidence of final acceptance by FEMA of the CLOMR submitted under (c) above, and a letter of acknowledgement by FEMA of a complete application for a LOMR.
3. The applicant shall bear the cost of engineering services required to develop the application, respond to review comments, and obtain final approval of LOMRs and CLOMRs. The applicant shall bear the cost of any fees associated with review and disposition of LOMR's and CLOMR's that are established by FEMA.

1.2.7 Grading

1. A comprehensive grading plan shall be included with subdivision construction plans.
2. The grading plan shall be designed to ensure all lots will adequately drain upon completion of the subdivision improvements. The Engineer will set the elevation of

lot corners in conjunction with preparation of the drainage plan. Lot corner elevations shall be shown on the grading plan.

3. Where practical, all lots shall be graded from rear to front at which point the drainage shall be intercepted by the street. Alternate grading schemes may be utilized if it can be demonstrated to the satisfaction of the City Engineer that grading from rear to front would be detrimental to trees or other natural features; or it would not be reasonably adaptable to the existing topography because of excessive cuts and fills, or future lot development (i.e. commercial, industrial or multi-family lots).
4. All lots shall be graded at a minimum of one (1) percent. Grading of lots with existing slopes of one (1) percent or greater will not be required provided the conditions under three (3) above have been satisfied and it is demonstrated to the satisfaction of the City Engineer that there are no existing or proposed features that will prevent the lots from adequately draining.
5. Unless otherwise accepted by the City Engineer, surface swales shall be designed and provided along lot lines when more than two lots will be contributing to stormwater runoff at any given point. Side slopes for swales shall not exceed 10:1 (Horizontal: Vertical) unless otherwise accepted by the City Engineer.
6. Minimum finished floor slab elevations shall be shown for all lots. Such elevations shall be a minimum of two (2) feet above the ultimate 100 year flood plain.
7. Fills shall be placed in maximum twelve (12) inch lifts and adequately compacted. The subdivider shall be responsible for determining any special fill requirements (i.e. FHA requirements).
8. Blue tops shall be set at lot corners and other points to ensure grading is accomplished in accordance with the plan.
9. Following final grading, all exposed areas shall be permanently stabilized. Earthen areas shall be seeded or sodded and erosion controls shall remain in place until grass growth reaches one and one half (1½) inches, is of a density where it can be reasonably expected to be self-sustaining and there are no bare areas in excess of ten (10) square feet.

1.2.8 EROSION CONTROL

Brush berms, silt fences, sedimentation basins, stabilized construction entrances/exists and similar recognized techniques shall be employed during and after construction to prevent point source sedimentation loading of downstream facilities. Such installations shall be to the satisfaction of the City Engineer. Additional measures may be required during and after construction if, in the opinion of the City Engineer, they are warranted.

All disturbed and exposed areas due to construction shall be permanently stabilized. All such areas shall be dressed with topsoil and vegetated by seeding or sodding as appropriate. Where the City Engineer determines that future maintenance is materially impaired or erosion is a distinct possibility, the developer shall be required to use concrete or similar permanent cover in lieu of vegetation. Erosion control matting (either pre-seeded or seeded after placement) may also be required if the City Engineer

determines that such protection of slopes is required to ensure that seeding or soil will not wash off of slopes.

1.3.0 DEFINITIONS

All terms and abbreviations used in the text are presented in the [Glossary](#) of this Manual. If there is any conflict between the terms provided in this Manual and the terms provided in the City of Round Rock Code of Ordinances, the Code of Ordinances shall control.