CITY OF MONT BELVIEU

INFRASTRUCTURE DESIGN AND CONSTRUCTION MANUAL

Last Updated: November 09, 2020

Adopted: Ordinance 2019-

Table of Contents

The City of Mont Belvieu Subdivision Construction Manual is adopted as the engineering standards governing the construction of subdivisions within the jurisdiction of the City. ***(Ord. 2019, July 18, 2019***

Section 1 - General

Design

Conformance to Applicable Rules and Regulations

In addition to the requirements established in these regulations, all subdivision plats shall comply with the following laws, rules, and regulations:

1) Include City's permit number application in all cover sheets, exhibits, drawings and correspondence.

2) All applicable statutory provisions.

3) All other applicable laws of the appropriate jurisdictions.

4) Plat approval may be withheld if a subdivision is not in conformity with the above laws, regulations, and policies as well as the purposes of these regulations established in Section 32 of the City of Mont Belvieu Municipal Code.

5) All work, methods, materials and equipment not covered by these "Regulations," shall conform to the most current issue of "Standard Specifications for Construction of Highways, Streets and Bridges" of the Texas Department of Highways and Public Transportation.

Construction

Clearing and Grubbing

1) A sight distance triangle study is required at intersections with one or more collector streets, through fares and boulevards.

2) Shall consist of the removal and disposal of trees, stumps, brush, roots, vegetation, logs, rubbish and other objectionable matter. Muck and peat shall be completely removed within the area between points five feet (5') outside the edges of pavement.

3) No on-site burning allowed unless approved by the City.

Section 2 – Grading

Design

All subdivision construction plans shall be accompanied by grading plans. These are to be depicted separately from other plans sheets such as existing topographic layouts and drainage plans. Grading plans shall include, but are not limited to, the following:

1) Use Permanent City benchmarks, exclusively as the basis for all project elevations. The City may reject any benchmark in favor of another, at its sole discretion. If no benchmark is acceptable, a new benchmark must be provided that ties into City monumentation.

2) Description and location of benchmark used and its date of adjustment.

3) Proposed surface features, such as roads, driveways, inlets, building perimeters, lot lines, lift stations, manholes, etc.

4) Include Latest FEMA firm maps in submittal.

5) Nearest FEMA and other 100-year flood plain elevations. If flood plain crosses property, provide a line to clearly designate the location of flood plain.

6) Identify high water elevations of out falling ditches and/or ponds.

7) Identify bank elevations of out falling channels/bayous/rivers.

8) High water elevation of proposed ditches for 100-year flow, clearly labeled.

9) Finished Floor Elevations (FFE) of all buildings shown in final plat, approved by city and must be shown on grading plans. All FFE must be 24 inches above FEMA flood elevation, high elevation of ditch/pond or elevation of road/curb whichever is higher.

10) Spot elevations for proposed elevations, only, at grade breaks, points of inflection, points of vertical tangency, and wherever else necessary to adequately describe the proposed grades and slopes of ground, streets, or driveways. Finished floor elevations (FFE) of all buildings in final plat, approved by city planner.

11) All existing surface features to remain, such as but not limited to, roads, fences, power poles, ditch flow lines and sidewalks shall be clearly labeled. A legend may be used to clarify existing features to remain for clarity.

12) Spot existing elevation of adjacent areas affected by proposed development shall be clearly marked on drawings. Spot elevations should ensure positive drainage for complete subdivision plat or adjacent areas affected by proposed development.

13) Existing elevations outside areas of proposed construction, only such that the transition between proposed and existing ground is adequately described.

14) International Residential Code (IRC) compliant ground slope around building perimeter. “The grade away from foundation walls shall fall a minimum of 6 inches (152 mm) within the first 10 feet (3048 mm)”. Spot elevations, sections, or other treatment shall be used to clearly illustrate this requirement on the plans.

15) For all pipeline corridors adjacent to residential lots, pipeline corridor needs to be infilled to adjacent grades and positive drainage needs to be maintained. Finish grading should ensure positive drainage.

Construction

1) Excavations and depressions must be properly backfilled and compacted.

2) All fill shall be constructed in eight inch (8”) maximum lifts to provide ninety-five (95%) density

3) All lots must be built up to final grade as approved on final plat at time of acceptance.

Section 3 – Drainage

Design

1) The most recently adopted Chambers County Drainage Criteria Manual is hereby adopted by reference. If any standard established by the City is in conflict with the Chambers County Manual, the strictest shall apply.

2) Inlets and pipes shall be installed at those locations where ditch requirements cannot be satisfied. All open drainage conveyance systems allowed by the City shall have a maximum side slope of 4:1 and a minimum longitudinal slope of 0.2 percent.

3) Provide time of concentration calculations.

4) No closed storm sewer system shall be smaller than 24 inches.

5) Provide inlet calculations for all inlets.

6) Provide capacity calculations for extreme event ditches and structures.

7) All plan and profile sheets must show 5-year and 100-year HGL in profile.

8) All detention ponds to be fully sodded above normal pool level.

9) If development is built in phases, drainage patterns during phasing shall be studied to ensure 5-year and 100-year events are properly conveyed through the development.

10) No “B-B” inlets are allowed.

11) All outfalls to be constructed using HDPE or HDPP piping material. No CMP piping material is to be used.

12) All other storm sewer piping other than outfalls may be RCP, HDPE, or HDPP. All storm sewer under pavement must be RCP only.

13) Concrete slope paving to be used for erosion protection. No rock or rubble allowed, unless approved by City engineer.

14) Enclosed storm sewer system only. No ditches to be used.

15) The following rational method coefficients table takes precedence over Table 4-1 of the Drainage Criteria for Chambers County. These values shall be used for all drainage and detention calculations.

RATIONAL METHOD COEFFICIENTS			
Description of Area	**Basin**		
	< 1%	**1% - 3.5%**	**> 3.5%**
Single-Family Residential Districts			
Lots greater than 1/2 acre	0.35	0.40	0.45
Lots 1/4 to 1/2 acre	0.45	0.50	0.55
Lots less than 1/4 acre	0.55	0.60	0.65
Multi-Family Residential Districts	0.60	0.65	0.70
Apartment Dwelling Areas	0.75	0.80	0.85
Business Districts			
Neighborhood	0.75	0.80	0.85
Industrial Districts			
Light	0.50	0.65	0.80
Heavy	0.60	0.75	0.90
Railroad Yard Areas	0.20	0.30	0.40
Streets			
All Types	0.85	0.85	0.85
Lawn Areas			
All	0.15	0.18	0.22
Woodlands			
All	0.18	0.20	0.30
Pasture			
Sandy Soil	0.25	0.35	0.40
Clay Soil	0.30	0.40	0.50
Cultivated			
Sandy Soil	0.30	0.55	0.70
Clay Soil	0.35	0.60	0.80

Construction

1) All detention pond, drainage outfall structures and extreme event swales must be constructed prior to any impervious cover placement. If extreme event crosses into future sections, the extreme event must be constructed at the initial phase.

Section 4 – Paving

Design

Subgrade

1) Subgrade Width – shall be four feet (4') wider than concrete pavement and curb, two foot (2') each side.

2) Stabilization - When the P.I. is Less than 10 (P.I.<10) – Cement stabilization will be required. Greater than 20 (P.I.>20) – Lime stabilization will be required. Greater than 10 but less than 20 (10<P.I.<20) no stabilization will be required.

Concrete Pavement

1) All streets and roadways to be constructed of reinforced concrete. All street and roadway project designs to include geotechnical investigation including design for pavement to be provided. Pavement design to be based on recommendations in the geotechnical investigation concerning pavement thickness, cement content, compressive strength, reinforcing, and subgrade preparation.

2) Minimum design criteria for residential concrete streets is 6", 5 sack cement per cubic yard concrete, 3000 psi reinforced concrete with #4 reinforcing bars – 24 inches c-c (both directions) with subgrade preparation per geotechnical investigation.

3) Minimum design criteria for collector and thoroughfare streets is 7", 5 sack cement per cubic yard concrete, 3000 psi reinforced concrete with #4 reinforcing bars – 24 inches c-c (both directions) with subgrade preparation per geotechnical investigation.

4) Compact prepared subgrade to a density of no less than ninety-five percent (95%) standard proctor determined by standard A.A.S.H.T.O. methods. Subgrade treatment or stabilization shall be no less than eight inches (8"). The maximum lift thickness for subgrade treatment shall be eight inches (8").

5) Refer to section 32 of Mont Belvieu Municipal Code for roadway minimum width.

6) The center line of the constructed roadway shall be no more than 6 inches above the natural ground elevation at the right-of-way.

7) If a cul-de-sac is allowed during design approval, the minimum pavement diameter shall be 100 feet face to face.

Construction

Concrete Street Construction

1) All concrete pavement is to be laboratory controlled by a certified laboratory. The laboratory shall inspect and test concrete batch design at the plant site before beginning each day's pour. A cylinder shall be made for each one thousand (1000) square yards of pavement, or part thereof for each day's pour and/or one cylinder on each street. The cylinder shall be tested at seven (28) days. Minimum compressive strength shall be 2800 psi and 3000 psi respectively for 4.5 and 5.0 sack concrete. Complete reports shall be furnished on all tests prior to city acceptance.

2) Concrete pavement surface shall be tested using an approved straightedge. The surface of the concrete shall not vary from straightedge by more than 1/16 much per foot from the nearest point of contact, and in no case, shall maximum deviation from a ten-foot straightedge to the pavement to be greater than 1/8 inch.

3) Wheel chair ramps to be constructed at all roadway intersections prior to City acceptance.

Section 5 - Sanitary Sewer

Design

1) Design of Sanitary Sewers shall conform to Section 32-90 of the Subdivision Ordinance, TCEQ Guidelines and this document 217 rules.

2) Sanitary Sewer system layout shall be provided showing all features, including but not limited to, roads, bridges, other utilities, and topography. and Soil type and floor elevations of all buildings being drained, shall be clearly labeled.

3) Plans shall show line size, slope, flow line elevations and hydraulic grade line. All manholes shall have both rim and floor clearly labeled.

4) Manholes shall not be located in drainage ditches or other appurtenances which will subject the manhole to unnecessary inflow or infiltration from storm water.

5) Accurate location of existing terminal manholes shall be provided on plans, giving manhole rim and floor elevation, proposed and existing pipe elevations, size and slopes.

6) Sanitary system shall be designed for gravity flow to the closest ultimate future sanitary sewer main and elevation. It shall be the developers' responsibility to locate the ultimate future design sewer main, with assistance from the City Engineer.

7) Within confines of current and future development, all sanitary flow shall be gravity, unless otherwise directed by city Engineer in writing. Forced-flow lines shall be avoided or kept to absolute minimum lengths.

8) Future development of surrounding tracts outside plat shall be considered, hence additional terminal manholes with pipe run and additional pipe capacity of specific lines shall on occasion be required.

9) Sanitary Sewers shall be designed to prevent admittance of surface water flow; thus manhole rims must be placed a minimum of 12" above the 100-year flood elevation.

10) Inverted siphons may be used for crossing under obstructions, only as directed in writing by the City Engineer. The design of an inverted siphon shall be such the velocity is greater than 3 feet per second.

11) All sanitary sewer manholes to be Xypex coated and no rings allowed unless authorized by City representative. Any rings allowed must be Xypex coated.

12) No 90-degree bends used in 4-inch sewer lines.

13) On 6-inch sewer lines, service leads must achieve 90-degree bend preferred double 45's but long radius. 90's can be used as well.

Construction

1) All sanitary sewer lines to be cleaned and jetted prior to any testing. Testing to include; pressure testing, mandrel testing, dying of the line and camering line testing. No testing will be done until all infrastructure is in place unless approved by City.

2) All lots shall have a single lead, with a minimum pipe size of 4 inches.

3) All manholes shall be equipped with inflow preventers acceptable to the City.

4) During home construction, cleanouts stack need needs to be placed inside official Mont Belvieu box purchased from Public Works.

Section 6 - Water Systems

Design

1) Design of water system shall conform to TCEQ 290 rules and regulations.

2) No dead-end waterlines are allowed. Any waterline terminating in a cul-de- sac shall be looped.

3) When a 2-inch blow off is to be installed, it must be flush hydrant.

4) No proposed waterlines shall be placed below a proposed sanitary sewer line.

5) All waterline stub outs must be capped and shall not be crimped. Stub outs must have valve installed with a min of one joint to extend past valve.

6) All waterline “T” s must have a minimum of 2 valves installed.

7) All waterline crosses must have a minimum of 3 valves installed.

8) All bends shall be secured with mechanical joints, thrust blocks and covered in plastic. Mechanical joints shall be cam locked or City approved equivalent.

Construction

1) All waterlines shall be PVC with a minimum size of 6 inches.

2) All appurtenances shall be from an approved list by the City’s Public Works Director.

3) Concrete aprons required around all water valves.

4) All hydrants must have pea gravel pack at base.

5) During homebuilding the minimum line size for service leads will be ¾ minimum.

6) All water meter boxes should be purchased from Public Work.

7) In order to tie into existing City water main new construction, a hot tap must be done. No interruption of City water service will be allowed unless approved by the City.

8) All water lines must have tracer wire installed.

Section 7 - Conduit System

Design

1) All roadways shall have a 2” inner duct with a pull string inside the road ROW but outside the pavement.

2) A handhold shall be installed between every other lot size to be determined by City Engineer’s office.

3) 1 ¼” inner duct shall be run from every hand holes, across the roadway, and to a hand hole between every other lot on opposite side of roadway; size to be determined by City Engineer’s office.

4) All inner duct to be a minimum of 24’ deep.

5) All construction packages must include a conduit plan.

6) Refer to COMB Standards for typical conduit system layout.

Section 8 - Street Lighting

Design

Street lighting shall be designed by the Electric Transmission and Distribution Company serving the Mont Belvieu area. The developer shall be responsible for requesting a street light Layout Plan from the Electric Transmission and Distribution Company.

1) All street lighting systems shall be designed as much as practicable in accordance with the standards set forth by the Illuminating Engineering Society (IES).

2) The design may vary from IES standards, in accordance with sound engineering judgment, when necessary to adjust for lot lines, driveways, and other obstacles.

3) Street lighting shall not be installed until the City Engineer's office issues a letter of authorization to the Electric Transmission and Distribution Company. The Developer shall be responsible for ensuring the City receives a copy of the Street Light Layout Plan from the Electric Transmission and Distribution Company.

4) All street lights are to be LED.

5) No overhead distribution lines allowed.

Section 9 - Inspection, Post-Construction survey and Engineers Certification

Construction

1) All construction work shall be constructed according to the plans. All grading and drainage work shall be measured, inspected and compared to approved plans by or under the supervision of a licensed professional engineer. An Engineer's certification letter shall be submitted to the City only when it has been ascertained that the work has been performed according to the plans.

2) Prior to commencing construction, the developer shall employ a licensed engineer to serve as Supervising Engineer to arrange and coordinate all tests, inspections and other quality control measures. The developer shall provide City the name, address, telephone, fax, and email contacts for the Supervising Engineer. The developer shall notify the City immediately if the designation of Supervising Engineer is changed by the developer.

3) Nothing in this section shall preclude the City or its authorized agents from conducting inspections independent of the Supervising Engineer.

4) Reporting Requirements - All construction work performed in existing or dedicated City rights of way, including road, sanitary, storm and water construction shall be scheduled with City Inspector on a weekly basis, to allow inspection and supervision. Developer shall submit to City each week a schedule of the work contemplated to be performed that week. The City Engineer shall have the authority to promulgate rules and other guidance to assure the proper inspection of all work performed in the public right-of-way.

5) Material Testing, at developer's expense, is required for all items being conveyed to the City.

6) Prior to conveyance of improvements of each phase to city, developer shall set a benchmark and provide a sealed benchmark sheet. Benchmark sheet template available upon request.

7) Before City acceptance of improvements, attributed GIS shape files of all infrastructure, based on criteria from the City Engineer's office, must be delivered to the City.

8) Testing shall be conducted after construction of pavement.