

**APPENDIX C
ENGINEERING CRITERIA MANUAL**

ROADS, TRAILS, ACCESS, CIRCULATION

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DRIVEWAY PERMIT

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3.2 ROADS, TRAILS, ACCESS, AND CIRCULATION

The below standards are excerpted from the Chaffee County Land Use Code. In the event of any inconsistencies or conflicts, the Land Use Code shall control.

DIVISION 3.2.1 PURPOSE AND APPLICATION OF CHAPTER

3.2.1.1 PURPOSE

The purpose of these standards is to promote safe, efficient, and effective road system within the County, provide necessary access for emergency vehicles, and minimize or eliminate conflict between motor vehicles, bicycles, and pedestrians. These standards provide design guidelines and minimum criteria for all roads to be constructed for public use, and for private roads and driveways within the County.

Sec. 3.2.1.2 APPLICATION

These standards apply to all new roads or improvements to existing roads in Chaffee County, including private roads and driveways.

DIVISION 3.2.2 ROADS

Sec. 3.2.2.1 ROAD LAYOUT AND DESIGN

- A. *Generally.* New roads shall be designed according to standards set out in the Chaffee County Engineering Criteria Manual and the provisions of this Section.
- B. *Design for Safe Passage Wildlife.* Where road impacts to habitats, big game migration corridors, and big game winter ranges cannot be avoided, the impacts of roads shall be minimized and mitigated using contextually appropriate design techniques to provide for safe passage of wildlife (*e.g.*, depending upon the nature of the resource, signage, reduced design speeds, narrow widths, traffic calming, wildlife passage structures, wildlife fencing, at-grade crossings, and periodic or seasonal closures).
- C. *Transportation Master Plan.* When a County-adopted master plan contemplates the establishment, realignment, or widening of a road that traverses a subject property that is proposed for subdivision, the applicant must, at the applicant's

expense, dedicate the necessary right-of-way for the establishment, realignment, or widening of the road.

- D. *Connections to Existing Roads.* Where roads outside a subdivision must be constructed to establish a connection between the subdivision and the existing state highway system (or existing roads which that will be used for such connection) must be upgraded to accommodate added traffic from the subdivision, the applicant must:
 - 1. Secure the necessary rights-of-way for required improvements; and
 - 2. Include such right-of-way on the plat or otherwise provide for a legal means of access per another legal mechanism approved by the County.
- E. *Intersection Spacing.* Road intersections shall be spaced as provided in the Engineering Standards or State Highway Access Code, as applicable.
- F. *Extension of Roads to Property Boundaries.* Certain proposed roads, as determined by the Director, shall be extended to the boundary of the subject property in order to provide for safe and efficient future traffic circulation within the vicinity. Stub-outs and temporary turn-arounds may be required as provided in the Engineering Standards.
- G. *Half-Roads.* New subdivisions shall not include new perimeter half roads unless satisfactory assurance for dedication of the other half is provided. Where an existing half-road is adjacent to a new subdivision, the other half of the road shall be dedicated and constructed by the subdivider.
- H. *Secondary Access.* Applications for development of parcels larger than 10 acres in area shall show an alternate access road (fire-trail or two-track) in addition to a primary access road or driveway. If possible, the alternate access road shall connect to a different road than the primary access road and shall be spaced from the primary access road as prudent to provide emergency access. In locations where steep slopes or narrow lots prevent compliance with this standard, the applicant shall consult with the fire protection district to provide a site design or access design that is acceptable to the fire protection district. The alternate access road shall be reviewed and approved by the fire protection district with jurisdiction.

3.2.2.2 REQUIRED ROAD IMPROVEMENTS

Roads shall be improved in accordance with the Chaffee County Engineering Criteria Manual (see below).

Sec. 3.2.2.3 ROAD NAMING CONVENTIONS

- A. *Generally.*
 - 1. All proposed road names shall be submitted to the County for approval. Local subdivision roads shall be suffixed with appropriate designation names such as "Trail, Lane, Drive," and the like, but shall not use a suffix of

“Road,” which shall be reserved for collector roads.

2. Generally, road names shall be consistent with the names of existing roads and streets in the same alignment; otherwise there shall be no duplication of street names in the County.
- B. *Renaming and Readdressing.* The County may, as a result of new developments, road names, or public safety factors, require the renaming and readdressing of all properties along a road. Notice of such action shall be provided by mail to all affected property owners at the applicant’s expense, postmarked not less than 60 days prior to such change.

3.2.3 TRAILS AND WALKWAYS

Sec. 3.2.3.1 TRAIL AND WALKWAY STANDARDS

- A. *Generally.* The type and construction of trails and walkways shall be compatible with the anticipated use.
- B. *Trail Right-of-Way Standards.* Trail rights-of-way for dedicated open space/amenities as set forth in Division 4.5.2., *Open Space/Amenities Dedication Requirements*, shall conform to the following criteria:
 1. The land required for trail rights-of-way shall be platted as an easement or as a separate lot. The width for trail easement shall be adequate to handle the proposed use based on the needs of the trail, its location, the surrounding terrain, and the anticipated usage.
 2. The trail easement may overlap and include property previously included in other easements such as ditch, canal, utility, and conservation easements and public or private open space, subject to a written agreement with the underlying easement rights owner. However, the trail easement shall not compromise the functional use of any other easement.
- C. *Trail or Walkway Service Comparable to Sidewalks.* A system of trails and walkways may be used as an alternative to sidewalks (where sidewalks would otherwise be required) provided that the level of service provided by the proposed trail or walkway system shall be comparable to that of applicable sidewalk requirements.
 1. Safety. Unsafe road crossing locations shall be avoided. Special structures or traffic control devices may be required at road crossings for safety.
 2. Maintenance. Suitable provisions for maintenance of trail and walkway systems shall be established through a perpetual association, corporation, or other means acceptable to the County.
- D. *Connections through Parking Lots.* Sidewalks, multi-use pathways, and trails shall not be routed through parking lots (except to make connections to buildings) if other practical alternatives exist. Where sidewalks, multi-use pathways, or trails must be routed through parking lots, they shall be located between parking

modules and protected by curbs.

3.2.3.2 TRAILS MASTER PLAN IMPLEMENTATION

Trails within a public right-of-way shall meet the standards identified in any adopted County Trails Master Plan.

3.2.4 ACCESS AND CIRCULATION

Sec. 3.2.4.1 ACCESS REQUIRED

All lots and parcels created by subdivision shall have access to the state highway system in conformance with the State Highway Access Code (2 CCR § 601-1). *See* C.R.S. § 30-28-133.1; C.R.S. § 43-2-147.

Sec. 3.2.4.2 ACCESS STANDARDS

- A. *Generally.* Easements for all private access, including shared driveways, private alleys, or other access ways shall be shown on final plats if they are pre-existing or are established at the time of the final plat to provide for access or circulation within the subdivision.
- B. *Number.* The number of access points shall be limited to the minimum that will allow:
 - 1. The subject property to accommodate the projected traffic; and
 - 2. The road network to safely accommodate vehicular ingress to and egress from the subject property.
- C. *Width.* Easements or other areas designated for shared driveways, alleys, or other access ways shall include, at a minimum, the width of the travel surface, two feet on either side, any associated cut and fill slopes, and any drainage improvements. The appropriate width of any such easement shall be determined by the Director, taking into account the minimum standards of this Division and referral comments from the fire protection district with jurisdiction, the Chaffee County Sheriff's Department, and utility providers.
- D. *Design.*
 - 1. Access to off-street parking shall be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic ingress and egress, and maximum safety for pedestrians and vehicular traffic on the subject property.
 - 2. Access points shall be:
 - a. Clearly and permanently marked and defined; and
 - b. Not more than 24 feet in width (measured on the property side of the curb return) unless the Director determines that a wider access is necessary (*e.g.*, for tractor-trailers or additional access lanes)
- E. *Separation of Driveway Connections.* Driveway connections shall be spaced from each other and from road intersections as provided in the ECM.
- F. *Cross Access/External Connections.*
 - 1. Cross-access shall be provided among nonresidential and mixed-use parcels where practicable, to manage the number of access points along County and

State roads, and to balance the need for mobility with the need for access to lots and buildings.

2. Proposed development shall connect to existing and planned roads where necessary to complete planned roads networks.

Sec. 3.2.4.3 ADDRESS MARKERS

All developed properties shall have a permanently posted, reflective, address sign with minimum four-inch letters that is placed at each driveway entrance above snow-line and visible from both directions of travel along the road that intersects with the driveway. If the letter-size requirement is not feasible as determined by the local fire protection agency, the minimum size shall be as advised by the local fire protection agency. For the purpose of emergency response, in all cases, the address shall be posted at the beginning of construction and shall be maintained thereafter by the property owner.

Sec. 3.2.4.4 SHARED RESIDENTIAL DRIVEWAYS

- A. *RS, RM, MUR, and MUC Zoning Districts.* In the RS, RM, MUR, and MUC zoning districts, driveways that are shared by two single-unit detached dwellings are allowed according to the following standards:
 1. The minimum lot width for a lot that is served by a shared driveway is 40 feet.
 2. Garage doors shall be either:
 - a. Side-facing; or
 - b. Set back at least 30 feet behind the front building line.
 3. If the garage is located behind the principal building, the driveway is set back at least two feet from the sides of the principal building.
 4. If the garage is located in front of the principal building, then the turnout from the shared driveway to the garage shall have a radius of at least five feet.
 5. An easement and maintenance agreement for the shared driveway shall be recorded.
- B. *AR and RR Zoning Districts.* In the AR and RR zoning districts, shared driveways may serve up to four single-unit detached dwellings or two duplexes (not more than four total dwelling units), according to the following standards:
 1. The minimum width of a shared driveway shall be a 22 foot wide gravel driving surface, or an 18 foot paved driving surface with two-foot gravel

- shoulders on each side, or as approved by the fire protection district with jurisdiction, if different;
2. Pullouts and turnarounds are required if requested by the fire protection district with jurisdiction;
 3. Individual driveways that connect to the shared driveway shall be at least 22 feet long;
 4. Access easements shall be provided for lot owners who take access from the shared driveway, and for law enforcement and emergency responders; and
 5. An easement and maintenance agreement for the shared driveway shall be recorded.

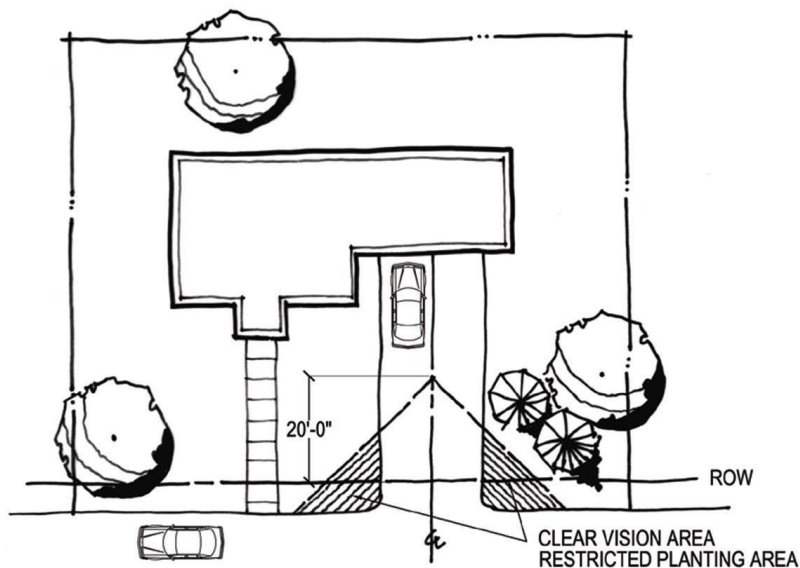
Sec. 3.2.4.5 ALLEYS

- A. *Generally.* Alleys may be used to provide access in residential developments where the lot width along the block face is less than 50 feet, and to provide access in nonresidential and mixed-use developments in the RM and MUC zoning district.
- B. *Dimensions.* Alleys shall be dimensioned to meet the requirements of reasonably anticipated service and utility providers. However, no alley right-of-way shall be less than 24 feet wide, which shall include 18 feet of pavement width.
- C. *Surfacing.* All alleys shall be hard-surfaced with asphalt, recycled asphalt, or concrete.
- D. *Maintenance.* Alleys shall be maintained at no cost to the County. The County may require the applicant to provide for perpetual maintenance by way of CCRs or other legally binding document that provides comparable assurances.
- E. *Parking.* Parking may be accessed from alleys, but shall not be allowed within alleys.

Sec. 3.2.4.6 SIGHT TRIANGLES

- A. *Road Intersections.* No building, fence, wall, sign, hedge, shrub, planting, tree, or other sight obstruction between two and one-half feet and nine feet above the elevation of the crown of the road shall be located within the triangular area formed by the nearest outer lane boundaries of intersecting roads and a line connecting them at points 35 feet from their point of intersection.
- B. *Driveway Connections.* No building, fence, wall, sign, hedge, shrub, planting, tree, or other sight obstruction between two and one-half feet and nine feet above the elevation of the crown of the road shall be located within the triangular area formed by the points along the nearest outer lane boundary of a road and the centerline of a connecting driveway that are situated 20 feet from the intersection of said lines. *See Figure 3.2.4.4, Illustrative Driveway Sight Triangle.*

Figure 3.2.4.4, Illustrative Driveway Sight Triangle



Sec. 3.2.4.7 SITE CIRCULATION

- A. *Design Objectives.* The internal circulation system shall be designed to:
1. Provide for logical and efficient interconnections;
 2. Provide necessary sight distances, stacking space, and traffic control devices to ensure the safest and most predictable system of parking and circulation;
 3. Include clearly defined points of ingress and egress that promote the orderly, safe, and logical movement of traffic within the subject property and on adjoining streets;
 4. Provide for emergency vehicle access (unobstructed by parking or loading areas), and sufficient areas to allow the staging of emergency rescue or fire-fighting efforts;
 5. Logically connect to adjoining properties where appropriate;
 6. Minimize the number of vehicular turning movements and points of vehicular conflict (particularly at access points); and
 7. Minimize points of potential conflict between pedestrian and vehicular traffic.
- B. *Pedestrian Routes.* Pedestrian routes shall be located along (or visible from) roads, except that, where road connections are not feasible or the County determines that they are undesirable, off-street trails and multi-use paths may

be used instead to provide pedestrian connections among buildings and land uses, and among abutting properties.

- C. *Alternative Travel Routes.* If proposed development includes more than one street or more than 50 parking spaces, then the internal circulation system (*e.g.*, new streets, sidewalks, trails, or multi-use paths) shall be designed such that alternative travel routes are provided through the development.

Sec. 3.2.4.8 STACKING

- A. *Generally.* Stacking spaces are used to measure the capacity of a drive-through lane to hold motor vehicles while transactions are taking place. Stacking spaces measure eight feet wide by 20 feet long and provide direct access to a service window, ATM, or station at a drive-through bank (collectively, for the purposes of this section, a “station”).
- B. *Requirements.* Uses that include drive-through services shall provide a traffic impact study that addresses the number of stacking spaces that are necessary for safe circulation on-site and for safe ingress and egress from the adjacent road.
 - 1. *Design.* Stacking lanes shall be clearly marked and shall not interfere with on-site or off-site traffic circulation or parking access.
 - 2. Generally, stacking areas shall not be situated between the facade of a building and a road frontage. If such a configuration is necessary for safe on-site circulation, ingress, and egress, then the drive-through lane shall be set back at least 10 feet from the road, and the setback area shall be planted with one tree and three shrubs per 30 linear feet of frontage occupied by the drive-through lane.

The below standards are intended to supplement the above standards. In the event of any inconsistency or conflict with the Land Use Code, the Land Use Code shall control.

ROAD, ACCESS, DRIVEWAY, AND PARKING STANDARDS

1. GENERAL

The purpose of these standards is to promote safe, efficient and effective road system within Chaffee County. These standards provide design guidelines and minimum criteria for all roads to be constructed for public use, and for private roads and driveways within the County.

A. Applicability. These standards apply to all new road construction or improvements in Chaffee County, including private driveways.

B. Enforceability. The County departments and offices or their agents, as designated by the Board of County Commissioners ("BOCC"), and the appropriate state and federal agencies, enforce these standards. Violations of these Road Standards may result in revocation of permits, withholding of permits including building permits, monetary penalties, closure of accesses, or injunctions, in addition to other remedies that may be available.

C. Hold Harmless: The applicant and/or permittee shall indemnify and hold harmless the County, its employees and agents for any and all costs, damages and liabilities (including without limitation, litigation costs and expenses and attorney's fees) which may accrue or be claimed to accrue by reason of compliance with these Standards, any work performed or improvements placed in a County right of way/easement or on private property. Acceptance of any permit shall constitute such an agreement by the applicant/permittee whether the same is expressed or not.

D. Penalties and Penalty Permits: In addition to other penalties that may be imposed, any person who commences work prior to obtaining a permit required under these Road Standards shall be required to obtain a penalty permit in addition to a standard permit. The fee for the penalty permit shall be \$100.00 per day until a standard permit is issued.

- 1.** Properties shall be permitted a maximum of one driveway access point to Collector roads. Up to two access points may be permitted for properties accessing Local or Low

Volume Rural Roads, subject to sightline and other requirements of this Code.

E. Road Vacations: Roads dedicated as public rights-of-way, public easements, platted streets, or roads that have been used by the public for seventeen years or more cannot be arbitrarily closed or rerouted without County approval.

Permits Required. All new roads or streets, including agricultural roads and private driveways, shall obtain legal access to municipal streets, county roads or state highways as necessary. Final subdivision plats will not be filed and wastewater treatment, building, and other permits will not be issued until the required permits have been obtained. All new roads or improvements to existing roads, accesses, and driveways shall be constructed in conformance with these standards, and shall be reviewed by the County Road and Bridge Department.

F. Road Construction. Road construction shall not begin until the required Chaffee County permit has been obtained. Road Construction permits shall not be issued for a proposed subdivision until the preliminary plat has been approved by the BOCC, or for a PD until the Final PD Plan is approved. For the purposes of this requirement road construction includes road cuts, road, bridge, culvert or drainage work related to roads, wetlands or changes to the flow of streams, ditches or runoff.

G. County Road Access Permits. Any new connection to a County Road, or increased use of an existing access, shall obtain a County Road Access Permit, and be constructed and be constructed in conformance with these standards. Where the land use change causes warrants for improvements to state or federal highways, or where the land use change increases the ADT on a county road by 20 percent, the developer shall be responsible for those necessary improvements.

- 1. Proportional Improvements.** Proportional improvements to public roads, intersections and traffic management systems will be required if the added Average Daily Traffic Volume or Peak Vehicles Per Hour Traffic Volume, or commercial heavy load traffic triggers the necessity of such improvements. The County may require future developers using the improved access to pay a proportional share of prior access improvements.
- 2.** The proposed development shall not have an adverse impact on the County's Road Improvement Plan. The applicant may be

required to make necessary improvements to the impacted roads as a condition of plat or development approval.

H. Adequate Capacity. Roads serving the proposed use shall have the capacity to accept the additional traffic generated by the use safely and efficiently. The use shall not cause traffic congestion or unsafe traffic conditions, and all impacts to the County and state roadway system shall be mitigated through roadway improvements or impact fees, or both.

1. **Roadway System Impacts.** Impacts to the County roadway system associated with hauling, truck traffic and equipment use shall be mitigated through roadway improvements or impact fees or both.
2. **Stub Roads.** For developments subject to intergovernmental agreements or within a Municipal Planning Area Overlay, the developer may be required to provide stub roads and/or easements that will connect to existing or future roadways depicted on the adopted municipal Transportation Plan for connectivity, traffic flow, and emergency access.

I. Driveway Permits. Any new driveway or non-residential access road or increase in use of an existing driveway or access, shall obtain a County Driveway Permit, and be constructed in conformance with these standards. A driveway permit is required where the driveway accesses a private subdivision road, municipal street, County Road, or State Highway.

1. **Driveway Permits.** Properties shall be permitted a maximum of one driveway access point to Collector roads. Up to two access points may be permitted for properties accessing Local or Low Volume Rural Roads, subject to sightline and other requirements of this Code.

J. Right-of-Way Permits. Any work within the County right-of-way requires a permit, including utility work, drainage, mailboxes, signage, trails, sidewalks, or any other above or below surface work in the right-of-way. A right-of-way permit is required for any work in the deeded or prescriptive right-of-way, including but not limited to work within the traveled roadway, shoulder, drainage areas, or unimproved areas.

1. **Underground Location.** Where utilities are installed underground, they shall be located in the right of way at

a depth of at least twenty-four (24) inches.

2. **Restoration.** Any disturbed portion of the right of way shall be restored as nearly as possible to the condition existing immediately prior to the company's installation. Backfilling shall be made in six-inch lifts, mechanically tamped and packed. The trench shall be left open until the County inspects installation.
3. **Safety.** Safety measures shall be implemented in accordance with state and federal requirements to protect the public from harm during utility construction, improvements, location or relocation.
4. **Cuts.** Open cuts across a roadway will be allowed, subject to conditions imposed by the County. Backfill shall be compacted in 6-inch lifts to a density of ninety-five (95) percent of standard proctor. Any compaction tests shall be conducted by the County at the expense of the applicant.

K. Other Jurisdictions. Depending on the location of the property, other jurisdictions, including Colorado Department of Transportation (CDOT), a municipality, the US Forest Service or Bureau of Land Management, or a subdivision homeowners association, may require a permit to build a road or access across their property or accessing a road within that jurisdiction. It is the applicant's responsibility to receive permits and approvals as needed by that jurisdiction; however, no County permits shall be issued or final construction approvals granted until approvals from the other jurisdiction are submitted.

2. ROAD CLASSIFICATION

Road Classification. County Roads are classified as to their current and projected use. For a list of County roads, their respective classifications and Average Daily Traffic volume (ADT) refer to the Chaffee County Road Inventory. Road classifications are determined not only on the current ADT, but also on a ten-year estimated ADT.

A. Arterial Roads. These roads are US and State Highways US 24, 50, 285 and SH 291, and serve as interstate and intrastate transportation routes. Access permits for these roads are administered by the Colorado Department of Transportation.

B. Collector Roads. Typical ADT in excess of 1000 vehicles.

Collector roads have the primary purpose of conveying traffic from local roads to business areas and to the State Highway system. These routes are spaced at intervals, to link locally important traffic generators with outlying rural areas. Individual lot access to collectors should be minimized. Chaffee County may designate a road as a collector regardless of present ADT to enhance safety and traffic flow. Examples include CR 162, 120, 140, 160, 306, 350, and 371.

C. Local Roads. Typical ADT less than 1000 vehicles. These routes primarily provide access to residential neighborhoods and have limited numbers of businesses or other facilities that generate significant traffic. Most internal subdivision roads and rural roads are local roads.

D. Low Volume Rural Roads. Typical ADT less than 200 vehicles. These routes are typically dead-end roads, roads that do not connect to multiple routes, do not provide access to businesses, large developments, or public lands, or are roads through the more remote places in the County.

3. Right-of-Way Dedication Required. All new roads are required to dedicate to the public the right-of-way for the road. All types of subdivisions and subdivision exemptions that front existing County roads shall be required to dedicate to the County additional right-of-way width from the center line of the existing road to the right-of-way boundary. Additional right-of-way dedication may be required if a proposed land use generates traffic volumes which may necessitate turn lanes or other improvements.

A. Right-of-Way Width. Any new road requires a minimum right-of-way dedication of 60-feet in width. Dedication of right-of-way from the centerline of adjacent County Roads is required, either 30 feet from centerline of the road, or the amount necessary to complete a partial right-of-way.

1. Exception: Low Volume Local Roads can dedicate a right-of-way width of 50 feet if the road layout and subdivision plat and restrictions result in no possibility of future development, increased future traffic volumes or connecting access to adjacent lands.

B. Cul-de-sac Right-of Way. A cul-de-sac right-of-way shall have a minimum radius of 55 feet.

4. Roadway Design and Construction. The purpose of this section is to identify minimum road standards for Chaffee County. A

registered professional engineer shall design all roads subject to these standards. The County may require any road subject to these standards to comply with codes or standards recognized by federal, state or national organizations.

A. General. New Roads shall comply with the following general criteria related to location and layout. Road designs must show a road grade profile with station identification that corresponds to the road design drawing and must identify clearly areas that are shadowed by terrain as well as identify sun angle information for any road with a grade in excess of 7%. Designers should refer to national and state recognized design guides.

1. **Conformance with Existing Land Use Plans:** Roads within three miles of a municipality must conform to the adopted arterial road plan of the municipality filed with the County at the time of the application. All roads must conform to the County Road Plans. The County may require public right-of-ways, public easements, stub roads and other such items necessary for the planning and development of a contiguous road and

street system for safety and efficiency as a condition of approval of any application for subdivision, re-zoning or PD.

2. **Special Design Requirements:** The BOCC may require special design and maintenance when special circumstances may affect the health, safety and welfare of the public.
3. **Relationship to Topography.** Roads and accesses shall be designed to bear a logical relationship to the topography, creeks, wooded areas, and other natural features. The road grade shall conform as closely as possible to the original topography. Combinations of steep grades and curves should be avoided. Cut slopes shall be a maximum of 1.5 (horizontal) to 1 (vertical) unless designed by a professional engineer. Fill slopes greater than 10 feet shall be designed by a professional engineer.
 - a. Where roads are constructed through timbered land, the timber shall be cleared a minimum of 10 feet beyond the edge of the traveled roadway. All limbs, timber and brush must be disposed. In no instance will roadways be accepted where timber

has been bulldozed to the side of the roadway.
Minimum height clearance is 13' 6".

4. **Emergency Access and Egress.** Roads and accesses shall be designed so as to provide emergency access and egress for residents, occupants and emergency equipment. Roads designated as emergency access only shall comply with provisions of these standards and requirements of applicable emergency services such as fire protection, ambulance and law enforcement.
5. **Access:** When two points of access are required, they shall be placed a distance apart equal to no less than one half of the length of the maximum overall diagonal dimension of the property or area to be served, and be measured in a straight line between accesses. The second access road must be made available to the public and cannot be designated for sole use by emergency responders unless otherwise approved by the fire code official.
6. **Commercial and Industrial.** Roads and accesses in commercial and industrial developments shall be designed to minimize conflict between vehicular and pedestrian traffic.
7. **Protection of Boundary Fences and Livestock.** Roads and driveways shall be located a sufficient distance back from the property boundaries so that normal maintenance of roads, including snow removal, will not damage boundary fences.
8. **Traffic Studies:** The County may require a traffic study as a condition of access permit approval, if the traffic volume generated by the proposed use increases traffic volumes on any County Road by 20 percent, or in the case of an existing access, at the point of access by 20 percent. The County may require improvements to County Roads and intersections based on the studies.
9. **Materials.** Standard specifications of materials for aggregates and soil aggregate sub-base, base and surface courses shall be governed by AASHTO Designation M147-65 (1993) or latest revision. Gravel surfaced roads shall meet the Chaffee County specification for gravel surfaced roads.
10. **Re-vegetation.** All disturbed areas outside of the

traveled way and shoulder shall be re-vegetated in accordance with an approved weed management plan. Erosion control devices may be required to be installed in roadside ditches to reduce sediment transport.

11. **Clear Zone.** With the exception of traffic control or safety devices, no above ground obstructions may be within 10' of the traveled way.
12. **As-Built Plans.** The developer shall provide an as-constructed centerline profile for any road with a grade greater than 7 percent.

3. INTERSECTION DESIGN

Intersection Design. Intersections shall be designed to meet standard safety specifications and shall take into account terrain, traffic count, approach speed, clear sight distance and vertical alignment. The County may require design changes that exceed standard specifications to improve safety and traffic flow.

- A. **Minimum Centerline Offsets.** No road intersection shall be closer than 300 feet from the nearest road intersection as measured between centerlines. Offset intersections shall be avoided on streets where the future traffic volume may warrant a traffic signal. High volume streets may require increased minimum offsets.
- B. **Intersection Angles.** Roads shall intersect at an angle 90 degrees. In rolling or hilly terrain where a 90 degree angle cannot be achieved, the County may approve an angle of 80-100 degrees, subject to design by a registered professional engineer, and may require increased design criteria, such as larger corner radii or increased sight distance. **Table**

7.4.5 B summarizes minimum access radii requirements for differing types of intersections.

Table 7.3.5 A – Intersection Radii

Intersecting Road Classifications	Minimum Access Radius
Collector - Collector	30
Local - Collector	25
Local - Local	20
Driveway – Collector	25

Driveway - Local	20
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- C. Vertical Alignment:** The vertical alignment within the intersection area shall be designed with a grade of 2 percent away from the edge of the street being intersected until reaching the line of the roadside drainage. Grades within 50 feet of an intersection shall not exceed 2 percent.
- D. Sight Distance Requirements for Public Road Intersections.** Sight distance refers to any obstruction such as hills, depressions, curves or any other physical obstruction, which may interfere with a vehicle's ability to safely merge or enter a lane of traffic.

Table 7.3.5 B - Minimum Sight Distances

Posted Speed Limit	25	30	35	40	45	50	55
Design Sight Dist.	150	200	250	325	400	475	550
Minimum Sight Dist.	150	200	225	275	325	400	450

- E. Grade.** Road grades are based on factors such as roadway classification, horizontal and vertical alignments, design speeds, type of terrain, safety and capacity. All roads having centerline curves greater than forty-five (45) degrees in arc shall have a maximum of six percent (6%) grade along such curves. On straight line portions, a grade of ten percent (10%) shall be allowed for a maximum of two hundred (200) feet in horizontal distance. Grades in excess of 7% in low winter sun areas may require mitigation. Steep grades with sharp drop off slopes may be required to install guardrails on curves or other critical areas.

Table 7.4.5 C - Maximum Road Grades

Roadway Classification	Residential District	Business District	Open Highway
Collector	7%	7%	6%
Local	8%	7%	6%
Low Volume Rural	9%	N/A	6%

4. ROAD DRAINAGE

Road Drainage. Water from roads must be contained or channeled in a manner

not to cause damage or erosion to County Roads, adjacent property, or irrigation ditches and conform to State and Federal guidelines for water quality and storm drainage. All roads shall be designed with a minimum 2% crown to facilitate drainage off the road. If natural channels do not provide adequate drainage within the framework of local, State and Federal regulations, an appropriate drainage collection and storage system must be installed. Roads with grades greater than 5 percent shall require a drainage plan prepared by a registered professional engineer.

1. **Elevation.** Roads shall be constructed to provide 2 feet of roadbed elevation above the bottom of the drainage on either side. Adequate cross drainage shall be provided to assure that flooding and washouts will be eliminated under maximum known snowmelt and rainfall conditions.
2. **Borrow Ditch Culverts.** Culverts shall be a minimum of 18" in diameter and shall extend a minimum of two feet beyond the edge of any road or driveway fill or be protected by concrete encasement or flared end sections. Culvert ends should be designed to minimize trash collection and sedimentation.

Table 7.3.5.D – Right of Way and Roadway Widths

Roadway Classification	Right of way width	Vehicle travel lane	Shoulder width	Surface (applies to lane and shoulder)
Collector	80 feet	12 feet	8 feet	Paved
Local	60 feet	11 feet	2 feet	Gravel
Low volume rural	50 feet	10 feet	2 feet	Gravel

5. ROAD SURFACING

- A. **Surfacing, Curb & Gutter Requirements.** Roadways shall be required to have a travel lane in each direction with a shoulder on each side of the road. Shoulders are required to ensure that vehicles can stop off the traveled way in case of emergency and to

provide parking off the traveled way.

1. **Collector Roads.** Collector Roads shall have a pavement structure designed by a registered professional engineer, and shall have a minimum compacted thickness of 3 inches of hot bituminous pavement placed in a minimum of two lifts on a site-specific base course designed by a licensed professional engineer.
 - a. Travel lanes shall be 12 feet wide.
 - b. Shoulders shall be a minimum of 8 feet wide.
 - c. A drainage plan and a storm water control plan are required.
 - d. Pedestrian walkways are required in commercial use areas.
2. **Local Roads.** Local roads shall be surfaced with a minimum of a four-inch compacted aggregate base with a dust control application.
 - a. Travel lanes shall be 11 feet wide.
 - b. Shoulders shall be a minimum of 2 feet wide, constructed with site-specific base course designed by a licensed professional engineer.
 - c. A drainage plan and a storm water control plan shall be required in Commercial areas.
 - d. Pedestrian walkways are required in commercial use areas.
3. **Low Volume Rural Roads.** Low volume rural roads shall be surfaced with a minimum of a four-inch compacted aggregate base with a dust control application.
 - a. Travel lanes shall be a minimum of 10 feet wide.
 - b. Shoulders shall be a minimum of 2 feet wide, constructed with site-specific base course designed by a licensed professional engineer.

6. CUL DE SACS

1. **Cul-de-Sacs.** Any road that is not completed as a through road, i.e. a dead-end road, shall have a cul-de-sac constructed at its terminus. Cul-de-sacs shall have a turn-around pad at the end with a minimum travel surface radius of forty-five (45) feet, surfaced with the same material as the remainder of the road.
 - a. Any road that terminates at the boundary of a subdivision, and may at some future date be extended, shall have a temporary cul-de-sac

constructed at its terminus. Temporary cul-de-sacs shall have a 50- foot radius right-of-way and a minimum of a 40-foot radius gravel surface traveled way. Unfinished easements or stub roads that are not accessed by individual lots do not require a finished cul-de-sac.

- b.** Cul-de-sacs greater than 1000 feet in length may be required to meet standards for a higher classification road, or provide additional turn- around areas along the road.

- 2. Accesses and Driveways.** Any access to a chip-sealed or paved County Road shall be paved between the edge of the travelled road and the right- of-way line.

7. BRIDGES, CULVERTS, DITCH CROSSINGS

A. Bridges and Culverts. Bridges and culvert crossings of natural streams, gullies, washes, and similar, shall be designed by a professional engineer and be constructed in compliance with AASHTO recommendations and may require approval of the Army Corp of Engineers. A Chaffee County building permit is required prior to construction of any bridge. All bridges on public roads shall have load limits posted, guardrails, a reasonable traction surface and may not exceed a 2% grade. The minimum clear width of a bridge deck shall equal the width of the travel lanes plus shoulders of the road.

B. Ditch Crossings. (See also Section 3.6.6.4, LUC)
Development of land crossed by irrigation ditches requires respecting rights of ditch owner(s) to operate and maintain their ditch without an increased burden of maintenance or liability due to land development and subdivision. Subdivision layouts should attempt to minimize ditch crossings by roads and driveways. As a minimum all irrigation ditch crossings by new roads, or existing roads being improved, shall:

- 1.** Require the crossing to be sized to not interfere with the ditch operations or change existing hydraulic flow characteristics (flow width, depth, slope, velocity or flow pattern) established within the ditch. Crossings shall not reduce the maximum flow possible in the ditch, including the maximum total ditch flow rights and possible runoff which may flow into and be carried by the ditch. Provision shall be made for routine inspection

of the crossing entrance and removal and disposal of trash.

2. Provide vehicle and maintenance equipment access to the ditch from both sides of the ditch crossing from all roads for use by the ditch owner(s). Allow access to all ditch crossings throughout the road system.
3. Require a letter from the ditch owner(s) or ditch company approving the crossing(s) prior to any permit application or construction within the ditch easement. The developer of the ditch crossing shall provide the ditch owner(s) with design drawings and hydraulic analysis of each crossing for which approval is requested.
4. Require execution of an agreement binding the property owner and all future property owners to accept all liability for damage caused by the improvements installed in the ditch.
5. Require execution of an agreement requiring present and future property owners to maintain the crossing and to keep it and the ditch access easement safe and free of trash at all times. Maintenance shall include without limitation frequent and timely trash and debris removal, repair or replacement of the crossing as needed, and construction of improvements to the crossing as may be considered necessary by the developer, property owners, or ditch owner(s). Ditch owners shall be notified prior to any work being performed within the ditch easement.
6. The BOCC may require specific improvements to ditch crossings to limit liability to ditch owners caused by the crossing, improvements or realignment. Improvements may be required to address safety concerns, minimize flood danger, or to protect downstream water rights.
7. Ditch crossings by any utility within any new public right-of-way or easement shall meet the requirements of this code with regard to permits and agreements required construction, maintenance, and minimizing of flood danger. Ditch companies or owners shall be notified prior to any new ditch crossings by utilities within existing public rights-of-way or easements. Additionally, underground utility locations in any public right- of-way or easement shall be marked on each side of the ditch.

8. SIGNAGE AND LIGHTING

A. Signage, Traffic Control Devices, and Street Lighting.

Traffic control devices, street signs, street lighting, striping and pedestrian crosswalks are to be provided in conformance with these Regulations, and the “Manual for Uniform Traffic Control Devices”, latest revision.

- 1. Road Names.** (see Section 3.2.2.3 LUC)
- 2. Subdivision Maps.** Subdivisions with more than 20 lots shall provide a map of the subdivision with labeled road names, located at the access point to the County Road or state highway system, no closer than 12 feet from the traveled way.
- 3. Traffic Control Signage.** All subdivision roads entering a county road, municipal street or state highway must have a stop sign or other appropriate signal device. Curves, depressions or other roadway hazards deemed significant by the local law enforcement jurisdiction will be required to have the appropriate signage whether the road is a public or private road.

9. DRIVEWAYS

Driveway Standards.

A. General Requirements.

- 1.** Driveway access is regulated within the County Right-of-Way (or 30 feet from the center of the road if the right is prescriptive) and 20 feet beyond the Right-of-Way for grading and drainage.
- 2.** The preferred driveway to road angle of access is 90 degrees. A driveway shall not access a road at an angle of less than 80 degrees.
- 3.** Driveways must have culvert sized for the borrow ditch drainage requirement at the roadway intersection unless it can be clearly shown that roadside drainage is not impeded during a 100-year storm. The minimum culvert size is 18” diameter and not less than 18 feet long regardless of drainage requirements. All driveways shall have a culvert unless approved by the County Road and Bridge Department.

4. Above grade driveway improvements must not intrude into the right-of-way easement. Improvements shall be removed at the owners expense if they are not removed within 30 days notice from any public right-of-way.
5. Driveway designs shall divert drainage away from the traveled roadway.
6. Where curbs are present, a curb cut style driveway or road entrance is required. Specific curb designs can be recommended by the Road and Bridge Department and be required by the BOCC.
7. Any access to a chip sealed or paved County road shall be paved between the edge of the traveled roadway and the right-of-way line.
8. Driveway access grades shall slope down and away from the roadway at a 2% grade minimum for the first 10 feet from the edge of the traveled roadway. From 10 feet to 20 feet from the traveled roadway, driveways shall not exceed a positive slope (toward the roadway) of 12%. Exceptions may be made where steep topography makes this requirement difficult to fulfill. The approved design shall protect the roadway from drainage flows by the use of pans, swales, or other approved means.
9. It is recommended that the entire driveway from the roadway to the structure does not exceed 12% grade, is at least 9 feet in width, and is properly maintained to ensure access to emergency medical services, law enforcement, and fire protection personnel. Driveways with steeper grades, narrower widths, and/or not properly maintained, may hinder or prevent access to emergency personnel creating the potential for greater risk to life and property.
10. Mailboxes within the driveway access shall be clustered whenever possible, must be at least 6 feet off of the traveled roadway, and must be of a breakaway type. Break-away types shall include connection with bolts designed to shear off upon vehicular impact, 4-inch by 4-inch or smaller wood posts, or steel pipe with a maximum wall thickness of 3/16- inches.

Table 7.4.6 Minimum Surface Widths for Access Driveways

Type	Width
Multi-family commercial or industrial	
One-way driveway	12 feet minimum
Two-way driveway	24 feet minimum
Residential	
One-way driveway	9 feet minimum
Two-way driveway	18 feet minimum

10. RIGHT-OF-WAY PERMIT

Available on the Chaffee County website

11. DRIVEWAY PERMIT

Available on the Chaffee County website

12. ROAD CONSTRUCTION PERMIT

Available on the Chaffee County website

12. ROAD MAINTENANCE REQUIREMENTS

This summary of maintenance requirements applies to both private roads and public roads that are privately maintained by an owner's association or similar entity. The level of maintenance on publicly maintained roads is subject to available resources. For further information, please see applicable Sections in the Land Use Code (LUC).

Many homeowners in Chaffee County use privately maintained roads to access their property. Below is a summary of maintenance standards listed in the Land Use Code. These standards apply to both private roads, and public roads that are privately maintained.																									
General Maintenance Standards	Perpetual maintenance, repair, and replacement of roads and associated drainage facilities, including but not limited to snow removal, dust control, repaving, pothole repair, culvert repair and replacement, swale clean-out, and vegetation and weed management/control. <i>Land Use Code (LUC) 4.5.3.4.A.2.</i>																								
Frequency of Maintenance	It is generally expected that gravel roads will be bladed and receive magnesium chloride treatment once per year. All other maintenance is on an as-needed basis.																								
Drainage	Water from roads must be contained or channeled in a manner not to cause damage or erosion to County Roads, adjacent property, or irrigation ditches and conform to State and Federal guidelines for water quality and storm drainage. All roads shall be designed with a minimum 2% crown to facilitate drainage off the road. <i>LUC Appendix C, p. 20.</i>																								
Widths and surfacing	<table><tr><th>Roadway Classification</th><th>Right of way width</th><th>Vehicle travel lane</th><th>Shoulder width</th><th>Surface (applies to lane and shoulder)</th></tr><tr><td>Collector</td><td>80 feet</td><td>12 feet</td><td>8 feet</td><td>Paved</td></tr><tr><td>Local</td><td>60 feet</td><td>11 feet</td><td>2 feet</td><td>Gravel</td></tr><tr><td>Low volume rural</td><td>50 feet</td><td>10 feet</td><td>2 feet</td><td>Gravel</td></tr></table>					Roadway Classification	Right of way width	Vehicle travel lane	Shoulder width	Surface (applies to lane and shoulder)	Collector	80 feet	12 feet	8 feet	Paved	Local	60 feet	11 feet	2 feet	Gravel	Low volume rural	50 feet	10 feet	2 feet	Gravel
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Local	60 feet	11 feet	2 feet	Gravel																					
Low volume rural	50 feet	10 feet	2 feet	Gravel																					
Good to Know	Any access to a chip-sealed or paved County Road shall be paved between the edge of the travelled road and the right- of-way line. <i>LUC Appendix C, p. 22.</i>																								

13. UTILITY STANDARDS

The below standards are excerpted from the 2014 Land Use Code. In the event of any inconsistency or conflict with the current Land Use Code, the Land Use Code shall control.

Water System Standards. All central water supply and distribution systems shall be designed to comply with state standards. If state permitting is not required, the following standards shall apply.

- A. Design.** The water distribution system shall be designed by a qualified professional engineer licensed by the State of Colorado and shall be approved by CDPHE or the County Engineer.
 - 1. Sized for Initial and Future Demand.** The water distribution system shall be sized to meet both the initial and future demands of the proposed development. Oversizing for likely extensions is encouraged.
 - 2. Sized for Maximum Day Demand.** The system shall be sized for maximum day demand plus peak hour demand, and fire flow if necessary.
 - a. Residential.** The average daily demand for a residential development shall be based upon 350 gallons per day per residential unit, or 75 gallons per day per capita, as appropriate.
 - b. Commercial and Industrial.** The average daily demand for commercial and industrial uses shall be based on the anticipated demand of the proposed development.
 - c.** Unless otherwise approved by the County Engineer, maximum day demand shall be 3.0 times average day demand, and maximum hour demand shall be 6.0 times average day demand.
 - d.** Minimum residual pressures shall be 20 psi under maximum hour demands; 40 psi if direct flow is used.
 - e.** The actual pressure in the supply system under the conditions specified shall be used in designing the distribution system. Assumed future supply pressures and points of connection for designing the

system in all other cases shall be subject to the approval of the County Engineer. If future connection to a different supply system is anticipated, critical pressure in that system may be used as the starting design pressure.

3. **Water Mains.** To the degree practicable, all lines shall be looped, avoiding dead ends in the system. Dead-end mains shall be provided with a suitable means for flushing.
4. **Financial Plan.** The developer shall submit a financial and operations plan ensuring the system can be constructed, operated and maintained in a manner to meet the applicable drinking water standards.
5. **Quality and Material Specifications.** Material specifications for all water distribution systems shall be approved by the County Engineer and meet AWWA Standards.
 - a. The distribution system shall be designed for a minimum service life of 50 years.
 - b. The distribution system shall have sufficient cover to prevent freezing.
6. **Pressure.** The system shall be so designed and maintained as to provide a pressure of not less than twenty (20) nor more than eighty (80) psi, under normal operating conditions at service buildings and other locations requiring potable water supply.
7. **Separation.** A minimum horizontal separation of ten (10) feet shall be maintained between all domestic water lines and sewer lines.

Wastewater System Standards. These standards apply to all central wastewater treatment systems, which shall be designed to comply with State standards, and / or the Chaffee County On-Site Wastewater System Regulations as applicable.

Central System Design. The wastewater system shall be designed by a qualified professional engineer licensed by the State of Colorado. The system shall be designed in compliance with the standards established by CDPHE. Effluent from sewage treatment facilities shall not be discharged into any waters of the state except with prior approval of CDPHE.

8. The collection system shall not be designed for less capacity than the anticipated maximum daily sewage flow or treatment requirements. Where guidelines and standards are not available, the design flows for the intended use shall be approved by the County Engineer or CDPHE.
9. Collection systems shall be designed and sized to comply with the guidelines and requirements of the service provider. Approval of the proposed system by the service provider shall be a condition of approval by the County Engineer.
10. Collection systems shall be sized to meet present and future demands of the proposed development. Oversizing for likely extensions is encouraged.
11. Adequate provisions for repair and maintenance of the wastewater system shall be required. The developer shall submit a financial and operations plan ensuring the system can be constructed, operated and maintained in a manner to meet the applicable water quality standards.
12. **Sewer Line.** All sewer lines shall be located in trenches of sufficient depth to be free of breakage from traffic or other movements and shall maintain a minimum horizontal separation of ten feet from all domestic water lines. Sewers shall be at a grade that will insure a velocity of two feet per second when flowing full. All sewer lines shall be constructed of materials that comply with state or County regulations and CDPHE design criteria.
13. **Sewage Treatment and/or Discharge.** Where the sewer lines of the park are not connected to a public sewer, all proposed sewage disposal facilities shall be approved by CDPHE prior to construction, and documentation of the construction and final construction approval by both CDPHE and the design engineer shall be provided to the County prior to operation.

B. Occupancy Restrictions. Where connection to a central wastewater collection and treatment system is proposed and approved, but not available until installation or expansion of such facilities is completed, no uses shall occupy the lot until the collection and treatment system is available to service the

proposed use.

C. Public Systems. Unless prohibited by intergovernmental agreement with the adjoining municipality, individual septic systems will be allowed for proposed land uses located in an area subject to intergovernmental agreements or within a Municipal Planning Area Overlay. If a public system is not available, a central on-site treatment plant and collection system in compliance with the municipal standards, and approved by CDPHE may be used.

D. On-Site Wastewater Treatment System (OSWS). Any OSWS (septic system) allowed under these Regulations shall comply with the Chaffee County On- Site Wastewater Treatment System Regulations. Site location approval shall be

obtained from the CDPHE Water Quality Control Division for systems over two thousand gallons per day.

Other Utilities. Adequate electric power and telephone service shall be available to serve the land use.

E. Approval of Utility Easement by Utility Company. Utility easements shall be subject to approval by the applicable utility companies and, where required, additional easements shall be provided for main switching stations and substations. The applicant shall work with the utility companies to provide reasonable sized easements in appropriate locations.

F. Utility Location. All utility lines, including appurtenances, shall be placed either within public road rights-of-way or within the subdivision easements or rights- of-way provided for the particular facilities. Installation within any County public right-of-way shall comply with the right-of-way cut standards in **Section 7.4.2 E**.

G. Underground Installation. All utilities except major power transmission lines, transformers, switching and terminal boxes, meter cabinets and other appurtenant facilities shall be located underground, unless it is demonstrated that compliance is impractical or not feasible and will result in undue hardship. Dry utilities shall be located a minimum of twenty four (24) inches below grade or below irrigation or drainage ditches, and water and sewer lines shall be buried to a minimum depth of the frostline, or forty eight (48) inches, whichever is greater.

H. Construction and Installation of Utilities. Applicants shall

make the necessary arrangements with each service utility for the construction and installation of required utilities.

14. STORMWATER AND DRAINAGE

Stormwater Run-Off. Designs shall be prepared by a registered professional engineer. Standards shall generally follow those listed below and the Urban Storm Drainage Criteria Manual.

A. Incorporate Drainageways. Significant drainageways shall be incorporated in site development as open space, wildlife areas, and trails. Whenever possible, drainageways should be left in a natural state.

B. No Direct Discharge to Streams or Other Waterbodies. Stormwater runoff from project areas likely to contain pollutants shall be managed in a manner that provides for at least one of the following, and is sufficient to prevent water quality degradation, disturbance to adjoining property and degradation of public roads.

1. Direct runoff to stable, vegetated receiving areas capable of maintaining sheetflow for infiltration. Vegetated receiving areas should be resistant to erosion from a 2-year, 24-hour design storm.
2. On-site treatment of stormwater by use of best management practices designed to detain or infiltrate the runoff prior to discharge to any natural waterbody or drainageway.
3. Discharge to a stormwater conveyance structure, designed to accommodate the projected additional flows from the proposed project, with treatment by a regional or other stormwater treatment facility prior to discharge into any natural waterbody.

C. Minimize Directly-Connected Impervious Areas. The site design shall minimize the extent of directly-connected impervious areas.

D. Detain and Treat Runoff. Permanent stormwater detention facilities are required to be multipurpose facilities designed to detain flows to historic peak discharge rates and to provide water quality benefits. Design criteria for detention

facilities include:

1. Detention facilities shall ensure the post-development peak discharge rate does not exceed the pre-development peak discharge rate for the 2-year and 25-year return frequency, 24-hour duration storm. In determining runoff rates, the entire area contributing runoff shall be considered, including any off-site contribution. Off-site contributions shall be determined using the full development potential of the area draining into the detention facility, based upon the existing zoning district regulations.
2. To minimize the threat of major property damage or loss of life all permanent stormwater detention facilities must demonstrate that there is a safe passage of a 100-year storm event without causing property damage.
3. Channels downstream from the stormwater detention pond discharge shall be protected from increased channel scour, bank instability, and erosion and sedimentation from the 25-year return frequency, 24-hour design storm.
4. Removal of pollutants shall be accomplished by sizing dry detention basins to incorporate a 40-hour emptying time for a 2-year, 24-hour design storm with no more than fifty percent (50%) of the stored water being released in twelve (12) hours. If retention ponds ("wet ponds") are used, a twenty-four (24) hour emptying time is required. To promote pollutant removal, detention basins length-to-width ratio should be not less than 2, with a ratio of 4 recommended where site constraints allow. A sedimentation "forebay" is recommended to promote long-term functioning of the structure. Access to both the forebay and pond by maintenance equipment is required.

E. Snowmelt Drainage. Adequate drainage retention shall be provided to accommodate snowmelt from snow removal and storage areas and to ensure it does not drain onto adjacent property.

15. WATER QUALITY

Protection of Water Quality from Pollutants. The following regulations shall apply to all **non-residential** land use changes.

A. Compliance with State and Federal Regulations. At a minimum, all hazardous materials shall be stored and used in compliance with applicable state and federal hazardous materials regulations.

B. Storage Near Waterbodies Restricted. Sand and salt for road traction shall not be stored within one hundred (100) horizontal feet of any waterbody unless there is no practicable alternative, in which case suitable site-specific best management practices shall be utilized.

C. Machine Maintenance Facilities. Maintenance of vehicles or mobile machinery requires an engineer-designed spill prevention and containment system approved by the County if within one hundred (100) feet of any waterbody.

16. STANDARD NOTES FOR CONSTRUCTION DRAWINGS

Please contact the Community Planning and Natural Resources Department

17. DRAINAGE REPORT, PRELIMINARY

The below information is excerpted from the Land Use Code Section 4.2.3. In the event of any inconsistency, the Land Use Code shall control.

Sec. 4.2.3.1 PRELIMINARY DRAINAGE REPORT

- A. *Generally.* The purpose of the preliminary drainage report is to update the concepts and to provide general design details for proposed drainage facilities. The preliminary drainage report shall be prepared, certified, and signed by a registered professional engineer licensed in the State of Colorado.
- B. *Contents.* At a minimum, the report shall provide:
 - 1. A description and scope of work, including locations (county roads, section, township and range)
 - 2. Identification of nearby water features and ownership, and hydrological soil types, including their locations on the subject property;
 - 3. Reference to other existing master drainage plans affecting the subject property, if any;
 - 4. Design storm/rainfall information;
 - 5. Hydrologic calculations (historic and developed basins);
 - 6. Detention and water quality control calculations
 - 7. Construction drawings that show one-foot contours and elevations (existing and proposed), pre-development and post-development drainage basins, and arrows depicting flow direction.

18. DRAINAGE REPORT, FINAL

The below information is excerpted from the Land Use Code Section 4.2.3.2. In the event of any inconsistency, the Land Use Code shall control.

Sec. 4.2.3.2 FINAL DRAINAGE REPORT AND OPERATIONS AND MAINTENANCE MANUAL

- C. *Generally.* The purposes of the final drainage report and operations and maintenance manual are to update the concepts and provide specific design details for the drainage facilities identified in the preliminary drainage report, and provide a plan for the ongoing operations and maintenance of drainage infrastructure. The final drainage report and operations and maintenance manual shall be prepared, certified, signed, and stamped by a registered professional engineer licensed in the State of Colorado.
- D. *Contents of Final Drainage Report.* At a minimum, the final drainage report shall contain all information required for the preliminary drainage report and, in addition:
 - 1. Identify the total acres of the subject property and the acres of the subject property that are within the limits of construction;
 - 2. Identify any FEMA flood zones on the subject property;
- C. Discuss the routing of off-site drainage;
- D. Provide detention pond release rate calculations;
- E. Provide post-construction site imperviousness;
- F. Provide hydraulic calculations for proposed drainage improvements (swales, culverts, riprap, pond, outlet, spillway, outlets, etc.);
- G. Include a conclusion statement verifying that the design will adequately protect public health, safety, and general welfare, and have no adverse impacts on public rights-of-way or offsite properties; and
- H. Provide construction drawings and details that include: time of concentration critical path; drainage design points; labeled improvements; permanent control measures (with design volumes); cross sections for open channels and profiles for pipes; elevations for inverts, flow lines, top of grates, orifice(s), and similar features; pipe specifications (size, material, length, slope); and outlet and spillway details.

E. *Contents of Maintenance Plan.* The maintenance plan shall include, at a minimum, details regarding:

1. The frequency of inspections;
2. The frequency and methodology for cleaning out sediment and debris;
3. The frequency and methodology for vegetation maintenance;
4. Manufacturer maintenance specifications, if applicable; and
5. The entity responsible for inspections and maintenance, and the funding source to ensure that inspections and maintenance are performed as provided in the maintenance plan.

F. *Other Required Documentation.* Based on the nature of the development, the types of improvements contemplated, and the conditions of the subject property, the County may require such other information and analysis it deems necessary to evaluate the impacts of the proposed development on drainageways, adjoining properties, and County resources.

See C.R.S. § 30-28-133(4)(b)

19. FLUVIAL HAZARD ASSESSMENT

The below information is excerpted from the Land Use Code Section 3.7.4. In the event of any inconsistency with the Land Use Code, the Land Use Code shall control.

Purpose:

1. Encourage and regulate prudent land use to promote the public health, safety and welfare of the citizens of the County;
2. Permit only such uses and activities within the fluvial hazard zone ("FHZ") that are anticipated to minimize the danger to public health, safety, welfare and property;
3. Reduce the demands for public expenditures for disaster relief, hazard mitigation, and protection and maintenance of infrastructure for structures and facilities permitted in the underlying zone district(s); and
4. Minimize disruption of commerce and governmental services, extraordinary public expenditures for protection and relief from fluvial processes, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare of the County.

Applicability: Any development within the Fluvial Hazard Zone.

1. An application for change of use;
2. An application for preliminary plat, final plat, or minor plat;
3. An application for floodplain development permit;
4. An application for building permit; or
5. An application for onsite wastewater treatment system permit approval or water or sewer connection.

Exceptions: See LUC Section 3.7.4.3.C.

Assessment means a study completed by a qualified professional that identifies existing fluvial hazards, and which may demonstrate if/how land alterations/development may increase risk of fluvial hazard to the subject property or properties upstream and downstream of the subject property.

Fluvial Hazard Buffer means erosion-prone land that is located beyond the active stream corridor, such as hillslopes and terraces, that may be susceptible to geotechnical slope failure as a result of toe erosion caused by fluvial scour. *Fluvial Hazard Zone ("FHZ")* means the area a stream has occupied in recent history, could occupy, or could physically influence as it stores and transports water, sediment, and debris during flood events.

Fluvial Hazard Assessment Requirements:

Prepared by a qualified professional fluvial morphologist, geologist, hydrologist, or engineer.

Required Application Documentation (for more information, see

<https://www.coloradofhz.com/resources>)

- 1) Identification of locations and the Fluvial Hazard Zone designation (ASC, FHB, AHZ, F,

GF, and/or D-ASC) of all proposed activities.

2) Memorandum from a qualified professional with the experience required in the Fluvial Hazard Zone Delineation Protocol that describes:

a) The types of fluvial hazards expected in the reach as well as a qualitative Fluvial Hazard Assessment as to if the proposed actions will worsen or ameliorate risks associated with the hazards in the following locations:

i) upstream reaches

ii) downstream reaches

iii) adjacent properties including those upstream, downstream, and on the opposite channel bank(s).

b) A Fluvial Hazard Assessment of the impacts of the proposed actions on: sediment continuity, sediment storage, unit stream power, unit stream power longitudinal variability, and the energy grade line through the reach(es).

3) Description of the extent to which a channel will be altered or relocated as a result of the proposed development.

4) Signed affidavit by the landowner(s) acknowledging that the property and proposed improvements are within a Fluvial Hazard Zone Overlay District along with a written commitment to openly disclose this information when selling, gifting, or otherwise relinquishing ownership of the property, in whole or in part.

20. GEOLOGIC HAZARD STUDY

The below information is excerpted from the Land Use Code Section 3.73. In the event of any inconsistency with the Land Use Code, the Land Use Code shall control.

Requirements:

Engineering Study.

1. If a subject property is known or reasonably suspected to be in a geologic hazard area, then the Director may require the applicant to provide a sites specific engineering study to:
 - a. Delineate the hazard;
 - b. Define its degree of severity;
 - c. Determine its frequency / probability of recurrence;
 - d. Evaluate the compatibility of the proposed land use;
 - e. Propose appropriate mitigation measures to reduce risks to people, property, and natural resources; and
 - f. Propose ongoing operations and maintenance programs to ensure that the mitigation measures function properly.
2. All reports and studies required by this Section shall be prepared by a “professional geologist,” as defined by C.R.S. § 34-1-01, as amended, or a “registered professional engineer,” as defined by C.R.S. § 12-25-102, as amended, under the direction of and at the expense of the applicant.
3. The extent of the site-specific investigation required shall be determined by the geologist or engineer who is responsible for the investigation; however, the investigation shall be of sufficient thoroughness and accuracy to allow such expert to certify to one of the following:
 - a. The subject property can be developed for the specific development that is proposed, without corrective engineering, engineered construction, or other mitigation or alterations;
 - b. The subject property is a geologically sensitive area, but the specific development that is proposed:
 - i. Can be constructed with corrective engineering, engineered construction, or other mitigation or alterations that mitigate the risks to the occupants of the development such that they are reasonable; and
 - ii. Will not increase the hazard to other property or structures or to public buildings, rights-of-way, roads, easements, utilities or facilities, or other properties of any kind; or
 - c. The subject property is a geologically sensitive area on which the specific proposed development is not appropriate because there are no mitigation techniques that could reduce the risks created by the geologic hazard to a reasonable level with respect to:
 - i. Occupants and property on the subject property; and
 - ii. Other property or structures, public buildings, rights-of-way, roads, easements, utilities, or facilities of any kind that are currently affected by the hazard or that would likely be affected by the hazard if the proposed

development occurred.

Effect of Study.

1. If the conclusion of the engineer or geologist performing the investigation is that the subject property can be developed for the specific building, structure, or activity proposed without corrective engineering, or engineered construction, or other mitigation or alterations, the requested approval may be granted without conditions relating to the mitigation of the areas of geologic sensitivity.

2. If the finding of the engineer or geologist performing the geologic investigation is that the subject property is a geologically sensitive area, but that corrective engineering, engineered construction, or other mitigation or alterations can be accomplished to reduce the danger to the public health and safety or to property to a reasonable level, and such mitigation does not increase the hazard to other property or structures, or to public buildings, roads, rights of way, easements, utilities, or facilities, the requested approval shall be conditional and contingent upon approval of plans for corrective engineering and engineered construction or other mitigation or alterations as identified in the report.

3. If the conclusion of the geologist or engineer performing the site-specific geologic investigation is that the subject property cannot be developed for the building, structure, or use proposed because the danger posed by the geologically sensitive area cannot be reduced or mitigated to a reasonable level, the application shall be denied.

Existing Uses Continued; Exceptions. Existing use of land, buildings, structures, or premises which are not in conformity with the provisions of this regulation may be continued, except that no building permit will be issued for the exterior expansion, alteration, or addition to existing structures in geologically sensitive areas except for windows, skylights, and other similar minor alterations, unless all of the requirements of this Section are met.

21. GEOTECHNICAL REPORT

The below information is adapted from the Land Use Code Section 4.2.2.2. In the event of any inconsistency, the Land Use Code shall control.

Purpose: The geotechnical report shall evaluate the potential impacts of adverse soil and bedrock conditions on proposed buildings, structures, pavements, drainage structures, and utilities. The objectives of the evaluation are to establish the depth to bedrock across the subject property with respect to the proposed final grades and foundation elevations of proposed buildings and structures, and to develop recommendations to mitigate the impacts of adverse soils and bedrock conditions.

Applicability: All subdivision and site plan applications except sketch plans.

Requirements:

The geotechnical report shall be prepared, certified, and signed by a professional geologist, as defined by C.R.S. § 23-41-208(1)(b). At a minimum, the report shall provide:

1. A description of the subject property, including existing vegetation, evidence of previous construction, nearby water sources, and slopes;
2. A description of the proposed construction, including site grading, anticipated maximum cut and fill depths, the types of buildings and structures planned, and any anticipated sources of water such as detention or retention ponds, lakes, or other water features;
3. Results of field and laboratory investigations and tests;
4. Graphical logs of the exploratory borings, including all measurements of moisture content, dry density, Atterberg Limits, percent passing the No. 200 sieve, measured percent swell of relatively undisturbed samples, existing surface elevations, proposed surface elevations, foundation limits, and bearing elevation limits of over-excavation, if applicable;
5. Results of laboratory tests in graphic or tabular form;
6. A geotechnical map of the area of investigation, at a suitable scale, including the proposed development's boundaries and any lots, tracts, and road alignments; the existing topography of the subject property, based upon a topographic survey performed by a professional land surveyor; the surface elevation of the bedrock beneath the subject property in the form of a contour map if not already included in the geologic reports; delineation and identification of soil types; and soil hazard areas; and
7. The date of all fieldwork was performed and a list of references and other supportive data used in the report.

22. GRADING, EROSION, SEDIMENT CONTROL

The below information is adapted from the Land Use Code Section 4.2.4.2. In the event of any inconsistency with the Land Use Code, the Land Use Code shall control.

Purpose: Ensure compliance with State and Federal regulations.

Applicability: Where development requires grading of more than one acre of land (cumulatively), a site-specific grading, erosion, and sediment control ("GESC") plan is required. The plan shall show the limits of construction, and provide for initial (pre construction), interim (construction), and final (post-construction) BMPs to control erosion and sediment. The plan shall be prepared by a Professional Engineer, Certified Professional in Erosion and Sediment Control, or other individual who possesses comparable credentials, as determined by the Director. Applicants shall self-certify and send Chaffee County Planning Department update reports every 6 months.

MINIMUM PLAN CONTENTS

A. *Potential Pollution Sources.* The GESC plan shall identify all potential pollution sources that may reasonably be expected to affect the quality of stormwater discharges associated with construction activities, including but not limited to land disturbance, vehicle tracking, loading and unloading, materials staging and storage, and concrete washout;

B. *Description of BMPs.* The GESC Plan shall describe the stormwater pollution prevention BMPs (as to erosion control, sediment control, and waste management control) that are selected to address the potential pollution sources, whether the BMPs are temporary or permanent, structural or non-structural, and when said BMPs will be installed or utilized; and

C. *Plan Sheets.* The GESC plan shall include plan sheets that, at a minimum:

1. Show the limits of construction; all areas of site disturbance, cuts, and fills; construction staging and storage areas, and the locations of temporary batch plants, if any;
2. Show the location of rivers, streams, wetlands, irrigation ditches, reservoirs, and other waterbodies; and
3. Provides separate sheets for the initial, interim, and final BMP types and placements.

Sec. 4.2.4.3 EROSION AND SEDIMENT CONTROL NEAR WATERBODIES

A. *Generally.* The following requirements shall apply to land disturbances, except agricultural activities and ditch maintenance activities, that occur within 50 feet of a waterbody. GESC plans shall demonstrate compliance with this Section.

B. *Erosion and Sediment Control Measures.* Erosion and sediment control measures shall be installed before site grading or other construction.

C. *Cut and Fill Slopes.* Where cut and fill cannot be avoided, slopes shall be designed for long term stability. Permanent vegetation shall be used as the priority approach to stabilization of cut and fill areas where slopes are less than or equal to 3:1. On steeper cut and fill slopes,

stabilization shall be attained by utilizing a combination of retaining walls, rock walls, up-slope runoff diversions, terracing, slope drains, soil nailing, mulch binders, erosion control blankets, vegetation or other measures appropriate for the specific situation.

D. *Construction De-Watering*. Construction de-watering activities will conform to CDPHE construction de-watering permit requirements.

Sec. 4.2.4.4 INSPECTION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL DEVICES

Erosion and sediment control devices shall be maintained in a manner to support their effectiveness. The applicant shall be responsible for inspection and repair of all erosion and sediment control devices after any precipitation that creates runoff. Accumulated sediment shall be removed periodically from sediment basins and traps; straw bale and silt fence barriers shall be checked for undermining and bypass, and repaired or expanded as needed; and mulched soils shall be re-mulched where mulch has been lost or damaged. The County may require the applicant to document BMP maintenance activities in a log book that may be inspected by the County upon request. Reports shall be submitted to Chaffee County every six (6) months.

23. SITE AND SOILS SUITABILITY STUDIES

Below is an excerpt from the Land Use Code Section 4.2.2. In the event of any inconsistency with the Land Use Code, the Land Use Code shall control

Sec. 4.2.1.1 PURPOSE

The purpose of this Chapter is to ensure that development is located on soils that are suitable for the type of development proposed, that drainage systems are designed in an appropriate manner, and that erosion and sediment are controlled.

Sec. 4.2.1.2 APPLICATION

This Chapter applies to all development that requires subdivision or site plan approval.

4.2.2.1 PRELIMINARY REPORT ON MAJOR FEATURES

B. *Contents.* At a minimum, the preliminary report on major features shall include:

1. Narrative and scaled maps describing streams, lakes, topography, and significant vegetation;
2. Geologic characteristics of the subject property and surrounding area that significantly affect the land use and address the impact of such characteristics on the proposed subdivision;
3. In areas of potential radiation hazard to the proposed future land use, evaluations of these potential radiation hazards;
4. A high-level overview description of the on-site and off-site drainage patterns and impacts associated with the proposed development, including potential impacts to surrounding properties, irrigation ditches and reservoirs, and existing public infrastructure; and
5. Maps and tables concerning suitability of types of soil in the proposed subdivision for the proposed uses.

24. WATER SUPPLY REPORT

The below section is excerpted from Land Use Code Section 4.3.2. In the event of any inconsistency with the Land Use Code, the Land Use Code shall control.

Purpose: All development in the County shall have access to a water supply for the development that is sufficient in terms of quality, quantity, and dependability will be available to ensure an adequate supply of water for the type of subdivision proposed, and where used for domestic purposes, meets CDPHE drinking water standards for potability. *See C.R.S. § 30-28-133(4)(c).*

Customizations and additional requirements may be applicable, if determined by the Director to meet the needs of the circumstance. For example, test wells may be required in zones of problematic groundwater, e.g. fractured bedrock.

Land Use Code - Sec. 4.3.2.5.B.2 – Water Supply Report

Where water is supplied by a water source other than an existing water system, a water supply report prepared by a County approved licensed water engineer, geologist, or hydrologist is required to determine whether the water supply proposed to serve a development is legal and adequate in terms of quantity, quality, and dependability. The water supply report shall contain an analysis of the following information:

- a. A description of the project and water estimate;
- b. A description of the legal and physical source of water supply to serve the development;
- c. If the water supply is groundwater:
 - i. A description of the aquifer, including but not limited to geologic maps, cross sections, boundaries, intakes and discharge areas, depth to water, water level contours, and estimated thickness of saturation of the aquifer; and
 - ii. Information regarding the aquifer's hydraulic conductivity, transmissivity, storage coefficient or probable yield, aquifer drawdown and recovery, and the potential for well interference.
- d. A summary of the results of the hydrologic assessment demonstrating the adequacy of the water supply to meet the estimated demand.
- e. Determination of the reliability of the water source confirming the ability to meet annual and peak demands of the proposed development under variable hydrology including normal, single dry, and 20-year drought conditions.
- f. Any proposed water demand management strategies to increase water efficiency and reduce water demand.
- g. Evidence of compliance with CDPHE Drinking Water Standard for potability.

25. APPROVAL STAMPS FOR ENGINEERS

[TBD]