



TOWN OF FRISCO
MINIMUM STREET DESIGN
AND
ACCESS CRITERIA

March 12, 2019

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I. General

A. Introduction

The purpose of this document is to specify established standard principles and practices to be used in the design and construction of streets or in Town right-of-way (unless otherwise noted) in order to provide for uniformity of streets within the Town of Frisco and to ensure the safety of the general public. Designs of streets for construction within the Town of Frisco limits shall be approved by the Town prior to construction. The design factors, formulas, and tables are intended to serve as guidelines for street design. Ultimate responsibility for actual design, however, remains with the design engineer. Sound engineering judgement must be applied. All streets shall be designed by a Colorado-licensed Civil Professional Engineer.

All new street design shall be in conformance with these design criteria unless otherwise approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria. Documents recommended for additional reference include the CDOT (Colorado Department of Transportation) Design Guide, latest edition, A Policy on Geometric Design of Highways and Streets and Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT<400) both published by AASHTO (American Association of State Highway and Transportation Officials), and ADA Standards for Accessible Design.

The Public Works Director may, from time to time as necessary, make changes to these Street Design Criteria. Prior to doing so both the Town Manager and the Town Council shall be notified and asked for any input they may have.

B. Street Classifications

The following classifications shall be utilized in determining the criteria under which a street is to be designed.

1. Alley – Provide for deliveries and back of house services to properties accessed off of another street. May also serve for access.
2. Local Streets – Provide primary access to abutting properties.
 - a. Commercial (ex. Ten Mile Drive)
 - b. Residential (ex. Lagoon Drive)
3. Collector Streets – Carry traffic from local streets to Major Arterial Streets, Highways and principle generators within the community, such as neighborhood shopping centers, schools and recreation areas (ex. 8th Avenue).
4. Major Arterial – Designed for the movement of through traffic and heavy local traffic. Arterials generally connect major traffic generators. In some instances, parking is not allowed on arterials, such as state highways (ex. Summit Boulevard).
5. Other – Main Street from Summit Boulevard to the West Frisco Interchange is unique in nature as it provides access and parking but also carries through traffic. Access directly from Main Street is discouraged.

C. Soils and Materials Testing

All soils and material testing shall be done by a soil/materials-testing firm under the supervision of a Colorado-licensed Geotechnical Professional Engineer.

For improvements made within Town ROW, soils testing and identification of the existing conditions shall be submitted to the Town with recommendations for structural sections. Structural sections shall be designed in accordance with Section III, I.

Improvements within Town ROW shall include observations and testing by a qualified Geotechnical Engineer. The testing firm will be required to provide sub-grade and road base for compaction test, materials testing of asphalt, road base, and concrete, and density tests of asphalt. All tests shall meet typical CDOT requirements for roadway construction. The Town shall be notified of any failed tests or unsuitable soils on site. Reports shall be provided to the Town promptly after preparation.

If unsuitable soils are encountered, a modified design shall be submitted by the Geotechnical Engineer to the Town for approval prior to construction.

The Town may not accept projects or may require a longer warranty period if there are test failures or testing has not been completed according to the requirements of this section or recommendations by the Geotechnical Engineer.

D. Design Speed

The choice of design speed is influenced principally by the character of terrain, type of roadway and traffic volume. A roadway in level or gently rolling terrain justifies a higher design speed than a roadway through steeper mountainous terrain.

Design speeds to be utilized for street design in the Town of Frisco are located in Table 1.

E. Right-of-Way

The width of right-of-way (ROW) required depends on the proposed future street classification, topography in the area, and other physical controls. Minimum ROW widths to be dedicated for street construction in the Town of Frisco are listed in Table 2.

Additional ROW width may be required to facilitate future widening and other improvements as traffic and development warrants it is necessary to meet side slope requirements.

F. Patching

Patching of Town streets shall require an Excavation/ROW Permit and shall follow the requirements detailed in the Excavation Ordinance of the Town Code (Chapter 87).

When new concrete (pan or curb and gutter) is added to an existing street, a minimum of two (2) feet of the existing roadway surface shall be removed and replaced to ensure a straight joint.

G. Final Acceptance

Soils and material testing results shall be provided to the Town every two (2) weeks during construction and at the end of construction. Inspection by the Town designee shall be required for asphalt, sub-base, sub-grade, and form inspection. Prior to acceptance of any new street, the sub-divider or developer shall request, in writing, inspection and acceptance by the Town and provide the Town all soils and material testing results. The Public Works Director shall inspect the street and notify the developer in writing of acceptance or non-acceptance of the street.

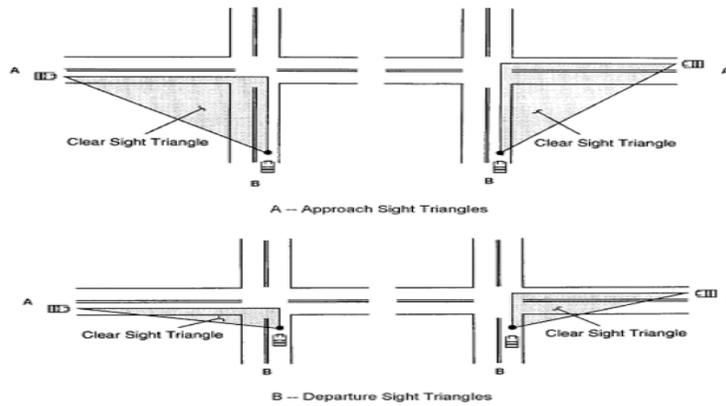
If not accepted, the notice shall identify reasons for non-acceptance so the developer may correct and re-apply. Until such time as the streets are accepted, the developer shall be fully responsible for all maintenance, including snow removal, for the street. The Town may not accept projects or may require a longer warranty period if there are failures or testing has not been completed according to the requirements of this section or recommendations by the Geotechnical Engineer.

II. Basic Design Parameters

All new street design shall be in conformance with these design criteria unless otherwise approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria. Documents recommended for additional reference include the CDOT (Colorado Department of Transportation) Design Guide, latest edition, A Policy on Geometric Design of Highways and Streets and Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT<400) both published by AASHTO (American Association of State Highway and Transportation Officials), and ADA Standards for Accessible Design.

A. Sight Distance

1. A primary consideration in the design of a street is to provide adequate sight distance for safe and efficient operation. There are two (2) types of sight distance to be considered; that required for visibility at an intersection and that required for stopping. AASHTO standards shall be met for these types of sight distances.
2. Intersection Sight Distance – Intersection sight distance is defined by AASHTO as adequate when a driver has an unobstructed view of the entire intersection and sufficient lengths of the intersection road to avoid collisions. AASHTO standards shall be met for the sight triangle. Obstructions of any type installed by private property owners are prohibited within Town ROW per Town Code Section Nos. 127-6 and 127-39.



B. Horizontal Alignment

1. *Standard for Curvature* – Table two (2) gives minimum centerline radii for curves. The table is based on design speed only. Increased radii may be required if minimum sight distances are not satisfied.
2. *Superelevation* – Superelevations shall not be used on streets within the Town.
3. *Reversing Curves* – True reversing curves are not to be used in the Town of Frisco except as noted herein. In cases where curves in opposite directions must be used, a tangent between shall be used. A minimum of fifty (50) foot tangent shall be used if at all possible between reverse curves to facilitate steering and control. Lesser tangent lengths may be considered with deflection angle curves less than ten (10) degrees.
4. *Broken Back Curves* – Broken back curves consisting of two curves in the same direction joined by a tangent less than fifty (50) feet shall not be used in the Town of Frisco, except on local streets with prior approval from the Public Works Director.
5. *Coordination with Vertical Alignment* – To avoid the possibility of introducing serious traffic hazards, coordination is required between horizontal and vertical alignment. Particular care must be exercised to maintain proper sight distances at all times.
6. *Pavement Transition* – A pavement transition is the area of variable pavement width encountered when changing from one roadway width, or section, to another. All pavement transitions shall be based on the following formula:

$$L=WS^2 / 60$$

Where: L = Length of transition or taper (in feet)

S = posted speed limit (in MPH)

W = offset in width

C. Vertical Alignment

1. *Grade Line* – The grade line is a reference line by which the elevation of the pavement and other features of the roadway are established. The grade line shall coincide with the street centerline for all streets.
2. *Grade* – The minimum and maximum grades as measured at centerline shall be one half percent (0.5%) and five percent (5%,) respectively. Steeper grades may be considered based on topography. Where allowed special consideration as to curves, solar exposure, and driveway limitations will be given. Steeper grades must be approved by the Public Works Director prior to design.
3. *Excessive Grade Changes* – Excessive grades shall not be permitted. Connections with existing streets shall be smooth transitions and existing grades shall be shown in the design for at least one hundred fifty (150) feet on all sides of a connection.
4. *Vertical Curves* – Properly designed vertical curves should provide adequate sight distance, safety, comfortable driving, good drainage, and pleasing appearance. Vertical curves in the Town of Frisco shall be parabolic curves.
5. *Intersection Grades* – Grades at intersections shall not exceed two percent (2%) at any point for one hundred (100) feet from the edge of the intersecting street, nor shall the grade exceed four percent (4%) overall for two hundred (200) feet from the same edge. Maximum grades may be increased beyond five percent (5%) for short distances in variable terrain when approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria. The through street may be up to a four percent (4%) grade through the intersection, although flattening the through street at the intersection is recommended.

III. Cross Section Elements

A. Concrete Pans, Curbs and Gutters (Concrete Drainage)

1. *General*

Minimum grade in all concrete drainage systems shall be one half percent (0.5%) measured along the flow line.

Concrete drainage systems shall be used when justified by sound engineering reasons based on the following:

- a. Where required for proper drainage.
- b. Where needed for channelization, pavement edge delineation, control of access, pedestrian safety, or other means of improving traffic flow and safety.
- c. Where vertical separation between the travel lanes and adjacent sidewalks or pathways is necessary.

2. *Types*

For specifications on types of concrete drainage systems available refer to CDOT *Standard Plans – M & S Standards*, latest edition. Refer to these types as specified in that publication on any plans submitted to the Town.

3. *Cross Pans*

- a. Cross-pans for drainage, located at stop intersections, shall be a minimum of ten (10) feet wide, six (6) inch thick concrete with six (6) inches of road base.
- b. Cross-pans are not allowed on Collector streets unless specifically approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria.
- c. Cross-pans are not allowed on Major Arterial streets.
- d. Cross-pans may be considered on alleys and local streets as a method of speed control, if properly designed and marked.
- e. Cross-pan approaches shall be designed using the appropriate design speeds as given in these specifications.
- f. Crown transitions where approaching a cross pan or an intersecting street shall be at a maximum of one percent (1%) change every twenty-five (25) feet.

4. *Location*

Where concrete drainage systems are used, street width requirements shall be measured from lip of concrete to lip of concrete. The Public Works Director shall be consulted on the type of concrete drainage to be used at any location in Town.

5. *Concrete Class and Additives* – Concrete used for concrete drainage and sidewalks shall be CDOT Class D concrete.
 - a. *Strength* – minimum of four thousand five hundred (4500) psi
 - b. *Fibers* – “Fiber Mesh” fibers or approved substitute shall be added to the concrete for strength, at the rate of one and a half (1.5) pounds of fiber per cubic yard of concrete.
 - c. *Reinforcement* – May be required when additional strength is needed.

B. Travel Lane Standards

1. *Cross Slope*

- a. Cross slope on all streets shall be a minimum of two percent (2%) measured from street centerline to edge of asphalt or concrete. In areas of minimum centerline grade, three percent (3%) shall be considered.

- b. Temporary unpaved streets shall be crowned to three percent (3%).
- c. When existing streets are overlaid, the maximum cross slope shall not exceed four percent (4%) measured as above.

2. *Width*

Street and alley asphalt widths depend on the total number of traveled lanes and their street classification. Minimums are listed in Table three (3).

C. Shoulder Standards

- 1. *Width* – The width of improved shoulder will vary with use and location. The improved shoulder shall consist of six (6) inches of compacted road base at grade with improved roadway surface. If parking is to be allowed by the Town, eight (8) foot shoulders shall be used. If parking is not allowed, two (2) foot shoulders shall be used and the roadway shall be signed and designated no parking. The decision to allow or not to allow parking shall be made by the Town.
- 2. *Side Ditches* – Side ditches shall be used in all cut sections. All roadside swales shall be sized to handle the historical one hundred (100) year storm flows tributary to the street, unless alternate routes for the major runoff are provided. Culvert sizes shall be designed to carry the one hundred (100) year historical flows. The slope from the edge of the shoulder to the bottom of the side ditch shall not exceed three to one (3:1).
- 3. *Side Slopes* – Side slopes shall not exceed two to one (2:1), unless otherwise approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria. Where slopes equal to or greater than two to one (2:1) are used, special provisions for erosion control and revegetation shall be made. Any proposal to deviate from a maximum two to one (2:1) slope shall be accompanied by a soils study identifying the slope treatment being proposed.

D. Minimum Culvert Diameters

- 1. *Size* – All culverts installed shall be sized to handle the one hundred (100) year (historical) storm flows. The minimum allowable culvert size shall be twelve (12) inches for driveways and eighteen (18) inches for culverts crossing streets or alleys. Flared end sections shall not be used unless otherwise specified by the Public Works Director.
- 2. *Cover* – Minimum cover over all culverts shall be twelve (12) inches from top of pipe to finish road grade for all culverts crossing public streets or alleys, and six (6) inches for private driveways, unless otherwise approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria. Additional cover may be required for larger culverts in accordance with the manufacturer's recommendations. Insulation may be required by the Town in cases where freezing may be a concern. Where needed for additional strength a concrete cover may be required over culverts.

3. *Type* – For all drainage systems, smooth walled high density polyethylene (HDPE) shall be used.

E. Retaining Walls

Where necessary to meet required side slope grades, walls may be utilized.

1. *Height* – Retaining walls may not exceed six (6) feet in height. If a greater height is needed, the wall must be stepped in maximum six (6) foot increments with a minimum four (4) foot shelf.
2. *Location* – Retaining walls may not be located closer than ten (10) feet from the traveled lanes (maximum separation is desired).
3. *Design* – All retaining walls over four (4) feet in height must be designed by a Colorado-licensed Civil Engineer, and are subject to Town review and approval.
4. *Materials* – the Town should be consulted prior to choosing which type of retaining wall materials will be utilized. The Town may specify which type to use since the Town will assume ownership and maintenance once constructed and accepted.
5. *Adequate ROW and Easements* - Walls shall be designed such that adequate right-of-way or easements exist or shall be provided to allow for proper maintenance and possible future replacement of all walls.

F. Guardrail

Guardrail requirements shall be as specified in the State Highway Roadway Design Manual, latest edition. Corten steel shall be used for all guardrail installations.

G. Signs

All signs and street markings shall be designed, constructed, and placed in accordance with the Manual of Uniform Traffic Control Devices (MUTCD), latest edition, of a material and installation approved by the Town.

H. Barriers

No barriers of any sort shall be allowed within the Town ROW (including all areas within ten (10) feet of roadway pavement or shoulders or curb/pan) unless approved by the Town. Landscape improvements including medians may be considered as long as adequate measures are made to protect the traveling public (such as curbs). Refer also to Town Code 127-6, prohibiting Obstructions of Public Way.

I. Pavement Design

1. *General* – Design of the pavement structure is the determination of the thickness of sub-base, bases, and surfacing to be placed over sub grade soils. The basic purpose is the selection of the most suitable, available materials and their most advantageous use.

Pavements shall be designed for a twenty (20) year life and designed by a Colorado-licensed Civil Professional Engineer.

2. *Types of Surfacing* – Bituminous pavement (asphalt) surfacing shall be used for streets in the Town of Frisco.
3. *Thickness Design* – Thickness design shall be in accordance with the procedures as outlined in the CDOT Design Guide, latest edition. All new streets constructed in the Town of Frisco must be designed per these methods or other methods acceptable to the Public Works Director.
4. *Minimum Base and Asphalt Thickness* – The pavement design shall be used unless the designed thickness is less than the minimum allowable according to the street classification found in Table three (3).
5. *Plant Mix Pavement and Base Course* – All asphalt shall be SX (PG 58-28), one half (½) inch aggregate superpave. All road base shall be CDOT Class Six (6) for areas being paved or hard surfaced (concrete) and either Class 4 or Class 5 for deeper fills. These requirements may be modified by a geotechnical report if approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria.
6. *Pedestrian / Bicycle Facilities Pavement Section* – Minimum section for pedestrian sidewalk and multi-use path shall be either four (4) inch concrete with three (3) inch compacted road base on a prepared sub-grade or three (3) inch asphalt with six (6) inch road base on prepared sub-grade.
7. *Fabrics* – The use of geotechnical fabric within the pavement section is prohibited. Fabric may be considered where appropriate, in areas of fill or areas with special soils.

IV. Other Elements of Design

A. Intersection

1. *Minimum Angle of Intersection* – Intersections shall approximate right angles as closely as possible. The minimum angle allowed for any type of intersection shall be seventy (70) degrees.
2. *Radius* – All intersections shall have a paved radius on all four corners with minimum radius as shown in Table 1.
3. *Cross Street Standard* – All local streets intersecting a Major Arterial Street shall be constructed to Collector Street standards for a distance of two hundred (200) linear feet as measured from the edge of Arterial right-of-way. This shall include street width (asphalt and base) and right-of-way width.
4. *Grades* – Grades at intersections shall not exceed two percent (2%) at any point for one hundred (100) feet from the edge of the intersecting street, nor shall the grade exceed four percent (4%) overall for the two hundred (200) feet from the same edge. Maximum grades may be increased beyond five percent (5%) for short distances in extreme terrain when approved by the Public Works Director in accordance with

Section VI, Waivers to These Criteria. The through street may be up to a four percent (4%) grade through the intersection, although flattening the through street at the intersection is recommended.

5. *Separation* – Intersections shall not occur at less than a three hundred (300) linear foot separation wherever possible. In no case shall two intersections be within two hundred (200) linear feet (edge to edge of ROW) of each other. Opposing intersections (4 way) are required when intersecting with a major road and certain intersections of two collector streets. T-type intersections have shown to be far safer than cross-type and shall be considered in the design of residential subdivisions.
6. *Intersection at a Curve* – Intersections should not be placed on a curve unless all applicable sight and stopping distances are complied with.
7. *Intersection Sight Distance* – For specifications on Intersection Sight Distance, refer to Section II.A. Sight Distance.

B. Cul-de-Sacs, and Dead Ends

1. *Cul-de-Sacs* – Cul-de-Sacs shall be permitted provided that they have a right-of-way diameter of at least one hundred fifty (150) feet; and an improved surface paved minimum ninety-nine (99) feet outer diameter and maximum forty-five (45) feet inner diameter. Maximum length of Cul-de-Sacs shall be determined by density of the development. In no case shall the maximum length exceed six hundred (600) feet.

Dead-End Streets – Dead-end streets (except for cul-de-sacs) shall be prohibited unless they are designed to connect with future streets on adjacent land that has not been platted. In such case a temporary turnaround of at least eighty (80) foot diameter shall be provided. Use of a temporary hammerhead type turn may be considered in special cases if approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria.

C. Parking Spaces

Size of Parking Stalls:

1. *30 degree to 90 degree* – The minimum size for this type of parking shall accommodate an eighteen and a half (18.5) foot by nine (9) foot rectangle within the stall.
2. *Parallel Spaces* – Shall be twenty-five (25) foot as measured along the street and eight (8) foot wide.
3. *Handicap Stalls* – Shall be a minimum of 8 foot wide by eighteen and a half (18.5) foot long, with a five (5) foot accessibility lane or eight (8) foot accessibility lane for vans. Handicap stalls placed on an angle shall accommodate an eight (8) foot wide by eighteen and a half (18.5) foot rectangle within the stall and accessibility lane as measured perpendicular to the stall. An acceptable route in compliance with ADA standards shall be provided from handicap stalls to businesses being served.

4. All parking spaces and adjacent drive aisles shall not exceed four percent (4%) grade in any direction.

D. Driveways

1. *General* – The term driveway or access are interchangeable terms and refer to the specific locations granted to properties adjacent to Town ROW for the purpose of accessing the property through the Town ROW from Town streets for all purposes including parking areas, dumpster enclosures, garages, etc.
2. *Intent of Requirements* – Driveway spacing and widths have been established for aesthetic, maintenance purposes, and safety reasons.
3. *Requirements* – A combination of these factors and others such as sight distance and safety has governed the following requirements:
 - a. *Proximity to Intersection* – Driveways accessing Town ROW near an intersection of a Major Arterial (Summit Blvd.) shall be a minimum of fifty (50) feet and for all other street classifications shall be a minimum of thirty-five (35) feet from the intersecting street ROW as measured from the nearest edge of the driveway. When this spacing cannot be achieved (for example, due to topography or lot size) effort shall be made to place the entrance as far from the intersecting ROW as possible.
 - b. *Access to Single Family* – Only one access will be allowed to single family residences. More than one access will be considered on lots with more than one street frontage when approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria.
 - c. *Parking Access* – Parking areas on private property shall be accessed by a driveway through Town ROW from the street. Driveway widths shall be in accordance with (3.e) of this section.
 - d. *Alleys* – Alleys may be used for access to an adjacent property subject to approval of the Public Works Director in accordance with Section VI, Waivers to These Criteria.
 - e. *Width of Driveways* – Driveway width shall be as set forth below and is measured within Town ROW from the ROW line to the edge of pavement, with an allowable three (3) foot angled or radial taper. All access and drive aisles are also subject to minimum widths as specified by the local fire authority.

f. Single Family Homes	g. 9 foot Minimum	h. 20 foot Maximum
i. Duplexes or Multi-Units	j. 9 foot Minimum	k. 20 foot Maximum
l. Commercial/Business	m. 12 foot (One-Way)	n. 24 foot (Two-Way)

- o. *Driveway Spacing* – No two driveways connecting to a public or private street, alley or highway shall be within thirty (30) feet of one another measured from edge of driveway to edge of driveway within the Town ROW or private street ROW. When this spacing cannot be achieved (for example, due to topography or lot size) effort shall be made to place the driveways as far apart as possible and must be approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria.
- i. When a new driveway is requested adjacent to a vacant lot, fifteen (15) foot spacing from that property line may be required. The intent is not to restrict the adjacent property owner on the location of their driveway due to the thirty (30) foot separation required.
- p. *Angle of Intersection* – All driveways shall intersect the access street at ninety (90) degrees unless otherwise approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria.
- q. *Grade* – Driveways up to eight percent (8%) in grade, with steeper grades subject to approval from the Public Works Director. Safety issues for both the driveway users and adjacent street users will be considered.
- r. *Drainage* – Facilities shall be graded for proper drainage so that surface discharge is channeled to a natural or improved drainage way without causing nuisance or damage to other properties or the improvements thereon. Proper drainage shall include the installation of such systems, including culverts and pans as necessary, which will protect all affected public rights-of-way. Drainage off driveways may not be directed onto Town street pavement.
- s. *Access to Collector and Major or Arterial Streets* – No driveways will be allowed onto collector or major arterial streets unless no other access to the lot exists. No new subdivisions shall be approved on which driveways must exit onto major arterial or collector streets, unless approved by the Town.
- t. *Heated Driveways* – Private driveways may be heated, excluding that portion extending into Town ROW to match the road edge. However, drainage from a heated driveway may not be discharged onto the Town street pavement; it must either be separated by a pan, or stop four (4) feet short of the Town street pavement.
- u. *Exemption and Conformity* – Driveways which are to be repaved (existing driveways) can be done to the previous width. Existing gravel driveways which are to be paved shall conform to these requirements.
- v. *Dumpster Access* – Dumpster enclosures shall be accessed through the same driveway allowed for access to the property. Additional width will not be allowed for the access to the dumpster enclosures adjacent to driveways within Town rights-of-way. Dumpster enclosures shall include a concrete floor, minimum of six (6) inches thick, including the area in front of the dumpster where the front wheels of a trash truck would sit while emptying the dumpster.

- w. *Main Street Access* – Driveways that directly access Main Street are discouraged and only permitted by the Public Works Director in accordance with Section VI, Waivers to These Criteria.

E. Pedestrian/Bicycle Facilities

Minimum sidewalk width shall be six (6) feet.

Minimum multi-use pathway width shall be ten (10) feet wide with one foot compacted road base shoulders six (6) inches thick on each side.

Minimum section for both shall be either four (4) inch concrete with three (3) inch compacted road base on a prepared sub-grade or three (3) inches asphalt with six (6) inches road base on a prepared sub-grade.

Concrete shall comply with requirements in SECTION III, A, 5.

Multi-use pathways shall have handicap ramps in compliance with current ADA standards.

Reduced widths for multi-use pathways may be considered where ROW widths are limited.

Detached sidewalks and multi-use paths are preferred where ROW and topography allows. If sidewalks and pathways are attached then the roadway they should be separated by either a pan or curb and gutter to provide either vertical or horizontal separation.

The Town of Frisco *Trails Master Plan*, Chapter 3 Paved Trails Typologies and Standards, should be reference as a guide to design of pedestrian and bike facilities. Specifications for design shall follow the criteria outlined in this section.

F. Temporary Unpaved Streets

Under certain circumstances, the Public Works Director may allow either a delay in final paving of a new street, or a delay in the final lift, until the following construction season to allow sufficient time for roadway stabilization or until a certain percentage of build out occurs. In those cases, all street construction up to and including base work shall be completed. Unpaved streets shall be graded to three percent (3%) crown and then re-graded and compacted as required by these standards prior to paving. Unpaved streets will not be accepted by the Town for maintenance purposes.

G. Half Streets

Half streets arise in attempting to locate street centerlines on the perimeters of subdivisions for land parcels. Constructions of half streets are not allowed in the Town of Frisco.

H. Erosion Control

Erosion control shall be in accordance with Exhibit A, the Northwest Colorado Council of Government Water Quality Protection Standards as modified for the Town of Frisco, attached to these Street Design Criteria, and the Frisco Town Code, Section 180, Article 6. The Frisco Town Code shall supersede in the event of any conflict between the two documents. Any deviation from these requirements must be approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria.

I. Traffic Signage and Traffic Calming

All traffic related signage on Town Streets or ROW shall comply with the Manual of Uniform Traffic Control Devices (MUTCD) as to size, materials and installation. Traffic Calming, including items such as speed bumps, speed humps, speed dips, and other forms of traffic calming shall be approved by the Public Works Director prior to design. Any such design must include proper consideration to street maintenance, design speed, traffic impacts including emergency vehicles, noise impacts, and neighborhood impacts.

V. Other

All new infrastructure given to the Town shall include a two (2) year warranty with appropriate security provided.

All construction plans shall include or refer to the Town of Frisco Construction General Notes, attached as Exhibit B to this document.

No barriers of any sort shall be allowed within the Town ROW (asphalt or shoulders) of any new public street, except curb and gutter, guard rails, street signs or retaining walls as approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria. Landscaped median features properly designed and approved by the Public Works Director in accordance with Section VI, Waivers to These Criteria are excepted.

Traffic control devices, such as speed bumps and humps, shall be approved by the Public Works Director prior to design. Any such design allowed must include proper design based on speeds and potential impacts to traffic and adjacent neighbors.

Any new subdivision shall have three (3) foot concrete drain pans for drainage and delineation on both sides of the roadway. If minimum grades cannot be achieved, other engineered alternatives may be considered.

Any improvements required on any portion of an existing street which serves as the access for a new development shall be designed and paid for by the developer of that new development. New and existing roadways shall be designed or improved to handle the additional traffic volume generated.

Prior to acceptance of any new street, the sub-divider of developer shall request, in writing, inspection and acceptance by the Town and provide to the Town all soils and materials testing results. The Public Works Director shall inspect the street and notify the developer in writing of acceptance or non-acceptance so the developer may correct

them and re-apply. Until such time as the streets are accepted, the developer shall be fully responsible for all maintenance, including snow removal, for the street.

Request for acceptance may only be made between April 15th and October 15th.

New streets accepted by the Town shall be warranted for a period of two (2) years from the date of acceptance. The Town shall inspect the streets prior to the end of the warranty period and notify the developer of any deficiencies identified.

Damage to Town property (e.g. pavement, signs, ground cover) as a result of construction activities shall be the responsibility of the developer/owner to repair or replace the damaged Town property at their expense to the satisfaction of the Town.

VI. Waivers to These Criteria

A. Summary

These design criteria as presented are intended to aid that design of the Engineer in preparation of plans and specifications for the Town of Frisco, including minimum standards where required. As with any set of design criteria, occasions will arise in which the criteria or minimums are inappropriate. In these cases, a waiver to these criteria may be considered by the Town, but should not be assumed.

B. Application

An application for a waiver to these criteria shall be filed with the Public Works Director. The waiver application shall be reviewed by the Public Works Director and shall only be approved upon a determination that:

1. Failure to grant the waiver would result in practical difficulty for the applicant or would make the project economically unfeasible for the applicant.
2. Granting the waiver would facilitate project maintenance; and
3. Granting the waiver would not be detrimental to public health, safety and welfare.

C. Appeals

Any decision made by the Public Works Director may be appealed in accordance with Town of Frisco Unified Development Code, Section 180-2.7.1, Appeals. For purposes of appeal under said section, reference to the Community Development Director shall be replaced by reference to the Public Works Director.

VII. Specifications

All construction methods and materials shall be in accordance with the Colorado Department of Transportation, Roadway Design Guide, and Construction Specifications, latest editions. In addition, testing in accordance with the same specifications shall also be performed.

VIII. Detailed Design Requirements

Design Drawing Requirements

All construction plans, pertaining to this Street Design Criteria, designed for construction in the Town of Frisco must meet the following criteria:

1. Twenty-four (24) in by thirty-six (36) inch blue line prints.
2. One (1) inch = fifty (50) feet horizontal and one (1) foot = five (5) foot vertical or one (1) foot = twenty (20) foot horizontal and one (1) inch = two (2) foot vertical.

(Larger scales will be considered.)

Any construction plans, pertaining to this Street Design Criteria, designed for construction in the Town of Frisco shall contain the following information:

1. Scale.
2. North arrow.
3. Plan view of all streets.
4. Grades.
5. Profiles or existing ground and proposed street at centerline (existing ground dashed).
6. Length of vertical curves, BVC's EVC's and PIV's.
7. Culverts including location, size and slope, and minimum cover.
8. Crosspans including location, size and slope.
9. All other structures.
10. Existing and proposed utility locations and elevations.
11. Existing and proposed signage.
12. Bench Mark, located within one thousand (1,000) feet of the street, tied to USGS datum, and referenced to the Town GIS datum (Colorado State Plane Central Zone NAD '83(92) coordinates).
13. Horizontal curve data including radii, delta angles, bearing, distances, centerline stations at one hundred (100) foot intervals, and BC and EC stationing.
14. Right-of-way widths.
15. Street cross sections for all typical sections.

16. Street names, including all intersections.
17. Flow arrows showing direction of drainage.
18. Existing and finished grade contours, two (2) foot spacing (one (1) foot spacing may be requested for more detail in flat areas).
19. Complete design drawings for all structures, such as bridges and box culverts.
20. Stamp and signature of the Colorado-licensed Professional Engineer under whose direction the plans were prepared.
21. Soils report (where required).

**Table 1
Design Speeds**

<u>Street Type</u>	<u>Design Speed (MPH)</u> <u>(see note)</u>	<u>Minimum Centerline</u> <u>Radius</u> <u>(in feet)</u>	<u>Minimum Tangent</u> <u>Between Curves</u> <u>(in feet)</u>
LOCAL	25	75	50
COLLECTOR	35	300	150
ARTERIAL	35	300	150

NOTE: Design speed is not necessarily posted speed.

**Table 2
Intersection Design**

<u>Design Topic</u>	<u>Street Type</u>			
	<u>Alley</u>	<u>Local</u>	<u>Collector</u>	<u>Arterial</u>
Minimum Curb or Edge of Asphalt Radius (in feet)	25	30	30	40

**Table 3
Street Classifications/Design Specifications**

<u>Street Type</u>	<u>Minimum Dedicated</u> <u>ROW (in feet)</u> <u>(see note 1)</u>	<u>Minimum Paved</u> <u>Width (in feet)</u>	<u>Minimum Allowable</u> <u>Base and Asphalt</u> <u>(see notes 2, 4)</u>
ARTERIAL	100	36 foot paved	4 inch asphalt 5 inch base
COLLECTOR	80	36 foot paved	3 inch asphalt 4 inch base
LOCAL (COMMERCIAL)	60	30 foot paved	4 inch asphalt 5 inch base
LOCAL (RESIDENTIAL)	60	24 foot paved	3 inch asphalt 4 inch base
ALLEYS	40	20 foot paved	3 inch asphalt 4 inch base
CUL-DE-SACS	75 radius	45 foot radius	3 inch asphalt 4 inch base

NOTES:

1. Required right-of-way may be modified in some cases by the Public Works Director.
2. Asphalt mat to be placed in two (2) lifts unless total pavement design is three (3) inches, in which case one lift may be considered.
3. Paving fabric will not be allowed, geotechnical fabric preferred depending on soils testing.