SECTION 300 - DESIGN CRITERIA

Section 300 explains the design standards used to shape safe, reliable, and well built roads throughout Kootenai County. It outlines the basic rules for how roads are classified, how wide they should be, how they should curve and slope, and what features—like drainage systems, signs, guardrails, bridges, and bike or pedestrian paths—may be needed to keep people safe.

These standards provide a framework for building each road, whether in a neighborhood, in the country, or part of a major route, using consistent practices and nationally recognized safety guidelines. By following these requirements, developers and engineers help the Highway Districts create roads that work well for drivers, walkers, bike riders, emergency responders, and future maintenance crews.

This section is generally divided as follows:

- Sub-Sections 301-304: Geometric Design Criteria
- Sub-Sections 305-306: Sight Distance and Cross-Sections
- Sub-Sections 307-308: Drainage and Structural Requirements
- Sub-Sections 309-312: Traffic Control and Multimodal Facilities

301. GENERAL DESIGN CRITERIA

301.01 All designs shall be based on criteria listed in the Highway Standards for the Associated Highway Districts (AHDS). The AHDS are based on the manuals and references listed below and are referenced throughout Section 300. In the event of a conflict, the Highway District Standards shall take precedence. Prior to designing any roadway, the Design Criteria Matrix (Appendix 1) must be completed by a qualified engineer and submitted to Highway District to demonstrate conformance with the AHDS. Any variance from these Standards and/or use of other standards or design criteria must be submitted and reviewed in accordance with Section 500 of these Standards prior to use.

- AASHTO A Policy on the Geometric Design of Highways and Streets
- AASHTO Roadside Design Guide
- AASHTO Bridge Design Manual
- AASHTO Guide for the Development of Bicycle Facilities
- AASHTO Manuals as appropriate and not listed herein
- Idaho Department of Environmental Quality (IDEQ), Stormwater Best Management Practices
- Idaho Transportation Department (ITD) Standard Drawings & Standard Specifications
- ITD Traffic Manual
- Idaho Standards for Public Works Construction (ISPWC) Standard Specifications and Standard Drawings
- Local Highway Technical Assistance Council (LHTAC) Manuals
- MUTCD (Manual on Uniform Traffic Control Devices)
- Public Right-of-Way Accessibility Guidelines (PROWAG)

302. ROADWAY CLASSIFICATION

302.01 Roadway classification affects design width, speed, drainage and other design elements. All roadways within each Highway District shall be classified in accordance with the current version of the Federal Highway Act. All roads shall be classified as Principal Arterial, Minor Arterial, Major Collector, Minor Collector, or Local Residential Roads.

303. PUBLIC RIGHT-OF-WAY

303.01 Arterial routes shall have a right-of-way between 80 and 120-feet in width.

303.02 Collectors shall have a right-of-way width of between 60 and 120-feet.

303.03 Local residential roads shall have a right-of-way width of between 60 and 80-feet.

303.04 Right-of-way for future connectivity of local public roads shall be provided. Additionally, roads providing access to 30 or more properties shall have multiple points of access from another public roadway.

Why It Matters:

Adequate right-of-way preserves space for future roadway improvements, drainage facilities, utilities, and maintenance activities. Securing needed right-of-way during development is often far less costly than acquiring it after development occurs

303.05 All routes and cul-de-sacs shall include additional right-of-way or easement as needed to accommodate cut and fill sections. There shall be a perpetual and exclusive minimum 10-foot roadway, drainage, and utility easement granted to the Highway District on each side of the right-of-way in addition to the right-of-way widths required. Cul-de-sacs shall have a minimum right-of-way radius of 60-foot with additional right-of-way or easement as needed to accommodate snow storage area. Cul-de-sacs of a temporary nature may be allowed providing each right-of-way is shown on the plat and approved by the Highway District. A standard cul-de-sac layout is shown in Appendix 1.

Why It Matters:

A snow storage area is needed at the turnaround to provide a designated area for plowed snow while keeping the turnaround clear and fully accessible for vehicles.

303.06 All intersecting rights-of-way lines at road intersections shall be connected by a curve having a minimum radius of 30 feet. All intersecting rights-of-way lines at cul-de-sac bulbs and private driveway approaches shall be connected by a curve having a radius of 20 to 30 feet or as directed by the Highway District.

304. ALIGNMENT AND PROFILE

304.01 Centerline horizontal and vertical alignments and superelevation rates must comply with latest edition of *AASHTO's Policy on Geometric Design of Highways and Streets* (Green Book), based on the agency's designated roadway classification and speed. Design engineers must also place the centerline profile of roads above the surrounding ground in flat and rolling terrain, as defined in these Standards.

Why It Matters:

Horizontal and vertical alignment decisions affect roadway safety, snow removal operations, drainage performance, maintenance costs, and emergency vehicle access.

304.02 Design speed will be defined by master plan documents, Director, or the provisions of Idaho Code Title 49, which established statutory speed limits and authorizes local agencies to modify speed limits based on engineering and traffic investigations and roadway conditions. If defined by AASHTO Green Book, the design speed shall be selected using the appropriate minimum design speed table based on roadway functional classification, terrain, design vehicle volume, and rural or urban context, and must be approved by the Highway District.

304.03 Vertical grades must range from a minimum 0.5% to a maximum 6% for all roadway classifications, whether urban or rural. On local roads and collectors in mountainous terrain (see definition in Section 150), vertical grades exceeding 6% may be considered with prior District approval through the varience process (See Section 500). Roadway alignments must prioritize safety and long-term maintenance and should not be placed on steeper portions of a property solely to justify the use of a Mountainous Terrain standard. Where Mountainous Terrain cannot reasonably be avoided, the Director may allow for vertical grades up to 10%.

304.04 Vertical crest and sag curves must conform to the AASHTO Green Book for the roadway design speed. See K-value definition in 305.02.

304.05 Superelevation rates and minimum centerline radii must conform to the current AASTHO Green Book table for Minimum Radii for Design Superelevation Rates, Design Speeds, and

emax = 6%, using Superelevation Distribution Method 5. Method 5 shall be used for all roadway classifications unless specifically permitted below.

Superelevation Distribution Method 2 may only be used on local roadways with design speeds of 25 mph or less and with frequent driveway access and urban-type development patterns, such as subdivisions with predominantly lots less than 1-acre in size.

- Where Method 2 is used, superelevation rates and minimum radii may utilize the AASHTO Green Book table for Minimum Radii for Low-Speed Streets in Urban Areas. When using Superelevation Method 2, the maximum applied superelevation rate shall not exceed 2.0 percent.

304.06 Approach skew angle (See Section 150 for definition) – must be between 75-degrees and 90-degrees.

304.07 Where future conditions prohibit a signalized intersection, stop controlled intersections may interpolate design speed, referencing AASHTO, to a stop condition.

304.08 Where development occurs within an Area of City Impact or High-Density Residential Zoning, the District will defer to City Roadway or AASHTO Urban Design Standards.

305. STOPPING AND PASSING SIGHT DISTANCE

305.01 The stopping and passing sight distances and crest and sag vertical curves shall have sufficient lengths to conform to the AASHTO Green Book for the designated design speed.

305.02 K-value is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve, which will provide minimum sight distance or passing distance.

305.03 According to the AASHTO Green Book (latest edition), the following values are assumed in sight distance design:

a. Driver's eye height: 3.50 feet for computation of stopping sight distance and passing sight distance.

b. Object height: 3.50 feet for computation of passing sight distance and 2.00 feet for computation of stopping sight distance.

c. Perception/reaction time: assumed equal to 2.5 sec(s) for stopping sight distance.

306. ROADWAY CROSS SECTION

306.01 The Roadway Standard Drawing sheets in Appendix 1 depict the cross-section characteristics for arterial, collector, and local residential roads. The pavement width is exclusive of the pavement requirements for bike/pedestrians, for paved shoulders, or widening on corners. The pavement width for the class of road will be set by the individual Highway District. The individual Highway District may also require bike/pedestrian paths, paved shoulders and/or pavement widening on corners (on narrow roads, on tight radius curves, or on roads with 5 percent or greater truck traffic).

306.02 Curb and gutter section d may be required on subdivisions with a density equal to or greater than one home per acre. Individual Highway Districts shall make that determination at the time of Plat Review by the Highway District and roadway sections will reference nearest and/or most applicable City standards.

306.03 Bicycle and pedestrian paths, new and extensions, may be required by the Highway District for new developments and on major roadway reconstruction projects in accordance with Highway District, Kootenai Metropolitan Planning Organization, Idaho Transportation Department, and local City Master Plans.

306.04 All bike and pedestrian projects should be designed to meet Americans with Disabilities Act (ADA) accessibility standards and American Association of State Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (Green Book) guidelines whenever possible.

307. DRAINAGE

307.01 All work within a public right-of-way or on adjacent land that drains to public right of way shall comply with all applicable federal, state, and local stormwater rules and regulations. All work within a public right-of-way shall comply with the stormwater requirements of the respective Highway District.

Why It Matters:

Improper drainage is one of the leading causes of premature roadway deterioration.

307.02 All drainage for the development shall be designed by a Professional Engineer licensed in Idaho. Drainage plans shall be reviewed and approved by the Highway District in conjunction with the roadway plans. The minimum design storm for culvert sizing will be the 50-year event unless otherwise directed by the District. Culverts must be sized to accommodate the design storm to provide adequate drainage capacity, protect roadway infrastructure, and maintain safe roadway operations during storm events. Any disruption of the normal drainage pattern of the area to be developed must have special consideration to facilitate future drainage of this area. It shall be the responsibility of the Developer to secure a Grading Permit from Kootenai County and to comply with the following requirements from the Highway Districts:

a. Permittees shall cover the cost for monitoring any/all stormwater discharge.

307.03 Roadway drainage culverts shall be corrugated galvanized steel, corrugated aluminized steel, polymer coated steel or corrugated high-density polyethylene pipe (HDPE) Type C (Corrugated) or Type S (Smooth) with approval from the Highway District. At the discretion of the Director, soil and water lab testing may be required to confirm pH and resistivity. HDPE pipe specifications must be submitted with bury and cover details to the Highway District for approval.

Corrugated metal pipe shall have 2 2/3 inch x1/2-inch corrugations. Culverts or multiple installations larger than 36 inches in diameter or any

structure under fills greater than 5 feet in height shall be designed by a Professional Engineer licensed in the State of Idaho.

All culvert installations shall be in accordance with the manufacturer's requirements. Provide a copy of the installation requirements to the Highway District for review and approval prior to culvert installation. Special ditch grading may be required for culverts over 12 inches in diameter and for polyethylene culverts to maintain the cover and the flow line.

307.04 Culverts under all roadways shall be a minimum of 18 inches in diameter until a length of 70-feet is reached. All culverts over 70-feet in length shall be 24-inches or more in diameter as required to accommodate the design flow. Culverts under driveway approaches shall be a minimum diameter of 12 inches, and a minimum length of 40 feet (or as directed by the Highway District). Culverts 18 inches in diameter and greater require aprons.

307.05 All necessary drainage easements for maintenance of drainage paths and structures shall be shown and recorded on the plat. Drainage easements necessary for draining stormwater across private property shall be shown on the plat with language requiring the underlying property owner to maintain said easement in a manner that will not impede or change the water conveyance.

307.06 Disruption of natural drainage paths and subsequent use of the roadway ditch to convey the natural drainage will not be acceptable.

307.07 Drywells may be required at the discretion of the Director. If required, drywells will be constructed to the standards as shown in Appendix 1. It shall be the responsibility of the Developer to secure all permits and pay all fees for installation of the drywells.

307.08 When a curb and gutter roadway section is proposed, a complete storm sewer system must be designed and constructed under the supervision of a Professional Engineer licensed in the State of Idaho.

307.09 The increase in runoff rate generated by developments shall comply with any and all applicable Kootenai County ordinances. The developer shall be responsible for obtaining all necessary permits. Copies of all permits must be submitted with improvement plans for review by the Highway District. Perpetual maintenance of the stormwater by the development must be on file at the Highway District before a development or a final plat can be formally reviewed and/or accepted.

308. STRUCTURES

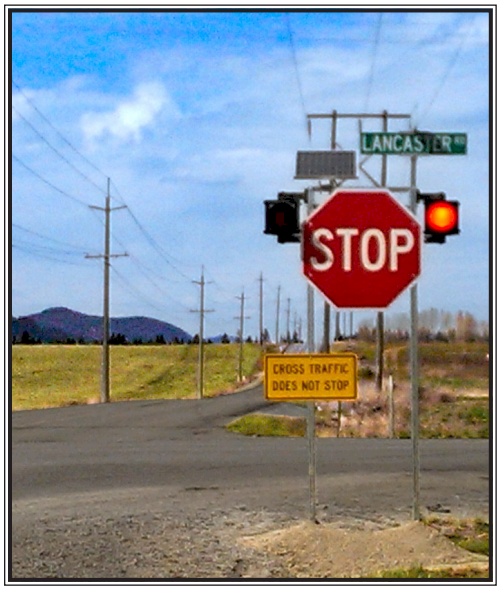
308.01 Bridge structures, structures 20 feet in length or longer, shall be designed in accordance with 1) *"Standard Specifications for Highway Bridges"*, latest edition, with supplements thereto prepared by the American Association of State Highway and Transportation Officials and 2) *Idaho Transportation Department Bridge Design Manual*, latest edition. The minimum width of a bridge structure from the face-to-face of curb or the face-to-face of the guardrail or bridgerail should match the width of the approach roadway guardrail. Only structures of steel or reinforced concrete shall be used.

Why It Matters:

Bridges and retaining walls are often among the most costly transportation assets to construct and maintain. Sound design protects public safety while reducing long-term ownership costs.

308.02 Retaining walls shall be reinforced concrete, bin walls, or concrete crib walls or other approved retaining wall system. All retaining wall structures shall be designed by a Professional Engineer licensed in the State of Idaho and shall be approved by the applicable Highway District prior to construction.

309. SIGNING, TRAFFIC CONTROL, AND CONSTRUCTION



309.01 All construction traffic control and permanent signing shall be included in the design plans, shall be in conformance with the Manual on Uniform Traffic Control Devices (MUTCD) latest edition, and be installed by the developer in accordance with the MUTCD.

309.02 Sign-posts shall be metal square tubing Type E-1 with Type E-1 anchor post sleeve or 4 x 4 treated wood to be decided by each Highway District. See Appendix 1 for standard drawing.

309.03 Special signing requested by other agencies or adjacent landowners shall meet MUTCD standards and shall be approved by the Highway District. Signs and posts placed within the clear zone shall not be constructed in a manner that creates a safety hazard.

310. GUARDRAIL

310.01 Guardrail may be necessary in certain areas depending upon the warrants for protecting the traveling public. The Highway District reserves the right to determine the need for guardrail under each separate circumstance. The warrants for determining the need for guardrail shall be made using the *Idaho Transportation Department Design Manual* or using the American Association of State Highway and Transportation Officials (AASHTO) *Roadside Design Guide for Selecting, Locating, and Designing Traffic Barriers*, latest edition.

310.02 The type of guardrail to be installed shall be approved by each individual Highway District as the location dictates.

311. PAVEMENT MARKINGS

311.01 Each Highway District will determine where pavement markings will be required. Should centerline markings or other pavement markings be required, they will be constructed in accordance with the *Manual on Uniform Traffic Control Devices for Streets and Highway*s, latest

edition. The spacing, location, and width of markings will be determined on an individual basis by the appropriate Highway District. Paint quality shall meet the same requirements as specified by the Idaho Transportation Department for their pavement markings.

312. BICYCLE AND PEDESTRIAN PATHWAYS

312.01 Alternative forms of transportation, including walking, bicycle riding, and bus transportation are encouraged. Each Highway District will consider each of these forms of transportation when reviewing a new development or road improvement project. Improvements to extend routes or provide additional linkages or safety will be evaluated as necessary to meet adjacent City Master Plans, Kootenai Metropolitan Planning Organization's (KMPO) Regional Transportation Master Plan or other adopted plans.

313. APPROACHES

313.01 Turn lanes, traffic signals, and other traffic control features in new developments shall be designed by a licensed Professional Engineer registered in Idaho.

Why It Matters:

The majority of roadway conflicts occur where vehicles enter, exit, or cross traffic. Proper access spacing and turn lane design improve safety while maintaining roadway mobility for all users

a. For Safety, turn lanes shall be installed at all new or modified approaches (including driveways – see Section 350) based on the following traffic volumes:

RIGHT TURN LANES[1]		LEFT TURN BY-PASS LANE[2]		LEFT TURN LANE[2]	
Through Volume, vph[3]	Turn Volume[4]	Opposing Through Volume, vph	Turn Volume	Opposing Through Volume, vph	Turn Volume
200	5	50	5	200	5
				100	5>19
				50	20 or more

1. Source, NCHRP Report 279, Table 4-7 (Idaho)

2. Source, NCHRP Report 745, Table 1

3. 10% of the Average Daily Traffic Volume.

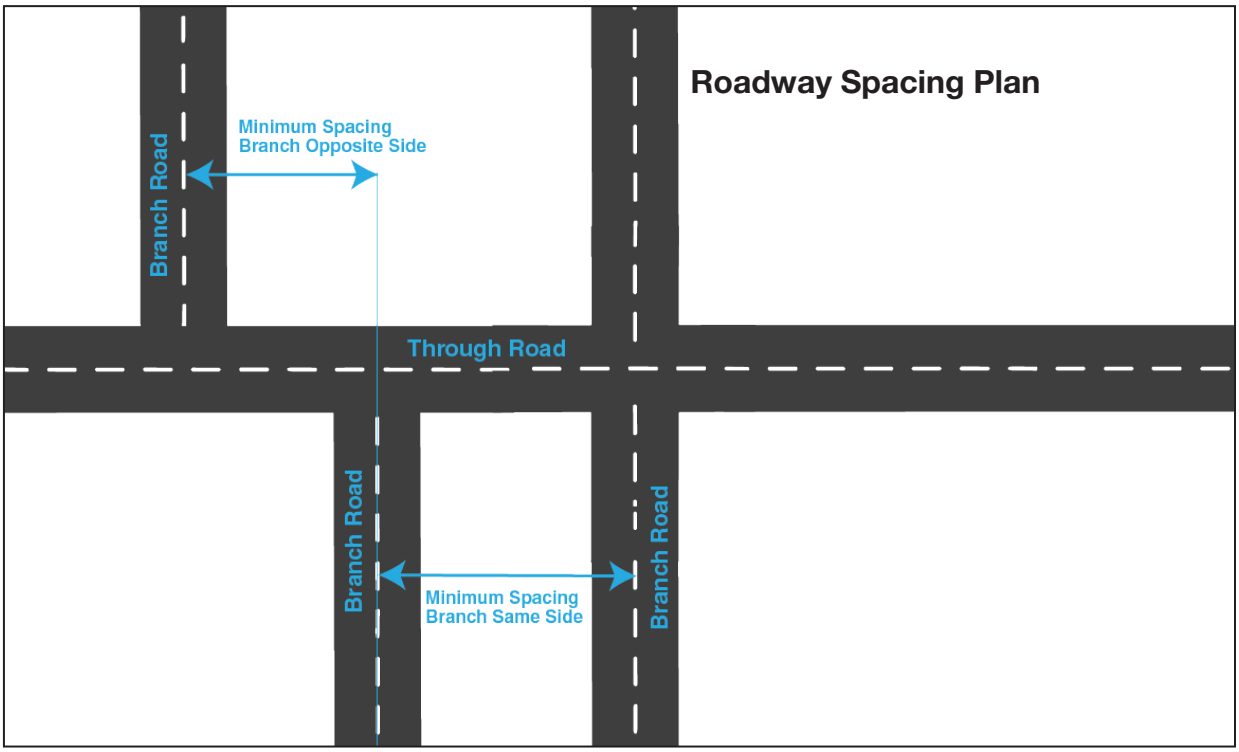
4. 10% of the total estimated Home-Based Trips

Turn lane warrants shall be performed for baseline and all future scenarios.

See the current ITD Traffic Manual for turn lane layout and pavement markings requirements.

Approach trip generation shall be based on current edition of the ITE Trip Generation Manual.

313.02 Roadway Spacing: See Table below for roadway spacing requirements on rural roadways.



Rural Roadway Spacing Table

Through Road	Branch Road	Minimum Spacing Branch on same side of Through Road	Minimum Spacing Branch on opposite side of Through Road
Major Arterial	Arterial	5,280	5,280
	Collector	2,640	2,640
	Local	No Direct Access	No Direct Access
Minor Arterial	Arterial	2,640	2,640
	Collector	1,320	1,320
	Local	No Direct Access	No Direct Access
Major Collector	Collector	1,320	660
	Local	660	330
Minor Collector	Collector	1,320	660
	Local	660	330
Local Road	Local	660	330

For Urban Spacing within an ACI, defer to City Requirements